SYLLABUS

1. Data about the program of study

1.1 Institution	Technical University of Cluj-Napoca
1.2 Faculty	Faculty of Electronics, Telecommunications and information Technology
1.3 Department	Communications
1.4 Field of study	Electronic Engineering, Telecommunications and Information Technologies
1.5 Cycle of study	Bachelor of Science
1.6 Program of study / Qualification	Telecommunications Technologies and Systems / Engineer
1.7 Form of education	Full time
1.8 Subject code	TST-E54.10

2. Data about the subject

2.1 Subject name			Multimedia Technologies				
2.2 Subject area			Theoretical area Methodological area Analytic area				
2.3 Course responsible			Assoc. Professor Bogdan ORZA, Ph.D, Bogdan.Orza@com.utcluj.ro				
2.4 Teacher in charge with laboratory / project			Madalina MOISA, Ph.D student, Madalina.Moisa@com.utcluj.ro				
2.5 Year of study	IV	2.6 Semester	8	2.7 Assessment	V	2.8 Subject category	DS/DO

3. Estimated total time

3.1 Number of hours per week	5	of which: 3.2 course	2	3.3 seminar / laboratory	3
3.4 To Total hours in the curriculum	70	of which: 3.5 course	28	3.6 seminar / laboratory	42

Distribution of time	hours
Manual, lecture material and notes, bibliography	25
Supplementary study in the library, online specialized platforms and in the field	10
Preparation for seminars / laboratories, homework, reports, portfolios and essays	14
Tutoring	3
Exams and tests	3
Other activities:	-

3.7 Total hours of individual study	55
3.8 Total hours per semester	125
3.9 Number of credit points	5

4. Pre-requisites

4.1 curriculum	N/A
4.2 competence	N/A

5. Requirements

5.1. for the course	Location: Amphitheater Classroom, Cluj-Napoca
5.2. for the seminars / laboratories / projects	Location: Lab Classroom, Cluj-Napoca

6. Specific competences

Professional competences	**C4. Design, implementation and operation of data, voice, video and multimedia services. This is based on the understanding and the application of fundamental concepts in telecommunications and transmission of information** C4.2 Solving practical problems using general knowledge of multimedia techniques C4.3 Explanation and interpretation of the main requirements and specific approach techniques for data, voice, video, multimedia transmissions C4.3 Solving practical problems using general knowledge of multimedia techniques C4.4 Use of the main specific parameters in evaluations based on the concept of quality of service in communications C4.5 Development of simple communications services **C5. Selecting, installing, configuring and operating fixed or mobile telecommunications equipment. Equipping a site with usual telecommunications networks**
Transversal competences	N/A

7. Discipline objectives (as results from the key competences gained)

7.1 General objective	To develop professional competencies for the use of multimedia technologies in the telecommunications industries.
7.2 Specific objectives	1.To gain theoretical and practical knowledge in multimedia information and data types, together with their manipulation in practical contexts of usage 2. To gain knowledge in compression standards applied to multimedia information and data 3. To identify the main types of multimedia applications: mobile, desktop-based, web-based, as well as processes involved in multimedia applications development using multimedia tools

8. Contents

8.1 Lecture (syllabus)	Teaching methods	Notes
1. Introduction to multimedia systems. Multimedia information types	Presentation, heuristic conversation, exemplification, problem presentation, teaching exercise, case study, formative evaluation	Use of .ppt presentation, projector, blackboard
2. Colour in multimedia applications.		
3. Text and Fonts in Multimedia		
4. Static and dynamic images. Sound and speech		
5. HDR imaging		
6. Video and Image compression and coding (I)		
7. Video and Image compression and coding (II)		
8. Image compression standards		

9. Video compression standards		
10. Videoconference systems		
11. Computer generated graphics		
12. Techniques for multimedia content aquisition and transmission		
12. Trends in multimedia content		
14. Revision. Preparation for the final exam.		

Bibliography
1. A.Vlaicu, V. Dobrota, S. Iacob – Tehnologii multimedia: Sisteme, Reţele şi Aplicaţii – UT Cluj, 1997
2. B. Orza – Sisteme de comunicaţii multimedia – în curs de editare (2007)
3. F. Fluckinger – Understanding Networked Multimedia: Applications and Technology, Prentice Hall 1995
4. William Horton, Katherine Horton, "E-Learning Tools and Technologies", Wiley Publishing Inc., 2003,
5. B.E. Usevitch, "A tutorial on Modern Lossy Wavelet Image Compression: Foundations of JPEG200", IEEE Signal Processing Mag., September 2001, Vol.18, No.5
6. D. Taubman, M.W. Marcellin, „JPEG 2000: Image Compression Fundamentals, Practice and Standards", Kluwer Academic Publishers, Dordrecht, 2001

On-line references
7. PORTAL Office 365 -TEHNOLOGII MULTIMEDIA

8.2 Seminar / laboratory / project	Teaching methods	Notes
1.Studio lighting scenarios and HDR imaging	Practical tasks in dedicated software environments, presentations, practical assistance, group discussions	Not applicable
2.Panoramic imaging		
3.2D/3D Graphics		
4. 3D graphic interaction environments (I)		
5. 3D graphic interaction environments (II)		
6. Collaborative video systems		
7. Project presentations		

Bibliography
1. I.P. Stroe, A. Ciupe, S. N. Meza, and B. Orza, "FireEscape: a Gamified Coordinative Aproach to Multiplayer Fire-Safety Training," in *Proceedings of 2019 IEEE Global Engineering Education Conference (EDUCON)*, 2019, pp. 1316–1323, ISSN: 2165-9567.
2. A.Pasca, A. Ciupe, S. Meza, and B. Orza, "Acquisition Modeling for Optimal Indoor Panoramic Imagery," in *Proceesings of* 2018 *13th International Symposium On Electronics And Telecommunications (ISETC)*, 2018, pp. 297–300, ISSN: 2475-787X.
3. A.Salomia, A. Ciupe, S. Meza, B. Orza, and G. Trifan, "Assistive AR Technology for Hearing Impairments in Driving Lessons," in *Proceedings of 2018 IEEE International Conference On Automation, Quality And Testing, Robotics (AQTR)*, 2018, ISSN: 1844-7872.
4. A.Muresan; A. Ciupe; S. Meza; B. Orza. „3D configurator for portrait lighting simulations", *in Proceesdings of 2017 XXVI International Conference on Information, Communication and Automation Technologies (ICAT)*, 2017, pp.1-4, ISBN 978-1-5386-3337-3.
5. C.Malinchi; A. Ciupe; S. Meza; B. Orza. „A Mobile Exploration Solution for Virtual Libraries in Higher Education", 2017 *IEEE 17th International Conference on Advanced Learning Technologies (ICALT)*, 2017, pp.490 – 492, ISSN: 2161-3761.

On-line references
6. PORTAL Office 365 -TEHNOLOGII MULTIMEDIA

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The discipline content and the acquired skills are in agreement with the expectations of the professional Competences acquired will be used in the following COR occupations (Electronics Engineer; Telecommunications Engineer; Electronics Design Engineer; System and Computer Design Engineer; Communications Design Engineer) or in the new occupations proposed to be included in COR (Sale Support Engineer; Multimedia Applications Developer; Network Engineer; Communications Systems Test Engineer; Project Manager; Traffic Engineer; Communications Systems Consultant).

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	The level of acquired theoretical knowledge and practical skills	2 evaluation tests (answers to theoretical questions)	T - 50%
10.5 Seminar/ Laboratory	The level of acquired knowledge and abilities	2 evaluations - Portofolio - based for the laboratory activity (50%) - Project - based (50%)	P - 50%
10.6 Minimum standard of performance			

Qualitative standards:

Fundamental knowledge in:
- ✓ *Multimedia content types, acquisition/transmission/representation and presentation of multimedia content.*
- ✓ *Multimedia content applicability to interactive environments*

Minimal skills:
- ✓ *To characterize multimedia content properties*
- ✓ *To describe compression and coding standards for various transmission scenarios*
- ✓ *To determine optimal parameters for image and video content acquisition in different physical environments based on applicability in interactive and static environments.*

Quantitative standards:
- ✓ *To conduct the practical activities within the laboratory sessions*
- ✓ *Passing grade for both laboratory and exam >= 5*
- ✓ *Final grade = 0,8*Exam grade+0,2*Laboratory grade*

Date of filling in:	Responsible	Title Surname NAME	Signature
29.09.2020	Course	Assoc. Professor Bogdan ORZA, Ph.D	
	Applications	Madalina MOISA, Ph.D student	

Date of approval in the Department of Communications 30.09.2020	Head of Communications Department Prof. Virgil DOBROTA, Ph.D.
Date of approval in the Council of Faculty of Electronics, Telecommunications and Information Technology 30.09.2020	Dean Prof. Gabriel OLTEAN, Ph.D.