

ELE725 - Basics of Multimedia Systems

- **Course Outline**

<http://www.ee.ryerson.ca/undergraduate/dcd/ele725.html>

- **Key Knowledge to Be Acquired**

An in-depth understanding of multimedia signals (audio, image and video), sampling in both time and spatial domain, quantization and audio-visual data representation. Analysis of statistical and structural redundancy in multimedia signals, limitations of human perception and how these may be exploited in the design of core compression sub-systems. The course also addresses perceptual quality vs performance of encoders; multimedia descriptors for search and retrieval; and systems for the transmission of multimedia over networks.

- **Key Skills to Be Mastered**

Building blocks of lossless and lossy compression. Design and implementation of core components of video and audio codecs: run-length, LZW and variable length encoding, DCT, JPEG, motion JPEG, motion compensation, colour histograms, template matching and similarity metrics. Systems level understanding of synchronization and transmission protocols. Develop competency with Matlab and the open computer vision library (OpenCV)

- **Potential Careers**

Video software engineers, embedded systems engineers, DSP engineers, communications & information systems engineers, hardware/software design engineers for development of commercial or consumer level products and services in interactive digital media, broadcast technologies, multimedia search and multimedia analytics, ...

- **Potential Employers**

IBM, Nvidia, AMD, ViXS Systems Inc., Evertz Microsystems, Christie Digital, FrescoMicrochip, Unique Broadband Systems (UBS), Idee Labs, Winvolve Inc., Alias Systems Corporation, UbiSoft, Electronic Arts, DALSA Corp, Silicon Optix Inc., Texas Instruments, Rogers, Telus, Bell Canada, Research-in-Motion, ...

- **Graduate Studies**

This course provides a solid foundation for students who would like to pursue a career in multimedia signal processing and communications. It is quite common for such pursuits to extend into Graduate Studies: this is reflected by the range of careers available at the Bachelor, Masters & PhD levels