**CO7096 Compression Methods for Multimedia**

**Credits:** 15  
**Convenor:** Prof. R. Raman  
**Semester:** 2nd

**Prerequisites:** Essential: Computer Science MSc students are assumed to have the required background. Students should consult the convenor in case of any doubt.

**Assessment:**  
Coursework: 30%  
Three hour exam in May/June: 70%  
Problem Classes: 5 hours  
Class Tests: 3 hours  
Private Study: 69.5 hours

**Lectures:** 30 hours  
**Surgeries:** 5 hours  
**Problem Classes:** 5 hours  
**Class Tests:** 3 hours  
**Private Study:** 69.5 hours

**Subject Knowledge**

**Aims**  
To study methods for compression of symbolic data as well as audio, image and video data. To gain an appreciation of the ubiquity and importance of compression technologies.

**Learning Outcomes**  
Students should achieve: broad knowledge of compression techniques as well as the mathematical foundations of data compression; factual knowledge about existing compression standards or commonly-used compression utilities; understanding of the ubiquity and importance of compression technologies in today’s environment; elementary understanding of the need for modeling data and the underlying issues.

**Methods**  
Class sessions together with course notes, recommended textbooks, problem classes with worksheets and model solutions, web support.

**Assessment**  
marked courseworks, class tests, traditional written examination.

**Skills**

**Aims**  
To teach students how to compute basic statistics of data, and how to apply nontrivial algorithms to real-world problems.

**Learning Outcomes**  
Students will be able to: understand and describe various models of data; understand the basic data compression algorithms and show how they work on a particular input; implement these algorithms; compare their efficiency in terms of speed and compression ratio.

**Methods**  
Class sessions and problem classes.

**Assessment**  
marked coursework, class tests Blackboard, traditional written examination.

**Explanation of Prerequisites**  
There are two main prerequisites. Firstly, students should have some knowledge of how data of various kinds (numbers, characters, images and sound) are represented digitally in uncompressed format. This will be reviewed rapidly at the start of the course. Some elementary mathematics is also required. In particular, trigonometry: basic functions—cos, sin and measuring angles in radians; probability: basic definitions and expected values; matrices: transposition and multiplication and recurrence relations: basic familiarity. Basic familiarity with the elements of computer systems and networks is also desirable.

**Course Description**  
Data compression is about finding novel ways of representing data so that it takes very little storage, with the proviso that it should be possible to reconstruct the original data from the compressed version. Compression is essential when storage space is at a premium or when data needs to be transmitted and bandwidth is at a premium (which is almost always). The first thing that one learns about compression is that it is not “one size fits all” approach: the essence of compression is to determine characteristics of the data that one is trying to compress (typically one is looking for patterns that one can exploit to get a compact representation). This gives rise to a variety of data modeling and representation techniques, which is at the heart of compression. The convergence of the communications, computing and entertainment industries has made data compression a part of everyday life (e.g. MP3, DVD and Digital TV) and has thrown up a number of exciting new opportunities for new applications of compression technologies.

*The Department of Computer Science*

**Reading List**


**Resources**  Course notes, web page, study guide, worksheets, handouts, lecture rooms with a computer to CFS, data projector, two OHPs, past courseworks and examination papers.

**Module Evaluation**  Course questionnaires, course review.