

CSE 471: Media Processing and Multimedia

Fall Term 2009

Course Information

This course will study the use of media in computer applications. Students will study basic signal and image processing and the manipulation of audio, images, and video content. We will learn how to acquire, process, and organize multimedia information. We'll also explore the use of a modern multimedia API (DirectX). A quick introduction to interactive 2D gaming and C# will be included in the course. This will include the use of tools and packages as well as creating your own programs to access and process multimedia data. The focus of this class will be on development tools, not authoring tools such as Director or Flash.

Objective: Students completing this course are expected to be able to:

- Understand the basic mathematics of signal and image manipulation.
- Capture, store, process, and present multimedia data.
- Understand common media software tools.
- Understand the use of a multimedia API

Instructor: Charles B. Owen
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Phone: 353-6488, 337-0543 (home)
Office Hours: 1:00-2:00 MTW, and by appointment.
I have an open-door policy. Feel free to contact me at any time.
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TA: Xiaojun (Wesley) Wang
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Schedule: MW 3:00-4:20pm in 1225 Engineering Building

Textbooks: No required text.

Special Materials: You will need a small set of headphones in the lab or speakers at home. These are identical to what you would use with a Walkman. I would also suggest obtaining an extension cord for these if you use the computer labs; since the lab audio jacks are farther away than you can usually reach.

During this course you will be commonly working with media data files, which can be very large and consume you quota. Consider utilizing flash drives for offloading what you don't need to keep on-line. Be sure to back up!

Prerequisites: CSE 320 or CSE 331 or CSE 335.

WWW: Information about the class will be posted at:
<http://www.cse.msu.edu/~cse471/>.

Angel: This class will be utilizing Angel, the online course management system. This is in addition to the regular class web site, which I will also use. Go to
<http://angel.msu.edu>.

Facebook: A facebook group will be used in support of this and other classes taught by Dr. Owen. A link to the group is on the class home page.

Privacy: Electronic conversation via email, bulletin boards, or any of the angel features, is different from verbal communication because it retains the identity of the participant. In this course, all participants will have access to a list of names and e-mail addresses of other course participants. Participants in the course will be able to send bulk e-mail to all other participants.

It is inappropriate to use the email features of this course to send bulk e-mail to all enrolled in the class, unless this type of activity is for a specific educational objective, e.g., to facilitate collaborative learning within the class. All use of the e-mail function within Blackboard is governed by the "Good Citizenship in Cyberspace" section contained in MSU's Acceptable Use policy (<http://www.msu.edu/unit/complab/policies.html> and <http://www.cse.msu.edu/facility/policy.html>)

Exams: This course will include a practical examination during the week of October 1, 2009. The exam will be conducted in a computer laboratory.

Notice: This course will have one practical exam. The class will not have a written final exam. We will, however, meet the scheduled day of the final exam for evaluation of final projects. **Attendance will be required.** This date is Monday, December 14 at 3:00pm.

Toe-Tippers: Many class sessions will include a handout referred to as a "toe-tipper". This assignment will be completed during the lecture period. Some toe-tippers will be group assignments, others will be individual assignments. Notice: toe-tippers are to be done **ONLY** in class and cannot be made up! If you miss class, you miss it. The two lowest-score toe-tippers are discarded in the grading process. This is provided to allow for some missing of classes. If you must miss more than two classes for university excused absences, toe-tippers beyond the first two can be made up.

You must bring to class a black or blue inking pen AND a red inking pen. Many of the Toe-Tippers will be collaboratively executed and graded in class.

Step Assignments: Many weeks there will be a smaller programming assignment that must be completed during that week. Some step assignments will include questions that must be answered as well as programming assignment steps. Programming assignment elements of a step will be due the following Thursday. Any additional written questions will be due the Monday following that.

Step Assignments Completion Rule:

If you fail to turn in any step assignment, that assignment will be assigned a grade of negative 100%.

Projects: 3 projects will be assigned during the course of the term. These assignments will be individually graded and some project work may be reflected in step assignment grades. Step assignments are synchronized to the projects. Two projects will be group projects.

Grading: There will be these grading elements in this course:

In-class examination:	25%
Step assignments:	20%
Project 1:	15%
Project 2:	15%
Project 3:	10%
Toe-tippers:	15%

Final grades will be based on the scale:

4.0	90%+
3.5	85%
3.0	80%
2.5	75%
2.0	70%
1.5	65%
1.0	60%

Attendance: You are expected to attend all class sessions. Failure to attend a class may be reflected in your toe-tipper scores.

Extra credit: There may be limited opportunities for extra credit. I do also make alternative incentives available for exceptional performance and competitive success. I also have on occasion assigned optional *loss abatement* questions.

Academic Honesty: Article 2.3.3 of the Academic Freedom Report states that "The student shares with the faculty the responsibility for maintaining the integrity of scholarship, grades, and professional standards." In addition, the College of Engineering adheres to the policies on academic honesty as specified in General Student Regulations 1.0, Protection of Scholarship and Grades; the all-University Policy on Integrity of Scholarship and Grades; and Ordinance 17.00, Examinations. (See Spartan Life: Student Handbook and Resource Guide and/or the MSU Web site: www.msu.edu.) Therefore, unless authorized by your instructor, you are expected to complete all course assignments, including homework, lab work, quizzes, tests and exams, without assistance from any source. You are expected to develop original work for this course; therefore, you may not submit course work you completed for another course to satisfy the requirements for this course. Also, you are not authorized to use the <http://www.allmsu.com> web site to complete any course work in CSE 471. Students who violate MSU rules may receive a penalty grade, including--but not limited to--a failing grade on the assignment or in the course. Contact your instructor if you are unsure about the appropriateness of your course work. (See also <http://www.msu.edu/unit/ombud/honestylinks.html>)

That's the university policy. My specific policies are as follows: You may discuss individual assignments with other students, but the assignment must be entirely your own work. Plagiarism just makes me mad! All work turned in must be your own. If you borrow or adapt software from a textbook or from source code that is obviously public, you must treat this as a quotation or paraphrase, acknowledging the source in the heading or the program module.

You may discuss assignments in general terms with your classmates, the course staff, or the instructor, but you are not permitted to receive solutions from others or to read or copy part or all of another person's solution to a problem.

Disabilities: Students with disabilities should contact the Resource Center for Persons with Disabilities to establish reasonable accommodations. For an appointment with a disability specialist, call 353-9642 (voice), 355-1293 (TTY), or visit MyProfile.rcpd.msu.edu.

Commercialization: Commercialization of lecture notes and university-provided course materials is not permitted in this course.

Religious Holidays: You may make up course work missed to observe a major religious holiday only if you make arrangements in advance with the instructor.

Required Activities: To make up course work missed to participate in a required activity for another course or a university-sanctioned event, you must provide the instructor with adequate advanced

notice and a written authorization from the faculty member of the other course or from a university administrator.

Attendance: Students whose names do not appear on the official class list for this course may not attend this class.

Internet: Some professional journals will not consider a submission for publication if the article has appeared on the Internet. Please notify your instructor in writing if you do not want your course papers posted to the course Web site.

Disruptive Behavior: Article 2.3.5 of the Academic Freedom Report (AFR) for students at Michigan State University states that "The student's behavior in the classroom shall be conducive to the teaching and learning process for all concerned." Article 2.3.10 of the AFR states that "The student has a right to scholarly relationships with faculty based on mutual trust and civility." General Student Regulation 5.02 states that "no student shall . . . interfere with the functions and services of the University (for example, but not limited to, classes . . .) such that the function or service is obstructed or disrupted. Students whose conduct adversely affects the learning environment in this classroom may be subject to disciplinary action through the Student Faculty Judiciary process.

Course Content (in a very approximate order of presentation)

- Introduction to Multimedia.
- Introduction to programming with Visual Studio and MFC.
- Media and data streams.
- Sound and audio.
- Digital sampling and representation of signals.
- Aliasing and antialiasing
- Feedforward filters.
- Feedback filters.
- Music fundamentals and synthesis
- Speech recognition and synthesis
- Digital representation of images.
- Image manipulations.
- Image filtering,
- Image segmentation.
- Augmented imagery.
- Video.
- Animation and time.
- Synchronization.
- Media compression.
- Content analysis and multimedia databases.
- Multimedia storage.
- Games and game design
- DirectX and C#

Notice: I never specify exactly what material will be covered on any particular week and reserve the right to modify the presentation order of materials. Likewise, I do not specify in advance the dates of projects and assignments. This is for your benefit. Course progress will be based on feedback from students, be it through grades or directly. Note, however, that we must cover the course materials, so if we slow in one area, we must accelerate elsewhere.

The course schedule is subject to change with appropriate notice. Dates for all assignments will be indicated on the class web site.

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