

**IMM EU Socrates Erasmus Programme**  
**49104-IC-1-2003-1-RO-ERASMUS-PROGUC-1**

**Master programme**  
**Syllabus**  
**Course proposal**

**Course Title:** Multimedia Compression Technologies  
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<b>Purpose</b>	The purpose of the course is to familiarize the students with the compression techniques used for audio – video signals, as well as with the main compression standards. The main compression applications will be presented in the field of multimedia and digital television.
<b>Learning Outcomes</b>	After attending the course, the student will be able to understand, compare and analyse different compression techniques. He will be able to choose the appropriate compression technique to be used in different multimedia applications.
<b>Course Summary</b>	The course covers audio-video compression techniques and their application in different fields.
<b>Course Structure</b>	<p>The proposed chapters of the course are:</p> <ul style="list-style-type: none"><li>• Role and necessity for compression techniques</li><li>• Lossless compression techniques<ul style="list-style-type: none"><li>- Variable length coding techniques</li><li>- Constant area coding, bit plane coding, LZW and RL coding</li></ul></li><li>• Lossy compression techniques<ul style="list-style-type: none"><li>- Prediction coding</li><li>- Delta modulation coding</li><li>- DPCM coding</li><li>- Transform coding</li><li>- Hybrid coding</li><li>- Adaptive block coding</li></ul></li><li>• Image coding based on contour and shape<ul style="list-style-type: none"><li>- Contour based coding</li><li>- Shape description based on contour</li></ul></li><li>• Use of mathematical morphology in compression techniques<ul style="list-style-type: none"><li>- Fundamentals of mathematical morphology</li><li>- Morphological operators</li></ul></li></ul>

	<ul style="list-style-type: none"> <li>- Morphological algorithms</li> <li>• Audio-video compression standards <ul style="list-style-type: none"> <li>- JPEG compression standard</li> <li>- MPEG compression: MPEG-1, MPEG-2, MPEG-4, MPEG-7</li> <li>- Audio compression standards: NICAM, Dolby AC-3</li> </ul> </li> <li>• Fundamentals of digital television <ul style="list-style-type: none"> <li>- Particularities, advantages, structure, bit rate</li> <li>- CCIR recommendation 601</li> </ul> </li> <li>• MAC television systems</li> <li>• High definition television (HDTV)</li> <li>• Digital broadcast systems (DVB, ATSC)</li> </ul>
<b>Learning Assignments</b>	<p>Types of assessments planned:</p> <ul style="list-style-type: none"> <li>- self-assesments</li> <li>- homeworks</li> <li>- project for implementing different compression techniques in C++ or Java</li> </ul>
<b>Tutorials Structure</b>	The course will consist of a balanced combination between face-to-face meetings and independent study.
<b>Interactive or Multimedia content</b>	The course is based on the material loaded by the instructor on the online platform. It contains some graphics, video and audio files, links to simulations or implemented compression techniques
<b>Software needed</b>	Software needed for students to be trained: C++, Java
<b>References</b>	<p>The main referenes:</p> <ol style="list-style-type: none"> <li>1. Radu Vasii: „Audio-video compression. Techniques and applications”, Ed. Orizonturi Universitare, Timișoara, 2002</li> <li>2. Z. Bojkovic, C.I. Toma, V. Gui, R. Vasii: „Advanced Topics in Digital Image Compression”, Ed. Politehnica, Timișoara, 1997</li> <li>3. Jerry Gibson: „Multimedia Communications. Directions and Innovations”, Academic Press, 2001</li> </ol>