Introduction to Digital Audio
MUGN-M350-001
MUGN-M350-002

Instructor: John “Jay” Crutti
Instructor of Music Technology.

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Also on Facebook

Office Hours: By appointment.
Course Term: Fall 2008

Class Meetings:

section 001: TR 6:20-7:35PM ML 113
section 002: MWF 10:30-11:20AM ML113

Catalog Description

Introduction to Digital Audio is an overview of the technology used to produce and improve audio recordings. A special emphasis is placed on working with audio using computer based audio applications.

Prerequisites

MUGN-M115 - Intro to Technology

Textbooks and Other Materials to be Purchased by Student

5 blank CD-R's/DVD-R's (available for sale in the library)
1 Firewire or USB 2.0 hard drive. At least 40 gigabytes of capacity.
Instructor will provide other texts as needed.

Course Requirements

Students are expected to attend all class meetings & participate in discussion.
A mid-term exam will be given on previously assigned class topics.
A final project will be assigned and is due at the start of the last class of the semester.
A final exam will be given on previously assigned class topics.
Quizzes and assignments will be assigned periodically and are due on dates given by the instructor. Quizzes and assignments may be issued electronically or aurally.

Special Accommodations

A student with a disability that qualifies for accommodations should contact Sarah Mead Smith, Director of Disability Services, at 865-2990 (Academic Resource Center, Room 405, Monroe Hall). A student wishing to receive test accommodations (e.g., extended test
time) should provide the instructor with an official Accommodation Form from Disability Services in advance of the scheduled test date.

**Academic Integrity**

All work you do for this class is expected to be your own, and academic dishonesty (including, but not limited to plagiarism on papers, class projects, or cheating on exams) will be punished. A summary of the University’s definitions and procedures concerning academic integrity can be found in the Undergraduate Bulletin (pp.45-46 of the 2003-5 Bulletin). If you are uncertain how to use and cite the work of others within your own work, consult reference works such as Kate L. Turbian, “A Manual for Writers of Term Papers, Theses, and Dissertations”, 6th ed., revised and by John Grossman and Alice Bennett, Chicago Guides to Writing, Editing and Publishing (Chicago: University of Chicago Press, 1996) or see the instructor.

**Evacuation Statement**

Students must log on to the College emergency website ([www.loyno.la](http://www.loyno.la)) and the University Blackboard site ([http://loyno.blackboard.com/](http://loyno.blackboard.com/)) within 48 hours of any University evacuation to receive further information regarding contacting course instructors for assignments, etc. Students should also monitor the University site ([www.loyno.edu](http://www.loyno.edu)) for general information.

**Expected Course Outcomes**

Once a student has successfully completed the course they are expected to possess the following skills and knowledge.

- Know the history and operating principles behind Digital Audio Workstations
- Be able to identify the connections on and operate digital audio interfaces
- Be able to use basic features of Digital audio workstations like editing, trimming, consolidation, import/export, routing, automation
- Proficiency in the theory and operation of Equalization, Dynamics, Time-based effects
- Understand different file formats and the relative merits of each.
- Be able to improve the sound quality of audio recordings, and master them in an appropriate fashion.
- Be able to combine audio with video productions

**Course Outline**

**Week 1:**
Overview of course
Audio basics and terminology
Periodic Motion, Amplitude, Frequency, Envelope, Harmonics, Velocity, Phase, Decibels.
Analog to Digital conversion
Review of sample rate, bit depth, and nyquist, binary numbers
Quality factors during conversion (jitter, converter linearity, DC Bias)
Week 2:
Overview of the recording process
Capturing sound using microphones and other devices
Digital Signal Workflow
AES/SPDIF/TOSLINK/etc.
Balanced vs. Unbalanced Connections
Digital Syncronization
Sample Sync / Word Clock / Time Sync(LTC, VITC, MTC, etc.,)
File Formats (AIFF, WAV, BWF, SD2, FLAC, etc.,)
Estimating file sizes

Digital Audio Workstations
The Digital vs. Analog debate
History of Digital Audio Workstations
Destructive vs. Non-destructive processing
Meta-data vs. Non-Meta systems
Hardware, software, interfaces

Week #3
Processing Audio
Visualizing and hearing problems in audio
Normalization, gain staging, clipping, quantization, dither
Spectrum analysis
Overview of DAW interface.
Mixing, routing, bussing, panning.
Automation concepts

Week #4
Editing
Zero-crossings, fades
Room tone / background sound
Editing speech
Region consolidation
Transferring files between DAWs (OMF/XML/EDL)

Week #5
Equalization
Purpose and proper usage
Types of EQ
Parametric, shelving, bandpass, low-cut / high-cut
Frequency / Bandwidth / Q
Using EQ to correct sound deficiencies
Using EQ in mixing
Week #6
Automation
Purpose of automation.
Modes of automation. Read, Write, Touch, Latch, Off, Trim
Creative uses of Plug-ins
Modern effects
Amp/Mic modeling
Pitch and time correction

Week #7
Time-based effects.
   Reverb, Delay, Echo, Chorus, Flanger, Phaser
Reverb types
   Plate, spring, chamber, tape, convolution
Matching reverb in existing tracks
Using reverb to create space
Creative uses to time-based effects.

Week #8  **Midterm exam**

Week #9
Dynamics Control
Compression / Expansion / Gating / Limiting
Dynamic range
Sidechain signals
Ducking
De-essing
Compressor usage
Mastering / multi-band compression
Effects of dynamics devices on sound envelopes
Creative uses of dynamics processing

Week #10
Audio restoration
Cleaning audio using noise-removal tools, EQ, dynamics, etc.
Pop removal
Analog audio tape care and handling / Tape baking
Capturing audio from Vinyl Records

Week #11
Surround sound and multi-channel audio
Stereo / ProLogic / MTS / DTS / Dolby Digital / Cinema Sound
Web delivery of multi-channel audio - QuickTime / Windows Media

Week #12
Audio for Picture
Typical location sound problems
Synchronizing audio and video
ADR
Foley
Sound Effects
Week #13
Mastering theory and process
Critical listening
Monitoring environments
CD/DVD sequencing and layout

Week #14
Authoring and product delivery
Archiving for long-term storage

Week #15
Final project critique

Week #16
Final Review
Final Exam

Evaluation

Grading points will be earned from the following:
- Attendance/Participation 10%
- Assignments/Quizzes 30%
- Mid Term Exam 25%
- Final Project 25%
- Final Exam 10%

Grade Scale

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Grade</th>
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<tbody>
<tr>
<td>93-100%</td>
<td>A</td>
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<tr>
<td>88-93%</td>
<td>B+</td>
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<tr>
<td>81-87%</td>
<td>B</td>
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<tr>
<td>78-80%</td>
<td>C+</td>
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<td>71-78%</td>
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<td>68-70%</td>
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<tr>
<td>61-67%</td>
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<td>0-60%</td>
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Assignments:

Assignments are due on the due-dates as assigned by the instructor. An assignment may be turned in late by one class period, but the letter grade is lowered one and a half letter grades. Assignments are not accepted after the one class period. Hand written assignments are not accepted. Please use one of the several computers available on the Loyola campus. Assignments that are submitted on recordable media must be presented in clearly labelled protective cases or they will not be accepted.

Studio Labs:

Students will utilize the Mac Lab or other similar facilities for class assignments. A class schedule will be posted on the door of the Mac Lab to show when it is available for lab use.

Backing Up

You should bring your hard drive to class and use it for your storage needs. You will be allowed to store your projects on the server for the Mac Lab, should you desire. You should back up your work on some external media (CDr, flash drive, etc.) at a regular basis. The accounts and hard drives will be purged periodically.
Lab Policies

Food and drink, including water is prohibited in the Mac Lab at all times! Smoking is not allowed in any part of the building, including the fire stairways. Possible dismissal from class will result if this policy is violated.

Attendance

Classes start and end on time.
Attendance will be taken at the beginning of class. Arrival after Attendance is taken constitute a tardy. Two tardies equal one absence.
Two absences – conference with Instructor.
Four absences – withdraw from class.

Students are responsible for all information missed during absence.

Prior notice give to the instructor or a call to the Music Business Program office (504) 865-3984 indicating illness, etc. will be the only excused absence.

Blackboard

The Blackboard system will be used extensively for posting of announcements and grades, links to websites, & digital distribution of documents. Blackboard does not constitute the only official venue for the dissemination of materials or the issuance of assignments.

Cell Phones

Please turn off cell phones in class.

Appeal of Grade

After grades have been posted, the instructor does not intend to ever change a student's grade. The only valid reason for appealing a grade should be miscalculation of scores. The following are never valid reasons for grade appeal: (1) impending removal from the university, (2) loss of scholarship, (3) delay in graduation, (4) embarrassment, (5) possible deportation to a country ruled by a brutal dictator, and (6) ex post facto discovery that poor performance for the entire course was caused by some tragic set of events beyond the control of the student.