

## **COM597: Streaming Media Summer 2006. Overview**

In this course, students will develop an understanding of the architecture of streaming media and the pros/cons of various streaming options as well as gain basic skills in media creation.

Each week will have a specific focus and includes instructor lecture, guest expert lecture and workshop. 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.

### **Details:**

CMU302. Tu/Th, 20 June – 18 July  
<http://courses.washington.edu/smedia/2006/>

### **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

### **Prerequisites:**

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

### **Text:**

Required: A practical Guide to Video and Audio Compression by Cliff Wootton. Focal Press (April 28, 2005) [Purchase ability to read, search, annotate online – see Amazon for details]

Optional: Streaming Media Bible by Steve Mack. Wiley; Book & CD-Rom edition (April 1, 2002)

## **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 to 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.

***This is not a course in original video production.***

## **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. 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.

## **IV Assignments**

### **Blog**

It is expected that everyone in the class will create and maintain a blog for their thoughts on readings, assignments, research and interesting items.

### **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 July 20, the last day of exam week. Although the specific topic is left up to you, the context must be an exploration of streaming media. Possible topic suggestions follow:

- 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

## V Course Structure (Week/Topic):

### **Week 1**      **Overview: How streaming media works**

**Class 1**      What is streaming media? Why streaming media? What media players?

**Tu June 20**    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 – due end of class:

- Set up blog, set-up course website
- In-class assignment: 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** (Blog your “ah-ha” from this before Thursday’s class)

- 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

**Class 2**      Before You Stream: Codecs, Encoding and Content Management

**Th June 22**    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 – due start of class:

- Create a blog entry describing a novel use of streaming media (not emulating a television or radio show).
- Blog course reading

**Reading for Class 3 (Blog your “ah-ha” from this before Tuesday’s class)**

- 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

## **Week 2    Podcasting and Audio Streams**

### **Class 3**

**Tu June 27**

Broadcast on the Net: The Nuts and Bolts of Streaming Audio

Guest: **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 – due start of class:

- Blog: find a web site (include links) that integrates media (flash or streaming) directly in the web page. 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 message? Be sure to include information on your operating system and browser, as well as the type of media/player utilized.
- Blog course reading

**Reading for Class 4 (Blog your “ah-ha” from this before Thursday’s class)**

- Wootton Streaming & Web Architecture: pp 345-362
- Wootton Real Networks: pp 397-406

### **Class 4**

**Th June 29**

Podcasting and vCasting

Guest: **UW C&C** – Podcasting on Campus

Workshop: Continued encoding with Real Producer

- Video Blogging
- Audio Blogging and Podcasting
- SMIL Overview
- SMIL Syntax
- Layout
- Synchronizing Streams

- Authoring SMIL
- SMIL with RealPlayer and QuickTime
- Other SMIL

Assignment – due start of class:

- Blog assignment TBD
- Blog course reading

**Reading for Class 5 (Blog your “ah-ha” from this before Thursday’s class)**

- Wootton QuickTime: pp 383-395

### **Week 3**

#### **Apple QuickTime**

#### **Class 5**

Going Beyond TV: Integrating Media With The Browser

*Th July 6*

Guest: **Apple QuickTime Expert**

Workshop: Encoding with QuickTime Pro

- QuickTime Video
- 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, Google Video)
- Brightcove’s distribution model
- Video on your phone
- iMovie / Play Station / mobile movies
- Optimizing the user’s experience with mobile video displays

Assignment – due start of class:

- Blog assignment TBD
- Blog course reading

**Reading for Class 6 (Blog your “ah-ha” from this before Tuesday’s class)**

- Wootton Windows Media: pp 373-382

### **Week 4**

#### **Windows Media**

#### **Class 6**

The current state of affairs. Emerging Practices of Internet-Based Media

*Tu July 11*

Guest: **Daniel Orme-Doutre**, Consulting Engineer, Windows Media or

**John Conrad**, Sr. Consulting Engineer, Windows Media

Workshop: Introduction to encoding with Windows Media Encoder

- Capturing, Editing and Rendering Video
- Optimizing Video Files
- Automation
- Encoding Settings
- Encoding Techniques
- Working with Encoded Files
- Authoring Basics
- Embedding

Assignment – due start of class:

- Blog assignment TBD
- Blog course reading

**Reading for Class 7 (Blog your “ah-ha” from this before Thursday’s class)**

- Wootton Web Delivery: pp 415-423
- Wootton Mobile Video: pp 439-444

**Class 7**

**Th July 13**

Planning Live Broadcasts: Going Beyond the Webcam

Guests: **Craig Mathewson**, MSN Autos / Event Podcast Coordinator

**Pete Grondal**, Windows Media Evangelist

Continued encoding with Flash Video

Workshop: Encoding Flash Video in web sites

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

Assignment – due start of class:

- Blog course reading

**Reading for Class 8 (Blog your “ah-ha” from this before Tuesday’s class)**

- Wootton Digital Rights Management: pp 307-332
- Wootton Macromedia Flash Video: 407-408

**Week 5**

**Flash Video**

**Class 8**

**Tu July 18**

Know your rights: DRM and protecting your content

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
- Recording and Editing Audio
- Optimizing Audio Files
- QuickTime Audio

Assignment– due start of class:

- Blog assignment TBD
- Final project due Thursday 20 July

Reading: Chuck the Wootton textbook under a passing bus