

Streaming Media Summer 2007 Overview

The course is designed to allow students to gain basic skills in media creation while developing an understanding of the architecture of streaming media and the pros/cons of various streaming options. Each week will have a specific focus and will include instructor lecture and class workshop, augmented with a few guest expert lectures. Discussion will include appropriate media selection, delivery system attributes and limitations, associated file types, audio and video codecs, and software players. Students will prepare auditory and visual media for Web delivery by encoding assigned projects.

Course Objectives:

- Develop an understanding of the dominant technologies used to deliver moving images and audio via the Internet
- Use the dominant audio and video Codecs to encode media for appropriate software players
- Perform all technical aspects of converting, encoding, linking, uploading and testing audio and video in Web sites
- Be able to recommend the appropriate delivery medium, taking into account delivery system strengths and weaknesses

Topics:

- What are streaming video and audio?
- Introduction to codecs and architectures
- What is the difference between live and on-demand streaming?
- How do streaming technologies actually work, from the lens to your PC screen?
- What quality-of-service and bandwidth issues do you need to understand?
- What hardware and software do you need for streaming media?
- Basics of audio and video recording and pre-production for streaming delivery
- Encoding, hosting, and serving your content

Recommended Prerequisite Skills:

Working knowledge the Internet and HTML, including web site construction and web page design.



Course Structure and Schedule:

- Week 1**
Class 1
June 21
Overview: How streaming media works
What is streaming media? Why streaming media? What media players?
Workshop: Streaming Media Examples / Introduction to the Lab / Catalyst
- Week 2**
Class 2
June 28
Podcasting and Audio Streams
Before You Stream: Codecs, Encoding and Content Management
Guest: **Travis Petershagen, Seattle Podcasting Network**
Workshop: Introduction to encoding MP3 audio files for web distribution
- Week 3**
Class 3
July 5
Broadcast on the Net: The Nuts and Bolts of Streaming Audio
Guest: **Real Networks Expert/Evangelist**
Workshop: Introduction to encoding with Real Producer
- Week 4**
Class 4
July 12
Apple QuickTime
Going Beyond TV: Integrating Media With The Browser
Guest: **Apple QuickTime Expert**
Workshop: Encoding with QuickTime Pro
- Week 5**
Class 5
July 19
Windows Media
The current state of affairs. Emerging Practices of Internet-Based Media
Guest: **Daniel Orme-Doutre, Consulting Engineer, Windows**
Workshop: Introduction to encoding with Windows Media Encoder
- Week 6**
Class 6
July 26
Know your rights: DRM and protecting your content
Guest: **Rights Management Expert** (law or technical)
Workshop: Using the Windows Media Profile Editor
- Week 7**
Class 7
August 2
Flash Video
Planning Live Broadcasts: Going Beyond the Webcam
Guest: **Flash Evangelist, Adobe**
Workshop: Encoding Flash Video
- Week 8**
Class 8
August 9
The Horizon and Beyond
Where do we go from here? Trends and opportunities with streaming media.
Workshop: Flash Video Server



Required Text:

- **A Practical Guide to Video and Audio Compression, First Edition : From Sprockets and Rasters to Macro Blocks.** Cliff Wootton. Focal Press (April 28, 2005)

Additional Resources:

- **Get Streaming!, First Edition : Quick Steps to Delivering Audio and Video Online.** Joe Follansbee. Focal Press (April 19, 2004)
- **Interactive QuickTime: Authoring Wired Media.** Matthew R. Peterson. Morgan Kaufmann; Bk&CD-Rom edition (August 8, 2003)
- **Mastering Internet Video : A Guide to Streaming and On-Demand Video.** Damien Stolarz. Addison-Wesley Professional (August 4, 2004)
- **Streaming Media Bible.** Steve Mack. Wiley; Bk&CD-Rom edition (April 1, 2002)

Websites and Blogs:

Unmediated.org

[Radio and The Internet Newsletter \(RAIN\)](#)

[ITV Today](#)

[Jeff Jarvis' Buzz Machine](#)

[J.D. Lasica New Media Musings](#)

[Jay Dedman's Video Blog](#)

[StreamingMedia.com](#)

[Vimeo](#)

Evaluation:

- Comparative analysis of three web sites that deliver at least two different forms of streaming media, including aesthetic and practical considerations. Recommendations for improved website experience.
- Completion of all encoding exercises.
- Participation in weekly discussion.

Software:

Students can download and install QuickTimePro, RealPlayer, Windows Media Player, RealProducer Basic, Adobe® Flash® Media Encoder, WindowsMedia Encoder, Firefox, Safari (Mac), and Explorer. All these applications will be available for class use in the communications labs.

Instructor: D. Keller



I COURSE DESCRIPTION

Traditional broadcast media (television and radio), the recording industry and filmmakers are in a time of transition. They are being pushed in new directions by the increasing ease of producing compelling material, and by the interactive and social nature of the internet. Changes in information technology now permit “streaming” to new audiences or existing audiences in new ways. Blogs and other internet based social networks have given rise to an audience that is eager to engage with and participate in the creation of media. This appetite is quickly moving into the realm of television, radio and film with new avenues for distribution and new means for audience interaction offering serious challenges to traditional distribution models.

This course focuses on decision making in the digital audio and video information environment. This includes collection development, management, and organization with emphasis on the evaluation, selection, and use of a wide range of low to high tech audio and visual media. Issues such as access, organization, promotion, multimedia copyright, and censorship will be discussed. This course is aimed at expanding thought about the integral role of audio and video resources

The skills-based aspect of this course is designed to familiarize students with the technologies associated with bringing images and audio to the Internet environment and enable them to identify and use the tools which facilitate these media in Web sites. Appropriate media selection, software tools for encoding various media, delivery system attributes and limitations, associated file types, audio and video codecs and software players will be explored. Students will learn to design for and solve problems with the integration of audio and video media into pre-existing Web sites.

This course aims to help students understand the processes involved in producing streaming media. This media creation is a multi-step effort, with thoughtful decision-making involved throughout the process. Working with existing video footage, students will deliver the source content in multiple versions of encoded formats and data rates for successfully streamed compression. The goal of this course is to introduce students to new technologies and methods for creating participatory media and making it available. Students will develop new ideas for helping this transition along both on the internet and in the traditional broadcast space.

II INSTRUCTIONAL GOALS

Goal A Demonstrate an understanding of basic streaming terminology

Learning Outcomes:

The student will:

- A-1 Determine advantages/disadvantages of streaming media
- A-2 Identify basic streaming technology
- A-3 Determine and evaluate source material
- A-4 Evaluate and determine network requirements



Goal B

To demonstrate the understanding of the encoding and publishing streaming video

Learning Outcomes:

The student will:

- B-1 Evaluate hardware and software compression tools
- B-2 Evaluate and develop encoding workstation requirements
- B-3 Produce and publish streaming content segment
- B-4 Evaluate, document, and investigate future solutions

III Assignments**Weblog**

It is expected that everyone in the class will create and maintain a blog for their thoughts on readings, assignments, research and interesting items. I prefer Vox.com because it is easy for me to subscribe to the feeds.

Weekly Assignments

We will have small assignments that are relevant to the previous class' material. Due to the fact that we are exploring this material from both a production and audience standpoint, most assignments will involve recording observations and insights about assigned readings or student assignments on their personal blog. In addition, students will be expected to post weekly assignments (compressed media) on their UW web sites for instructor review.

Paper

There will be a 8-10 page paper, due on August 10, Midnight. Although the specific topic is left up to you, some topic suggestions are as follows:

- A reaction to one of the suggested readings
- A project idea (relating to the class material)
- An analysis of a television or radio program that enables some type of audience interaction
- An idea for adding audience participation to an existing television or radio program

IV Expectations of Student Performance:

Upon successful completion of this course, the student should be able to:

- Develop an understanding of the dominant technologies used to bring still and moving images and audio to the Internet.
- Use appropriate terminology to identify and discuss media types and delivery systems and processes.
- Address access, organization, promotion, multimedia copyright, and censorship issues.
- Contribute to class discussion and project critiques and use the appropriate terminology to describe and evaluate media, procedures, equipment, software and delivery systems.



- Develop an understanding of delivery system attributes and limitations
- Identify appropriately prepared media for use in Web sites.
- Select equipment and software appropriate for preparing specific audio and image media types to use in Web sites.
- Locate and install software used to prepare audio and video for use on the Internet.
- Develop skill in using the dominant audio and video codecs to convert and encode media for the appropriate software players.
- Develop, manage, and organize digital audio and video information collections.
- Develop a demonstrable knowledge of media file types.
- Develop skill in solving problems with the integration and design of audio/video streaming for pre-existing Web site.

V Course Structure (Week/Topic):

Week 1

Class 1

June 21

Overview: How streaming media works

What is streaming media? Why streaming media? What media players?

Workshop: Streaming Media Examples / Introduction to the Lab / Catalyst

- Class objectives/Introduction/Review Syllabus
- Equipment and software for the course
- What Is Streaming Media?
- Before You Stream: The Basics
- The players
- The servers
- The codecs
- Bitrate and bandwidth
- Websites & Examples

Assignment :

- Set up blog, set-up course website
- Find a web site utilizing streaming media and write a blog entry about it (What you like, dislike, how it could be better, etc.)
- Reading for Class 2:
 - Wootton Introduction: pp 15-42
 - Wootton Audio: pp 147-149, 153-154, 160-162, 167 (7.9.1) – 169
 - Wootton Choosing a Codec: pp 171-185
 - Wootton How Encoders Work: pp 187-193



Week 2

Class 2
June 28

Podcasting and Audio Streams**Before You Stream: Codecs, Encoding and Content Management**Guest: **Travis Petershagen, Seattle Podcasting Network**

Workshop: Introduction to encoding MP3 audio files for web distribution

- The Streaming Media Process
- Media Players
- Encoding
- Network architectures
- Streaming protocols
- The Streaming Server
- Managing Media Assets
- Server Logs
- Advertising
- Peer to Peer distribution (BitTorrent)
- VoIP (Voice over IP) as a live production tool
- Video blog aggregators and Podcasting clients
- Streaming Flash
- Streaming Text
- Streaming Images
- Other Data

Assignment:

- Find a web site utilizing streaming media and write a blog entry about what it (What you like, dislike, how it could be better, etc.)
- **Or** create a blog entry describing a different use of streaming media (not emulating a television or radio show).
- Course reading (book & articles)
- Reading for Class 3:
 - Wootton Video Formats: pp 77-113
 - Wootton Tape Formats: pp 301-305
 - Wootton Digital Image Formats: pp 115-125, 130 (6.11) - 136
 - Wootton Encoded Output: pp 251-256
 - Wootton Real Networks: pp 397-406

Week 3

Class 3
July 5

Broadcast on the Net: The Nuts and Bolts of Streaming AudioGuest: **Real Networks Expert/Evangelist**

Workshop: Introduction to encoding with Real Producer

- Internet Audio Basics
- Internet Video Basics
- Tools
- Creating Useful Media
- Integrating with a browser
- Layout and simple interactivity



Assignment:

- 1 paragraph description of proposed final paper (e-mail to drewke@u.washington.edu)
- Blog (including links) about a web site that integrates streaming media directly in their web page. Media can be flash, WM, QT or Real. What do you like about the integration? What do you dislike? Why did they use this media? What is its purpose? How effective is it at communicating their message?
- Reading for Class 4:
 - Wootton Streaming & Web Architecture: pp 345-362
 - Wootton QuickTime: pp 383-395

Week 4**Apple QuickTime**

Class 4

Going Beyond TV: Integrating Media With The Browser

July 12

Guest: **Apple QuickTime Expert**

Workshop: Encoding with QuickTime Pro

- QuickTime Video
- Video Blogging
- Audio Blogging and Podcasting
- SMIL Overview
- SMIL Syntax
- Layout
- Synchronizing Streams
- Authoring SMIL
- SMIL with RealPlayer and QuickTime
- Other SMIL

Assignment:

- Blog (including links) about a web site that integrates QuickTime media directly in their web page. Media can be free or fee based (i.e. iTunes). What do you like about the integration? What do you dislike? Why did they use this media? What is its purpose? How effective is it at communicating their message? **OR** reading ah-ha's.
- Reading for Class 5:
Wootton Windows Media: pp 373-382



Week 5**Windows Media**

Class 5
July 19

The current state of affairs. Emerging Practices of Internet-Based Media
Guest: **Daniel Orme-Doutre**, Consulting Engineer, Windows
Workshop: Introduction to encoding with Windows Media Encoder

- Distribution models in the corporate world (iTunes, MSN, AOL, Yahoo!)
- Streaming Audio on the web (radio any time anywhere)
- Free video on the web (YouTube, Vimeo, Google Video)
- Brightcove's distribution model

Assignment:

- Blog (including links) about a web site that integrates Windows Media directly in their web page. Media can be progressive or streaming. What do you like about the integration? What do you dislike? Why did they use this media? What is its purpose? How effective is it at communicating their message? **OR** Brightcove compare and contrast.

Assignment:

- Reading for Class 8:
 - Wootton Digital Rights Management: pp 307-332

Week 6**Know your rights: DRM and protecting your content**

Class 6
July 26

Guest: **Rights Management Expert** (law or technical)
Workshop: Continued encoding with Windows Media Encoder

- Overview of DRM technologies
- Revenue matrix of distributed media (legal v. illegal files)
- Alternative digital rights methodologies
- Capturing, Editing and Rendering Video
- Optimizing Video Files
- Automation
- Encoding Settings
- Encoding Techniques
- Working with Encoded Files
- Authoring Basics
- Embedding

Assignment:

- Blog about personal experiences with Digital Rights Management.
- Reading for Class 7:
 - Wootton Macromedia Flash Video: 407-408
 - Wootton Web Delivery: pp 415-423
 - Wootton Mobile Video: pp 439-444



Week 7

Flash Video

Class 7
August 2

Planning Live Broadcasts: Going Beyond the Webcam
Guest: **Flash Evangelist**, Adobe
Workshop: Encoding Flash Video in web sites

- Flash basics
- Recording and Editing Audio
- Optimizing Audio Files
- QuickTime Audio
- Video on your phone
- iMovie / Play Station / mobile movies
- Optimizing the user's experience with mobile video displays

Assignment:

- To heck with the reading and blog, work on your papers. Papers are due Friday August 10 at midnight.

Week 8

The Horizon and Beyond

Class 8
August 9

Where do we go from here? Trends and opportunities with streaming media.
Workshop: Flash Video Server

- Planning Live Broadcasts
- Content for Broadcast
- Encoding Broadcasts
- Authoring Broadcasts
- Serving Broadcasts

