

SYLLABUS

Discipline name	Media Processors
Profile	Electronics and Telecommunications Engineering
Specialization	Telecommunications Technologies and Systems
Code	51325409-1
Course leader	Professor Radu Arsinte, Ph.D – Radu.Arsinte@com.utcluj.ro
Collaborators	
Department	Communications
Faculty	Electronics, Telecommunications and Information Technology

Sem.	Type of discipline	Course	Applications			Course	Applications			Ind. study	TOTAL	Credits	Form of assessment
		[hours/week]				[hours/semester]							
			S	L	P		S	L	P				
8	Speciality, Optional	2	-	1	1	28	-	14	14	64	120	4	Verification

Acquired competencies:

Acquired skills (what the student is able to do):

- Establish and design the block schematic of embedded multimedia systems using special processors
- Select and integrate special components in a signal processing application
- Evaluate the main components in embedded multimedia (RISC, CISC, DSP, FPGA) to find the most suitable for the desired application
- Choose, modify or adapt standard codecs to fit into a specific embedded media application
- Integrate an embedded media system into a system with multiple functionality
- Develop, debug and integrate software for audio and video media processing

Acquired abilities (what type of equipment/ instruments/ software the student is able to handle):

- use simulation environments to develop media information processing algorithms
- to interface EVM (Evaluation Modules) with external devices, sensors
- Evaluate decoding and streaming performances using analyzers and special programs
- Use oscilloscopes and signal analyzers to track signals in complex systems
- use special environments (like Code Composer Studio) to develop and debug media processor programs
- use of JTAG interface to debug the system at basic level

Prerequisites (if necessary):

Knowledge about digital signal processors, television, software (basic C programming), audio-video signal manipulation (acquisition and conversion).

A. Course/Lecture (course/lecture titles)

1	Introduction. 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 in high performance DSP architectures. TMS320C6000
5	Hardware architecture of C6000. Functional units.
6	Use of the main blocks in program implementation.
7	C6xxx instructions
8	C6xxx memory map and peripherals
9	Real time operating systems in media and DSP applications. DSP BIOS.
10	Implementation scenarios for media processors
11	Software development using media processors. Code Composer Studio.
12	Media processors based on C64x. TI C64x software platform. 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

B. Applications – Project (project contents)

1	Knowledge of the most important families of TI media processors. Study of the support site
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.

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6	Basic level development tools for media processor systems. JTAG interface.
7	Laboratory test
	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.

C. Individual study (reference study contents, synthesis materials, projects, applications etc.)						
6 sets of problems and questions (the preparation part in every laboratory)						
6 sets of problems (course homework)						
Individual study structure	Course study	Problem solving, laboratory, project	Applications preparation	Examination time	Additional reference study	Total no. of individual study hours
Hours	28	6	18	3	9	64

References (Textbooks, courses, laboratory manual, exercise book)	
1.	Steven W. Smith, <i>The Scientist and Engineer's Guide to Digital Signal Processing</i> , California Technical Publishing San Diego, California, 1999
2.	David J Katz, Rick Gentile, <i>Embedded Media Processing</i> , Newnes, 2005
3.	Rulph Chassaing, <i>DSP Applications Using C and the TMS320C6x DSK</i> . John Wiley & Sons, 2000, ISBNs: 0-471-20754-3
4.	C6000 Teaching materials, Texas Instruments, 2004
5.	Digital media resource CD, Texas Instruments, 2006
On – line references	
1.	R.Arsinte, <i>Course support (presentations)</i> , http://users.utcluj.ro/~arsinte/ProcMedia
2.	R.Arsinte, <i>Laboratory support</i> , http://users.utcluj.ro/~arsinte/ProcMedia

Final evaluation	
Evaluation method	Written exam (E): problem solving (30%) and theoretical subjects (70%).
Mark components	Exam (E: 0...10 points); Laboratory (L: 0...10 points); Project (P: 0...10 points);
Mark computation	$M = 0.5E + 0.25L + 0.25P$. Pass if: $E \geq 4$ and $L \geq 4$, $P \geq 4$ and $M \geq 4.5$

Course leader,

Professor Radu ARSINTE, Ph.D.
