

CS 3121: Interactive Multimedia Technology (4)**Catalog Description:**

Fundamentals of multimedia computing and interactive technologies; digitizing and manipulating images, audio, and video materials; perception, cognition, and communication issues; copyright and ethics. Includes practical labs and authoring a large-scale project.

Textbooks: Chapman, N, & Chapman, J. (2004). *Digital Multimedia (2nd Edition)*. John Wiley & Sons, Ltd.
Williams, R. (2004). *The Non-Designer's Design Book. Second Edition*. Berkeley, CA: Peachpit Press.

Course Goals:

This course is an introduction to the fundamentals of interactive multimedia computing. Course coverage will include both theoretical understanding of multimedia technologies, and hands-on experience with applications and hardware. Topics may include digitizing and manipulating images, voice, and video materials, including authoring a larger multimedia presentation. While the course will not be predominantly about programming, some multimedia-related programming will be included.

Prerequisites by Course & Topic

CS 2511: Software Development – large scale software issues including management, design, modularity, and data abstraction

FMIS 2201: Information Technology in Business – use of basic business software

Major Topics Covered in the Course

- Perceptual and cognitive issues
- Data sampling and digitization
- Media formats
- Compression
- HTML/JavaScript
- Legal and societal issues
- Communication theory
- User interface design
- Event-driven graphical user interfaces

Class/Laboratory Schedule: Lecture: 3 hours per week, Laboratory: 1

Course Outcomes

1. Understanding of perceptual and cognitive psychology related to visual and auditory perception.
 - a. Understand the psychophysical range, function, and limitations of auditory and visual perceptual skills
 - b. Understand terms related to auditory and visual perception.
 - c. Understanding of how perception and cognition and different sensory systems may interact.
 - d. Acquire concepts related to communication theory applicable to multimedia presentations.
2. Proficiency in methods of data sampling and digitization relative to different formats of audio and video media.
 - a. Understand frequency- and spatial-based sampling.
 - b. Understand vector-based and sampling-based media representations.
 - c. Understanding of specific media representations of audio and video files including AVI and WAV.
 - d. Specify how audio and video are sampled to create multimedia data files.
 - e. Understand the uses and application of XML.
 - f. Understand the basis of media data compression.
3. Understanding of ethical issues in multimedia
 - a. Understand the application of “fair use” to multimedia copyright.
 - b. Recognize when fair use applies in situations of using external media in their projects.
 - c. Understand procedures to apply for copyright of their own media.
4. Proficiency in the HTML and JavaScript languages.

- a. Analyze problem descriptions for interactive multimedia problems and generate algorithmic specifications for the problems.
- b. Ability to write interactive programs in HTML/JavaScript based on an algorithmic specifications.
- 5. Acquire working knowledge involved in programming a moderate size multimedia application project.
 - a. Acquire knowledge of various multimedia software tools including Macromedia Flash, Macromedia Dreamweaver, and Final Cut Express.

Relationship to Program Outcomes

Students who have completed software design and analysis may take this course. CS 3121 contributes to meeting the following program outcomes:

1. *Students understand the mathematics and statistics that underlie scientific applications.*
Students learn mathematical techniques related to frequency and spatial-based sampling of signals, and also media data compression
2. *Students can design, develop, and analyze significant software systems.*
Student programs must demonstrate good design and well-structured implementation of their multimedia application project.
3. *Students understand the fundamentals of computer organization and architecture, data structures and related algorithms, and programming languages.*
Students increase their proficiency in algorithms by creating interactive programs. They also learn JavaScript and HTML, new programming languages. In the context of media representations (e.g., WAV files) students review some aspects of machine data representation.
4. *Students can apply computer science principles and practices to a variety of problems.*
Students apply knowledge gained in this course to multimedia problems in the lab and in the application project.
5. *Students can work independently and also work effectively in teams.*
Students continue to enhance their abilities to work independently on software design and implementation.
6. *Students can communicate effectively both orally and in writing.*
Students make an oral class presentation of their multimedia application project.
7. *Students understand social, professional and ethical issues related to computing.*
Ethical issues in multimedia are covered.
8. *Students are knowledgeable of contemporary issues in the arts, social sciences, and humanities.*
Perceptual and cognitive psychology are covered as related to visual and auditory perception.

Assessment Plan for Course:

This course is assessed every third year by the instructor and a course assessment document covering all of the course outcomes and their effect on the program outcomes is prepared.

Estimate CSAB Category Content

	CORE	ADVANCED		CORE	ADVANCED
Data Structures			Computer Organization and Architecture		1
Algorithms		1	Concept of Programming Languages		1
Software Design		1			

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