

SYLLABUS

Discipline name	Multimedia Tehnologies
Profile	Electronics and Telecommunications Engineering
Specialization	Telecommunications Technologies and Systems
Code	51325309-1
Course leader	Assoc. Prof. Bogdan ORZA , Ph.D.– Bogdan.Orza@com.utcluj.ro
Collaborators	Eng. Adrian CHIOREANU , Ph.D.– Adrian.Chioreanu@com.utcluj.ro Eng. Serban MEZA, Ph.D. student – Serban.Meza@com.utcluj.ro
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	94	150	5	V

Acquired competences :

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

- understand the models and the principles behind various multimedia systems
- understand the main characteristics and be able to work with all the different types of multimedia data and formats
- understand the algorithms used in multimedia compression standards
- be able to develop generic multimedia applications using existing tools and technology

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

- deploy the Panasonic VDR-D300 video cameras (DVD storage)
- use video editing equipment and software mixers for the digital processing of video sequences
- use different software environments for the conversion of video under various representations/formats
- use the ASP.NET technology and SharePoint Portal Server for developing custom multimedia applications
- deploy professional platforms dedicated to dynamic WEB page and presentation material creation, like Adobe Flash, Adobe Dreamwaver
- use Polycom Videoconference system – VSX6000, VSX8000, RSS 2000

Prerequisites (if necessary):

- general PC operating skills

A. Course/Lecture (course/lecture titles)

1	Introduction to Multimedia Systems. Types of Multimedia Information Multi-media and multi-sensor systems. Characteristics of multimedia system.
2	Color. Additiv and substractiv mixing of colors. Color spaces: RGB, HSV, YCbCr, YUV. Color management.
3	Text Standards, fonts and characters, digital fonts.
4	Vector Graphics. Vectors and coordinates, Bezier curves, textures and filling elements, geometric transformations, 3D graphics and models.
5	Static and Moving Images. Sound and Speech Resolution, color depth, color indexing, image formats, video sequence digitization, video editing and post-processing, audio-video (AV) data streams.
6	Multimedia Data Compression Image transformations: the Discrete Cosinus Transform (DCT), fast DCT algorithms
7	Multimedia Data Compression Image transformations: the Discrete Wavelet Transform (DWT), fast DWT algorithms
8	Loss-less and Lossy Compression Techniques Huffman coding, RLC coding, RLC Fingerprint, Predictive coding, transform coding, vector quantisation, binary image compression
9	The JPEG and JPEG 2000 Compression Standards
10	The MPEG, DivX, H.261 and H.263 Compression Standards
11	Multimedia Applications Introduction to multimedia applications • Multimedia application taxonomy • Multimedia application types • Inter-personal application: computer assisted telephony, computer asisted video conferencing
12	Multimedia Applications

SYLLABUS

	„Shared whiteboard” applications • Access policies • Program window • Audio-video distribution • Video conference
13	Multimedia Applications Applications based on Multimedia Servers.
14	Course Summary, exam preparation.

B. Applications – Laboratory (list of laboratories), Seminar (contents), Project (project contents)	
1	Multimedia data acquisition systems – installing and configuring the OSPREY data acquisition boards
2	Colour spaces
3	Image and video compression standards
4	Installing, configuring and using the Polycom Videoconference system
5	Installing and configuring the SharePoint Portal Server- Creating dynamic Web sites
6	Installing, configuring and using the communication server Microsoft Communicator Server
7	Review of the laboratory work. Laboratory test.

C. Individual study (reference study contents, synthesis materials, projects, applications etc.)						
1. Used technologies in content creation and presentation						
2. Multimedia servers						
3. Solutions for dynamic WEB page creation using features present in multimedia databases						
4. Practical implementation of multimedia compression standards using various SDK's						
5. Conversion solutions for ensuring compatibility between different compression standards.						
Individual study structure	Course study	Problem solving, laboratory, project	Applications preparation	Examination time	Additional reference study	Total no. of individual study hours
Hours	28	36	17	3	10	94

References (Textbooks, courses, laboratory manual, exercise book)	
1.	L. Grindei, B.Orza, A. Vlaicu, „Tehnologii multimedia cu aplicatii interactive in eLearning”, ed. Albastra, 2007
2.	B.Orza, „Codarea si compresia informatiilor multimedia”, ed. Albastra, 2007
3.	William Horton, Katherine Horton, “E-Learning Tools and Technologies”, Wiley Publishing Inc., 2003,
4.	B.E. Usevitch, “A tutorial on Modern Lossy Wavelet Image Compression: Foundations of JPEG200”, IEEE Signal Processing Mag., September 2001, Vol.18, No.5
5.	D. Taubman, M.W. Marcellin, „JPEG 2000: Image Compression Fundamentals, Practice and Standards”, Kluwer Academic Publishers, Dordrecht, 2001
6.	R. Steinmetz, K. Nahrstedt, „Multimedia Systems”, 2004, Springer Verlag, Berlin
7.	N. Chapman, J. Chapman, „Digital Multimedia”, 2004,
8.	T. Vaughan, „Multimedia: Making It Work”, McGraw-Hill, 2008
9.	R. Steinmetz, „Multimedia Applications”, Springer-Verlag, 2004
On-line references	
1.	B.Orza, A.Chioreanu – „Multimedia Technologies” lecture slides (Powerpoint), icar.utcluj.ro – Discipline

Final evaluation	
Evaluation method	Written exam (E): problem solving (50%) and theoretical subjects (50%) with answers in the form of a short essay + multiple choice. The examination will be made every 6 weeks (e.g. 2 preliminary test.)
Mark components	Exam (E: 0...10 pts – average of the 2 preliminary tests); Laboratory (L: 0...10 pts); Projects and literature survey (P: 0...10 pts);
Mark computation	$N=0,5E+0,25L+0,25P$; Pass if: $E \geq 5$ (and preliminary tests) and $L \geq 5$ and $M \geq 5$

Course leader,

Assoc. Prof. Bogdan ORZA , Ph.D.