



## Course Specification Document

<b>Title</b>	Multimedia Systems
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<b>Credits</b>	2.5 ECTS
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<b>Aims</b>	This course aims to provide the student with knowledge related to image, audio, and video, as well as techniques for text, image, audio, and video compression specifically. This equips him to handle and transfer such media between information systems and keep pace with technological advancements in this field.
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### Intended learning outcomes

On successful completion of this course, the student will be able to:

- Define the methods used for media transmission (text, audio, images, video) and their evolution.
- Comprehend Huffman coding techniques, adaptive Huffman coding, and arithmetic coding algorithms.
- Understand the methods and algorithms for compressing textual data, and optimal representation of text symbols (characters).
- Understand methods for computer-based image representation and color representation, as well as how they are perceived by the eye and how to utilize that for compression purposes.
- Understand audio signals, how the ear responds to them, and relate this to the compression methods used for audio.
- Understand video compression, and the formation of the bitstream sent through the transmission channel.

### Syllabus

- **A reminder of information theory.**
- **Data compression:** Introduction to various compression methods with and without loss, encoding using Huffman and adaptive Huffman and its relationship to information entropy, encoding using decimal representation and comparison with Huffman and adaptive decimal encoding.
- **Image systems and representation:** Image representation and used color systems, systems used for television broadcasting and analog and digital standards.
- **Image compression:** Image compression using the JPEG standard and its implementation.
- **Wavelet transformation:** Wavelet transformation and its use in image and video compression.
- **Video compression standards:** Video compression, motion estimation in video and its use in the H261 standard and its latest developments H265, H263, video compression, motion estimation in video and its use in the MPEG-1 standard and its updates.
- **Representation and compression of audio:** Physics of sound and its representation, ear response to sound frequencies and its use for audio compression.
- **Network protocols for multimedia:** Introduction to the most important visual communication protocols over the network.

Syrian Arab Republic  
Higher Institute for Applied Sciences and Technology

