CSC557, Fall 2001
Multimedia Computing and Networking

Syllabus

"Multimedia" is a loose term which for the purposes of this course means audio (including voice), images, and video. There are plenty of opportunities in this field, since the integration of these technologies is a driving force behind the massive convergence we see today of so many markets: computer hardware and software, data network equipment, telephone equipment vendors, network service providers, telephone carriers, TV broadcasters and cable companies, news and publishing, entertainment, education, consumer electronics, etc.

This course describes how multimedia is captured, processed, and compressed, and how it is transmitted across networks. There will be a good amount of reading, some tool use, and some programming and experimentation. We will spend approximately half the semester on media topics (recording, processing, and compression). In the other half of the semester, we will study the transport of multimedia across networks.

Just for purposes of clarification, this course is *not* about using commercial tools to create multimedia content, about effective design principles, or about the applications of multimedia. Those topics are more appropriately taught by such disciplines as design, fine arts, communications, education, etc., or as part of a human-computer interaction course.

Goals

When you finish this class you should have a good understanding of concepts, standards, or procedures:

- Signals, sampling, spectrum, transforms, and filtering
- Compression such as entropy coding, run-length coding, transform coding, and quantization
- Perception and physics of sound, useful audio processing operations, voice compression standards, MPEG audio compression
- Sound synthesis and the MIDI standard
- Color, image representations, useful image processing operations, JPEG image compression
- Video standards, MPEG video compression
- TCP/IP internetworking, quality of service, scheduling and jitter buffers

- Packet buffering, dropping, and scheduling
- RSVP and integrated services
- DiffServ and differentiated services
- RTP and streaming protocols
- SIP, MGCP, and telephony protocols

Prerequisites

You should be a major in Computer Science or Electrical and Computer Engineering. It is helpful if you have taken a basic computer networks course, but if not, I'll do my best to tell you what you need to know for this class. It is also helpful if you have a basic background in signal and image processing, but since that is not the case for most computer science students, once again I'll tell you what you need to know.

Who am I?

I am Douglas Reeves, a Professor of Computer Science and Electrical and Computer Engineering at N.C. State. My research interests include network quality of service and security. I can be contacted at

office	450 EGRC
phone	515-2044
class message board	http://wolfware.ncsu.edu/wrap-bin/mesgboard/csc:557::001:8:2001
email	reeves@eos.ncsu.edu
office hours	I will try to be available most days from **3-4pm** in my office. Periodically I may have meetings elsewhere that impinge on this time. If you're making a special trip, check with me in advance to be sure I'll be there, or just call before you hop in the car.

Textbook

We will use a variety of sources for this course. Some portion may be a coursepak available for the purchase. The rest will be on the web, or on reserve on reserve at the library for you to check out.

Computing facilities

We will use both the campus-wide EOS/Unity computing facilities, and the Multimedia Lab in EGRC (room 450).

Time and Place

We meet 2 days a week (Mon-Wed) at 6:30-7:45pm in Ventures II, room 150.

Grading

Grades are weighted as follows:

Exam 1	10%
Exams 2,3	12.5% each
Homeworks 1,2,3,4	10% each
Final Exam	25%
Total	100%

Grades and class rank will be posted (using pseudonyms) after each assignment or exam. The top 30% of the class should expect an A- or better, and the next 50% of the class should expect a B- or better.

Makeup Policy

The schedule shows due dates and exam dates. Please mark on your calendar. I regret I will not be able to accept late work or give makeup exams; the additional paper handling is just not worth it. Exceptions will be made for unavoidable emergency or illness, which hopefully will be rare.

Academic Integrity

See the university statement on academic integrity:

http://www.ncsu.edu/provost/academic_policies/integrity/reg.htm

See also the student code of conduct:

http://www.fis.ncsu.edu/ncsulegal/41.03-codeof.htm

Some specific scenarios:

OK or NOT OK?	Scenario
OK	Student finds non-copyrighted code on web that fulfills part of an assignment. She points it out to the instructor and asks for permission to use. Instructor agrees and the student submits as part

	of the assignment. The accompanying documentation makes clear what is copied, and where the source of copied material may be found.
NOT OK	Student has problem with an assignment, or starts late. He copies work (code, data, or answers) of another student, with or without their permission (makes no difference), and submits as his own work.
NOT OK	Student finds non-copyrighted code on web that fulfills part of an assignment, incorporates in her own program and submits as original, without acknowledging the source.
NOT OK	Student is working on a report and finds much information on the web. Student copies sections from the web verbatim (or with minor modifications) and pastes into his report, without acknowledging the source.
OK	Student is working on a report and finds information on the web. Student makes notes of information found. She incorporates this information in the report, written using her own words, and cites the source of information in the normal way. Short sections may be used verbatim, if they are a) in quotes, or indented paragraphs, and b) cited properly.
OK	Student has a problem with an assignment, asks for clarification or ideas or pointers from any one, using the class message board. Another student replies, also through the message board, with suggestions or information or advice that is useful, but does not just hand over code or the answer.

Maintained by Douglas Reeves
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Mail to the course support staff at csc557-001-sup@wolfware.ncsu.edu