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-E55.10

2. Data about the subject

2.1 Subject name	Media Processors						
2.2 Subject area	Theoretical area Methodological area Analytic area						
2.3 Course responsible	Prof. Radu Arsinte, Ph.D – radu.arsinte@com.utcluj.ro						
2.4 Teacher in charge with laboratory / project	Prof. Radu Arsinte, Ph.D – radu.arsinte@com.utcluj.ro						
2.5 Year of study	IV	2.6 Semester	2	2.7 Assessment	V	2.8 Subject category	DS/DO

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	30
Supplementary study in the library, online specialized platforms and in the field	19
Preparation for seminars / laboratories, homework, reports, portfolios and essays	14
Tutoring	2
Exams and tests	4
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	Basic courses in electrical and electronic engineering from TTS or AE Curricula. Knowledge of digital signal processing, television, software (C based programming), audio-video analog signal handling (acquisition and conversion), Basic processor architecture
4.2 competence	Use of electronic test and measurement instruments and computing technique

5. Requirements (where appropriate)

5.1. for the course	
5.2. for the seminars / laboratories / projects	

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** **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	Understanding the fundamentals of processing systems with special purposes for digital media processing. Analysis and design of media processing systems, adaptations of systems to specific purposes, writing software for media processing applications.
7.2 Specific objectives	• Explaining and interpreting the methods of acquisition and processing of the signals (audio and video) - Establishing and designing a block diagram of a multimedia system using special processors - Selection and integration of special components in the signal processing application • The use of programming languages of general use and specific to applications with microprocessors and microcontrollers; explaining the functioning of automatic control systems that use these architectures and interpreting the experimental results • Explanation and interpretation of the main requirements and specific approach techniques for data, voice, video, multimedia transmissions

8. Contents

8.1 Lecture (syllabus)	Teaching methods	Notes
1. Introduction to media processor and general digital processor		
2. Architectures used in media processor environments		
3. Definition of media processor concept. Generic architectures for special applications: streaming media		
4. Introduction to high performance DSP architectures. TMS320C6000 Hardware architecture of C6000. Functional units.	Presentation, heuristic	

5. Use of the main blocks in program implementation.	conversation, exemplification, problem presentation, teaching exercise, case study, formative evaluation	Use of .ppt presentation, projector, blackboard
6. C6xxx instructions		
7. C6xxx memory map and peripherals		
8. Real time operating systems in media and DSP applications. DSP. BIOS.		
9. Implementation scenarios for media processors		
10. Software development using media processors. Code Composer Studio.		
11. Media processors based on C64x. TI C64x software platform.		
12. Advanced software support: DaVinci		
13. Open cores in media processing: ARM, MIPS, ST20		
14. Applications of media processors in embedded multimedia applications. Future solutions: FPGA		

References (Textbooks, courses, laboratory manual, exercise book)

In UTC-N library (print)

1. Radu Arsinte – Arhitecturi paralele si procesoare de semnal , Ed. Politehnica, Timisoara, 2000

Electronic media

2. Radu Arsinte – course support CD -2013
3. C6000 Teaching materials, Development with Matlab/Simulink, Texas Instruments, 2010
4. Digital media resource CD, Texas Instruments, 2010

8.2 Laboratory	Teaching methods	Notes
1. Knowledge of the most important families of TI media processors. Study of the support site	Didactic and experimental proof, didactic exercise, team work	Use of laboratory instrumentation, experimental boards, computers, multimedia board
2. Code Composer Studio for media processors		
3. Evaluation Modules for C64xx DSP.TMS320C6416DSK		
4. Application development under Code Composer Studio and TMS320C6416DSK		
5. Application development under Matlab /Simulink and link with TMS320C6416DSK.		
6. Basic level development tools for media processor systems. JTAG interface.		
7. Laboratory test		
8.3 Project		
1. Introduction. Projects presentation and allocation		
2. Analysis of the project. Theoretical fundamentals		
3. Implementation of the project under CCS		
4. Program testing		
5. Program testing and report editing		
6. Preliminary verification of the project		
7. Project presentation. Evaluation.		

Bibliography

1. Rulph Chassaing, DSP Applications Using C and the TMS320C6x DSK. John Wiley & Sons, 2008
2. David J Katz, Rick Gentile, Embedded Media Processing, Newnes, 2005
3. Steven W. Smith, The Scientist and Engineer's Guide to Digital Signal Processing, California Technical Publishing San Diego, California, Edition 2013

On-line references

4. Radu Arsinte – Media Processors - http:/users.utcluj.ro/~arsinte/ProcMed

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

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	*Written test(theory and problems)*	*T 50%*
10.5 Seminar/ Laboratory	The level of acquired knowledge and abilities	*Laboratory tests/ Project evaluation*	*L 25%* *P 25%*
10.6 Minimum standard of performance			

Qualitative level:

Minimal knowledge:

- ✓ *To know the basics of media processors(architecture, elements of the block schematics)*
- ✓ *Knowledge of the most important generic architectures in media processing*
- ✓ *Use of simulation (Matlab) in application test before implementation*

Minimal competencies:

- ✓ *To connect the development systems to external sources(microphones, video sources)*
- ✓ *Use of computer equipment to control and setup of embedded applications*

Quantitative level:

- ✓ *Attendance of all laboratory and project sessions*
- ✓ *Evaluation in exam (T) and practical activities ((L+P)/2) at least 4.5 points/out of 10.*
- ✓ *Final grade is computed with the formula: 0,5*T+0,25*L+0.25*P*

Date of filling in:	Responsible	Title Surname NAME	Signature
27.09.2021	Course	Prof. Radu Arsinte, PhD	
	Applications	Prof. Radu Arsinte, PhD	

Date of approval in the Department of Communications 27.09.2021	Head of Communications Department Prof. Virgil DOBROTA, Ph.D.
Date of approval in the Council of Faculty of Electronics, Telecommunications and Information Technology 27.09.2021	Dean Prof. Gabriel OLTEAN, Ph.D.