

**Brooklyn College**  
**Department of Computer and Information Sciences**

**CISC 4610 [45.1] Multimedia Databases**

3 hours; 3 credits

Multimedia data types and formats. Multimedia computer database design issues. Indexing and automated retrieval of text documents, audio files, images and video. Techniques and data structures for efficient multimedia similarity search. System support for distributed multimedia databases. Measurement of multimedia information retrieval effectiveness. Products, applications, and new developments.

**Objectives**

Multimedia has become an essential part of the digital information that we deal with every day. Images, video, and even sound clips can enhance alphanumeric data describing people, consumer products, and many other subjects. Meanwhile, archives of songs, radio broadcasts, satellite images, stock photos, video clips and full-length movies are steadily growing. To make this data useful and available, it needs to be stored in databases that support browsing, querying, and rapid retrieval.

Yet multimedia data is inherently problematic. Multimedia is multidimensional. It is stored in a wide variety of file formats. And multimedia files are inevitably huge, requiring compression and/or streaming to make their storage and transmission more manageable. Continuous media (such as video and audio) must be received without interruptions or delays. Furthermore, multimedia does not lend itself to the precise query techniques typically used to retrieve alphanumeric data.

The purpose of this class is to familiarize students with the issues, techniques, and technologies used to manage databases containing multimedia data. At the end of the course, students will be able to evaluate and select database technologies that are appropriate for a given type of multimedia. They will also be able to design a simple multimedia database, and develop functions for retrieving multimedia.

**Syllabus:**

- Week 1: Introduction to multimedia databases. Issues of multimedia data types.
- Week 2: Review database approaches. Relational databases, especially SQL. Object-oriented databases.
- Week 3: Multimedia data and data formats. Perceptual issues.
- Week 4: Approaches to multimedia databases. Pros and cons of extended relational versus object-oriented multimedia databases.

- Week 5: Querying multimedia. Classification problem.
- Week 6: Modeling multimedia databases. Universal modeling language.
- Week 7: Using multimedia metadata. Metadata creation and extraction.
- Week 8: Multimedia database architectures and performance issues.
- Week 9: Distributed multimedia databases. Internet distribution. Delivery methods. Quality of service.
- Week 10: Principles of content-based retrieval. Indexing methods. Minimizing false negatives and false positives.
- Week 11: Approaches to indexing and querying text documents. Information retrieval.
- Week 12: Image processing, analysis, and understanding, applied to multimedia databases.
- Week 13: Continuous media processing and analysis. Storage and disk scheduling issues.
- Week 14: Multimedia database applications.

**Textbook:**

L. Dunckley, Multimedia Databases: An Object-Relational Approach, Addison Wesley, 2003.

**Bibliography:**

1. S. Khoshafian and A.B. Baker, Multimedia and Imaging Databases, Morgan Kaufman, 1996.
2. G. Lu, Multimedia Database Management Systems, Artech House, 1999.
3. B. Thuraisingham, Managing and Mining Multimedia Databases, CRC Press, 2001.
4. V.S. Subrahmanian, Principles of Multimedia Database Systems, Morgan Kaufmann, 1998.