

## SYLLABUS

### Multimedia Techniques and Technologies

#### 1. Information on academic programme

1.1. University	„1 Decembrie 1918” of Alba Iulia
1.2. Faculty	Faculty Of Informatics And Engineering
1.3. Department	Exact Science and Engineering Department
1.4. Area	Computer Science
1.5. Level	Undergraduate
1.6. Specialization	Computer Science, 2511/ Systems Analyst, 2512/ Software developers Analyst 251201 Computer System Programmer 251204 Computer System Engineer 251203

#### 2. Information of Course Matter

2.1. Course	<i>Multimedia Techniques and Technologies</i>		2.2. Code	CSE 307			
2.3. Course Leader	Kadar Manuella						
2.4. Seminar Tutor	Kadar Manuella						
2.5. Academic Year	<b>III</b>	2.6. Semester	<b>I</b>	2.7. Type of Evaluation (E – final exam/ CE - colloquy examination / CA -continuous assessment)	<b>CE</b>	2.8. Type of course (C– Compulsory, <b>Op</b> – optional, <b>F</b> - Facultative)	<b>Op</b>

#### 3. Course Structure (Weekly number of hours)

3.1. Weekly number of hours	<b>6</b>	3.2. course	<b>2</b>	3.3. seminar, laboratory	<b>4</b>
3.4. Total number of hours in the curriculum	<b>84</b>	3.5. course	<b>28</b>	3.6. seminar, laboratory	<b>56</b>
Allocation of time:					Hours
Individual study of readers					<b>28</b>
Documentation (library)					<b>20</b>
Home assignments, Essays, Portfolios					<b>10</b>
Tutorials					-
Assessment (examinations)					<b>8</b>
Other activities.....					-

3.7 Total number of hours for individual study	<b>66</b>
3.8 Total number of hours in the curriculum	<b>84</b>
3.9 Total number of hours per semester	<b>150</b>
3.10 Number of ECTS	<b>6</b>

#### 4. Prerequisites (*where applicable*)

4.1. curriculum-based	
4.2. competence-based	C3.3. The use of computer and mathematical models and tools to solve specific problems in the application field. C3.4. Data and model analysis. C3.5. The development of software components of interdisciplinary projects.

#### 5. Requisites (*where applicable*)

5.1. course-related	Room equipped with video projector / board
5.2. seminar/laboratory-based	Laboratory – computers, Software: MATLAB 7.12, Internet access.

#### 6. Specific competences to be acquired (chosen by the course leader from the programme general competences grid)

Professional competences	<b>C2. Development and maintenance of computer applications</b> C2.4. The use of appropriate criteria and methods for the evaluation of computer applications. C2.5. The development of dedicated computer projects. <b>C3. The use of computer tools in an interdisciplinary context</b> C3.1. The description of concepts, theories and models used in the application field. C3.2 The identification and explanation of base computer models that are suitable for the application domain. C3.3. The use of computer and mathematical models and tools to solve specific problems in the application field. C3.4. Data and model analysis. C3.5. The development of software components of interdisciplinary projects.
Transversal competences	<b>CT3</b> The use of efficient methods and techniques for learning, scientific inquiry and development of the capacities of using knowledge, of adapting to a dynamic society and of communication in English.

#### 7. Course objectives (as per the programme specific competences grid)

7.1 General objectives of the course	The Multimedia Techniques and Technologies course presents scientific and technical principles of media capture and computer representation. It is focused on methods of operation and application of computer software and systems that enable delivery of multimedia productions and also contains descriptions and examples of methods used for compression of symbolic data, as well as audio, image and video data. Data compression is discussed taking into consideration novel ways of data representation in order to take very little storage, with the possibility of reconstruction of the original data from the compressed version. The course offers many examples and applications such as: examples in Matlab, Adobe Flash, Adobe PhotoShop to be solved within the labs.
7.2 Specific objectives of the course	By taking this course the students will be able to: <ul style="list-style-type: none"> <li>• understand various concepts associated with multimedia technology and computing</li> <li>• understand the components of multimedia systems</li> <li>• explain some desirable features for multimedia systems</li> <li>• explain the basic concepts of multimedia elements' representation</li> <li>• implement and discuss various compression techniques</li> <li>• explain how a compression system works</li> <li>• analyse the advantages and disadvantages of data compression.</li> </ul>

## 8. Course contents

<b>8.1 Course (learning units)</b>	<b>Teaching methods</b>	<b>Remarks</b>
1. <i>Introduction to multimedia technology</i>	<i>Lecture, conversation, exemplification</i>	2h
2. <i>Color model and human vision. Color spaces</i>	<i>Lecture, conversation, exemplification</i>	2h
3. <i>Data compression. Compression techniques and algorithms</i>	<i>Lecture, conversation, exemplification</i>	4h
4. <i>Multimedia data compression standards</i>	<i>Lecture, conversation, exemplification</i>	2h
5. <i>Image and sound</i>	<i>Lecture, conversation, exemplification</i>	4h
6. <i>Video frames. Video frames digitization and compression</i>	<i>Lecture, conversation, exemplification</i>	4h
7. <i>Audio data representation and processing. Audio compression</i>	<i>Lecture, conversation, exemplification</i>	4h
8. <i>Semantic annotation of images</i>	<i>Lecture, conversation, exemplification</i>	2h
9. <i>Video segmentation</i>	<i>Lecture, conversation, exemplification</i>	2h
10. <i>Multimedia society - where are we going?</i>	<i>Lecture, conversation, exemplification</i>	2h

### References

1. VAUGHAN, Tay, *Multimedia: making it work*, 7th ed., New York, San Francisco, Chicago: McGraw-Hill : McGraw-Hill : McGraw-Hill, 2008, 0-07-226451-9, 978-0-07-226451-7.
2. WEIXEL, Suzanne, FULTON, Jennifer, BARKSDALE, Karl, MORSE, Cheryl, MORSE, Bryan, *Multimedia basics*, Boston, Mass. : Course Technology, 2004, ISBN 0-619-05533-2, 978-0-619-05533-2
3. STEINMETZ, Ralf, *Multimedia applications*, Berlin, Heidelberg: Springer : Springer, 2004, ISBN 3-540-40849-5, 978-3-540-40849-9.
4. CHOU, Philip A, SCHAAR, Mihaela van der, *Multimedia over IP and wireless networks: compression, networking, and systems*, Burlington, MA : Academic Press, 2007, ISBN 0-12-088480-1, 979-0-12-088480-3.
5. OHM, Jens-Raine, *Multimedia communication technology: representation, transmission and identification of multimedia signals*, Berlin, Heidelberg : Springer : Springer, 2004, ISBN 3-540-01249-4, 978-3-540-01249-8.
6. GARRAND, Timothy, *Writing for multimedia and the Web: a practical guide to content development for interactive media*, 3rd ed., Burlington, MA : Focal Press, 2006, ISBN 0-240-80822-3, 978-0-240-80822-2.
7. WEINSTEIN, Stephen, *The multimedia Internet*, New York : Springer Science + Business Media, 2005, ISBN 0-387-23681-3, 978-0-387-23681-0.
8. STAMOU, Giorgos, KOLLIAS, Stefanos, Chichester, England: John Wiley and Sons, 2005, ISBN 0-470-85753-6, 978-0-470-85753-3.
9. HALSALL, Fred, *Multimedia communications: applications, networks, protocols and standards*, New YorkLondonHarlow, England : Pearson Education : Pearson Education : Pearson Education, 2001, ISBN 0-201-39818-4.

<b>Seminars-laboratories</b>	<b>Teaching methods</b>	
1. Introduction to MATLAB programming environment	<i>Project-work, computer-based activities, laboratory activities</i>	4
2. MATLAB functions	<i>Project-work, computer-based activities, laboratory activities</i>	4
3. MATLAB arrays	<i>Project-work, computer-based activities, laboratory activities</i>	4

4. MATLAB graphics	<i>Project-work, computer-based activities, laboratory activities</i>	4
5. Image processing using MATLAB	<i>Project-work, computer-based activities, laboratory activities</i>	8
6. Image compression using MATLAB	<i>Project-work, computer-based activities, laboratory activities</i>	4
7. The design and implementation of image compression techniques using MATLAB	<i>Project-work, computer-based activities, laboratory activities</i>	4
8. The design and implementation of audio compression techniques using MATLAB	<i>Project-work, computer-based activities, laboratory activities</i>	4
9. The design and implementation of video compression techniques using MATLAB	<i>Project-work, computer-based activities, laboratory activities</i>	8
10. Project presentation and evaluation.	<i>Project-work, computer-based activities, laboratory activities</i>	12

### References

- GONZALEZ, Rafael C., WOODS, Richard E., EDDINS, Steven L., Digital image processing using MATLAB, Upper Saddle River, New Jersey : Pearson Education, 2004, ISBN 0-13-008519-7, 978-0-13-008519-1.
- GOPI, E.S., Algorithm collections for digital signal processing applications using Matlab, Dordrecht : Springer, 2007, ISBN 978-1-4020-6409-8.
- MILIC, Ljiljana, Multirate filtering for digital signal processing : MATLAB applications, Hershey, PA : Information Science Reference, 2009, ISBN 978-1-60566-178-0.
- VAUGHAN, Tay, Multimedia : making it work, 7th ed., New YorkSan Francisco, CAChicago : McGraw-Hill : McGraw-Hill : McGraw-Hill, 2008, 0-07-226451-9, 978-0-07-226451-7.
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- OHM, Jens-Raine, Multimedia communication technology: representation, transmission and identification of multimedia signals, Berlin Heidelberg : Springer : Springer, 2004, ISBN 3-540-01249-4, 978-3-540-01249-8.
- GARRAND, Timothy, Writing for multimedia and the Web: a practical guide to content development for interactive media, 3rd ed., Burlington, MA : Focal Press, 2006, ISBN 0-240-80822-3, 978-0-240-80822-2.

### 9. Corroboration of course contents with the expectations of the epistemic community's significant representatives, professional associations and employers in the field of the academic programme

*The knowledge Multimedia Technologies and Techniques is increasingly valued in the media, medicine, Web services, presentation of companies and organizations on the Internet. There are plenty of employment opportunities at local, regional and international level.*

### 10. Assessment

Activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of final grade
10.4 Course	<i>Final evaluation</i>	<i>Written paper</i>	60%
10.5 Seminar/laboratory	<i>Continuous assessment</i>	<i>Laboratory activities portfolio</i>	40%
10.6 Minimum performance standard: a minimum of grade 5 at each criteria			
Modeling and solving problems of average complexity, using mathematics and computer science.			

Submission date

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Course leader signature

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Seminar tutor signature

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Date of approval by Department members

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Department director signature

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