

Course Code  
**COMP 4431**

Course Title  
**Multimedia Computing**

### Course Description

Color theory; digital audio, image and video fundamentals, representation, and processing; digital multimedia applications and programming. Prerequisite(s): COMP 2012 OR COMP 2012H; Exclusion(s): ELEC 3170

### List of Topics

Week	Course Introduction / Video Lecture	Activity Lecture	Labs
1	<ul style="list-style-type: none"><li>• Course Introduction</li><li>• Multimedia Representation – Sampling</li><li>• Multimedia Representation – Quantization</li><li>• Introduction to MIDI</li></ul>		
2	<ul style="list-style-type: none"><li>• More on MIDI</li><li>• Basic Digital Audio Concepts</li><li>• Basic Waveform Generation</li></ul>	<ul style="list-style-type: none"><li>• Course Participation</li><li>• Pop Quiz</li></ul>	
3	<ul style="list-style-type: none"><li>• Frequency Domain</li><li>• Additive Synthesis</li><li>• Frequency Modulation</li></ul>	<ul style="list-style-type: none"><li>• Pop Quiz</li></ul>	<ul style="list-style-type: none"><li>• Self-study Lab – HTML and JavaScript</li></ul>
4	<ul style="list-style-type: none"><li>• Post-Processing Effects</li><li>• Echo and Reverberation</li></ul>	<ul style="list-style-type: none"><li>• Pop Quiz</li></ul>	<ul style="list-style-type: none"><li>• Lab 1 MIDI Keyboard</li></ul>
5	<ul style="list-style-type: none"><li>• The Karplus-Strong Algorithm</li><li>• MIDI and Music Synthesis</li></ul>	<ul style="list-style-type: none"><li>• Pop Quiz</li></ul>	<ul style="list-style-type: none"><li>• Lab 2 Audio Generation</li></ul>
6	<ul style="list-style-type: none"><li>• Image and Colour</li><li>• Using HTML Canvas</li><li>• Monadic Image Processing</li></ul>	<ul style="list-style-type: none"><li>• Pop Quiz</li></ul>	<ul style="list-style-type: none"><li>• Lab 3 Post-Processing and Frequency Modulation</li></ul>
7	<ul style="list-style-type: none"><li>• Image Dithering</li><li>• Working with Histograms</li><li>• Local Operations – Blur</li></ul>	<ul style="list-style-type: none"><li>• Pop Quiz</li></ul>	<ul style="list-style-type: none"><li>• Lab 4 Karplus-Strong and More Post-Processing</li></ul>
8	<ul style="list-style-type: none"><li>• Local Operations – Edge and Sharpen</li><li>• Kuwahara Filter</li><li>•</li></ul>	<ul style="list-style-type: none"><li>• Pop Quiz</li></ul>	<ul style="list-style-type: none"><li>• Lab 5 Basic Image Processing and Comic Colour</li></ul>
9	Basic Video Processing	<ul style="list-style-type: none"><li>• Mini Project</li></ul>	<ul style="list-style-type: none"><li>• Lab 6 Image Dithering and Working with Histograms</li></ul>
10	<ul style="list-style-type: none"><li>• Video Motion Tracking</li><li>• Shaking Camera Removal</li><li>• Chroma Key Effect</li></ul>	<ul style="list-style-type: none"><li>• Mini Project Submission</li><li>• Pop Quiz</li></ul>	<ul style="list-style-type: none"><li>• Lab 7 Blur, Kuwahara and Edge</li></ul>
11	<ul style="list-style-type: none"><li>• Lossless Audio Compression</li><li>• Lossy Audio Compression</li></ul>	<ul style="list-style-type: none"><li>• Pop Quiz</li></ul>	Lab 8 Basic Video Processing

12	<ul style="list-style-type: none"> <li>• Lossless Image Compression</li> <li>• Lossy Image Compression</li> <li>• Video Compression</li> </ul>	<ul style="list-style-type: none"> <li>• Pop Quiz</li> </ul>	
13	<ul style="list-style-type: none"> <li>• Video Lecture</li> </ul>		

Textbook

N/A

Reference books

N/A

Grading Scheme

Labs	30%
Mini project	20%
Participation	10%
Final	40%
Total	100%

Course Intended Learning Outcomes

At the completion of this course students will be able to:

- 1) Identify and apply common digital audio representation concepts, tools and algorithms used to process digital audio
- 2) Identify and apply common digital image representation concepts, tools and algorithms used to process digital images
- 3) Identify and apply common digital video representation concepts, tools and algorithms used to process digital video

Assessment Rubric

N/A

