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-E44.00

2. Data about the subject

2.1 Subject name	Television						
2.2 Subject area	Theoretical area Methodological area Analytic area						
2.3 Course responsible	Assoc. Professor Șerban Nicolae MEZA, PhD – Serban.Meza@com.utcluj.ro						
2.4 Teacher in charge with seminar / laboratory / project	Assist. Prof. Aurelia CIUPE, PhD – Aurelia.Ciupe@com.utcluj.ro						
2.5 Year of study	IV	2.6 Semester	1	2.7 Assessment	EXAM	2.8 Subject category	DD/DI

3. Estimated total time

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 seminar / laboratory	2
3.4 To Total hours in the curriculum	56	of which: 3.5 course	28	3.6 seminar / laboratory	28

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	28
Tutoring	3
Exams and tests	3
Other activities:	-

3.7 Total hours of individual study	69
3.8 Total hours per semester	125
3.9 Number of credit points	5

4. Pre-requisites (where appropriate)

4.1 curriculum	N/A
4.2 competence	N/A

5. Requirements (where appropriate)

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	C2.2 Explanation and interpretation of the signal acquisition and processing methods C2.4 Use of specific methods and tools for signal analysis C3.5 Project development using hardware (processors) and software (programming) C4.1 The identification of the fundamental concepts related to the information transmission and analog and digital communications C4.3 Explaining and interpreting the main requirements and approach specific techniques for transmissions of data, voice, video and multimedia C6.5 Elaboration of low / medium complexity projects regarding emission-reception equipment
Cross competences	CT1 - Methodical analysis of the problems encountered in the field, identifying the elements for which there are established solutions, in order to ensure the fulfillment of professional tasks CT3 - Adaptation to new technologies, professional and personal development, through continuous training using printed documentation sources, specialized software and electronic resources in Romanian and, at least, in a foreign language

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

7.1 General objective	Developing professional competencies in the field of television and video systems engineering
7.2 Specific objectives	1. Acquire general theoretical knowledge about the structure of the television signal 2. Acquire general understanding of the technologies used in video sensors and video rendering devices 3. List main standards that apply to television and video signal 4. Gain the ability to use dedicate software and hardware solutions for video editing and processing 5. Analyze and understand 3D image and video-based systems

8. Contents

8.1 Lecture (syllabus)	Teaching methods	Notes
C1: Television and Video Systems Fundamentals	Presentation Open discussion, Examples Study cases	Video projector, interactive board, internet access
C2: Video and TV Signal Structure		
C3: Color in Video and TV		
C4: Video and Television standards. Storing and Transmitting Video.		
C5: Digital Television Fundamentals		
C6: Video Sensors and Sources (I). Sensor Technologies		
C7: Video Sensors and Sources (II). Camera Processing		
C8: Video Rendering Devices (I).		
C9: Video Rendering Devices (II).		
C10: 3D Video Acquisition and Processing		

C11: 3D Video and Immersive Rendering		
C12: Dedicated AV Equipment		
C13: Interfaces and Inter-connections in Video and TV		
C14: Emerging Video and TV Technologies. Revision & exam. prep.		
8.2 Seminar / laboratory / project	Teaching methods	Notes
L1: Introduction. Laboratory and general equipment presentation. Safety regulations.	Applied practical works on dedicated software platforms. Board presentations Explanations Discussions	
L2: The Black and White Analog TV Signal		
L3: The PAL and NTSC Color (analog) TV Signal		
L4: The NTSC and SECAM (analog) TV Signal		
L5: Nonlinear Video Editing Tools. Introduction to Adobe Premier		
L6: Advanced Video Editing in Adobe Premier		
L7: Cinematics and Video Editing in Adobe After Effects		
L8: Advanced Motion Tracking and 3D Scenes in Video Editing with Adobe After Effects		
L9: Composition based on Templates in Adobe Affects and Adobe Premiere		
L10: Linear Video Editing and Mixing Tools and Equipment		
L11: Professional Photo and Video Cameras		
L12: Introduction to 3D TV and Stereoscopic Vision Technologies		
L13: Photo – Video Geometric Camera Calibration		
L14: Special Application Video Equipment Demo. Lab Recovery and Evaluations		

Bibliography

1. A.Vlaicu - Televiziune alb-negru şi color, Ed. Compress, 1994
2. A. Vlaicu - Transmisia şi recepţia semnalelor de televiziune, Ed. Interferente, 1995
3. J. Whitaker – Master Handbook of Video Production – Ed. McGraw-Hill, 2007
4. H. Zettl – Television Production Handbook – Ed. Thomson&Wadsworth, 2006
5. J. Rice, B. McKernan – Creating digital content - Ed. McGraw-Hill, 2002
6. A Guide to Standard and High-Definition Digital Video Measurements – Tektronics
7. B. Orza, Ș. Meza – Ingineria sistemelor de televiziune – fascicule de laborator (14 fascicule) – 2012
8. https://docs.opencv.org/
9. https://colab.research.google.com/
10. Meza, Serban-Nicolae; VLAICU, Aurel; ORZA, Bogdan - *Bridging the gap between video data acquisition, compression and transmission under emerging technologies and scenarios*. In: 2010 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR). IEEE, 2010. p. 1-6.
11. Meza, S. N., Damstra, K. J., Rooy, J. V., & Persa, S. - *Embedded real-time look-up table processing for high definition video signals*. In: 2010 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR). IEEE, 2010. p. 1-4.
12. Pasca, A., Ciupe, A., Meza, S., & Orza, B. - *Acquisition Modeling for Optimal Indoor Panoramic Imagery*. In: 2018 International Symposium on Electronics and Telecommunications (ISETC). IEEE, 2018. p. 1-4

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

The gained competences will be used by the following job positions, classified according to the Official Job Positions Registrar of Romania (COR Clasificarea Ocupațiilor din România): Transmission engineer, Electronics, transmission and telecommunications engineer; Image engineer; Sound engineer; Electronics designer engineer; Television engineer; Telecommunications design engineer; System security engineer; Computer systems designer engineer; Sales support engineer; Multimedia applications developer; Network operator engineer; Communications test engineer; Project manager; Data traffic engineer; Communications Systems engineer. The contents of the subject and the acquired competences answer to the expectations of professional organizations and bodies in the field (e.g. ARIES, Cluj IT) as well as of the companies employing graduate students or interning students (e.g. IT companies, Samsung Romania, Huawei, etc.)

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	summative evaluation written exam (theory and problems, multiple choice questions, open-answer questions, interviews)	E max 10 pct 60%
10.5 Seminar/ Laboratory	The level of acquired knowledge and abilities	-continuous formative evaluation -practical lab test -lab mini project -lab portfolio assessment	L max 10 pct 40%
10.6 Minimum standard of performance			

Quantitative Level:

Minimum knowledge about:

- ✓ *the information structure in the TV signal*
- ✓ *the basic components of the TV signal*
- ✓ *correspondence between the human visual system and TV technological requirements*
- ✓ *the technological approaches to video signal acquisition and examples thereof*
- ✓ *the technological approaches to video signal rendering and examples thereof*

Minimum competences:

- ✓ *recognize the components in a TV signal*
- ✓ *basic usage of non-linear video editing tools*
- ✓ *basic operation and configuration (minimum setup) of TV equipment (e.g. cameras, rendering devices)*
- ✓ *provide explanation on how TV systems and/or components of the it work*

Qualitative Level:

- ✓ *Successful completion of all laboratory works/assignments*
- ✓ *Laboratory grade* ≥ 5 (from a maximum of 10)
- ✓ *Written examination grade* ≥ 4.5 (from a maximum of 10)
- ✓ *The final grade obtained using the formula 40% laboratory grade + 60% written examination grade* ≥ 4.5

Date of filling in:	Responsible	Title First name SURNAME	Signature
28.09.2020	Course	Assoc. Professor Serban Nicolae MEZA, PhD	
	Applications	Assist. Prof. Aurelia CIUPE, PhD	

Date of approval in the Department of Communications 28.09.2020	Head of Communications Department Prof. Virgil DOBROTA, Ph.D.
Date of approval in the Council of Faculty of Electronics, Telecommunications and Information Technology 29.09.2020	Dean Prof. Gabriel OLTEAN, Ph.D.