

# Fundamentals of Audio Recording (MTEC 175)

Syllabus Spring 2022

2 hours per week (2-units)

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## Course Description

Fundamentals of Audio Recording, MTEC 175, is an introduction to the principles and techniques of audio recording and music production as related to project or small studio. Topics will include the physics of sound, audio cables and connections, audio signal flow, microphones, digital audio and computer based recording systems, studio setup, monitoring, MIDI music production, and session management.

## Objectives

Students will acquire a basic understanding of signal flow, gain structure, optimal recording levels, signal to noise ratio, microphones, project studio setup, monitoring systems, signal processing, analog and digital audio, mixing and MIDI.

## Requirements, Exams and Grading Information

Student evaluation in MTEC 175 will consist of exercises, quizzes, writing assignments and exams. The exercises are take-home assignments intended to help the students develop and apply the specific language used in an audio production environment when discussing related hardware, software, principles and techniques. Lab projects will consist of written assignments or student demonstrations of concepts and techniques discussed during labs. Concise instructions for all exercises and lab projects will be available at a later date. All exercises and written assignments are due one week after assignment.

The midterm and final exams are written exams. Please note that the final exam is cumulative. Exams must be taken during the scheduled times and cannot be made up at a later date. **The final exam will be given during the university scheduled final exam time for the class.**

Attendance is taken each class and will count towards your final grade. After two absences your grade will be lowered one-half grade for each additional absence. Because of the importance of hands on experience with this subject, attendance to all classes is the only method of understanding the concepts of this specialized topic.

## Grading

|                                     |     |
|-------------------------------------|-----|
| 1. Class Participation and Research | 10% |
| 2. Quizzes and Exercises            | 25% |
| 3. Midterm Exam                     | 30% |
| 4. Final Exam                       | 35% |

## **GRADING SCALE**

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|          |    |
|----------|----|
| 100 - 94 | A  |
| 93 - 90  | A- |
| 89 - 87  | B+ |
| 86 - 83  | B  |
| 82 - 80  | B- |
| 79 - 77  | C+ |
| 76 - 73  | C  |
| 72 - 70  | C- |
| 69 - 67  | D+ |
| 66 - 64  | D  |
| 63 - 60  | D- |
| Below 60 | F  |

### **Recommended Textbooks- wait till first meeting discussion before any purchases**

Huber, David Miles and Runstein, Robert E. *Modern Recording Techniques, 8<sup>th</sup> Edition*.

Focal Press (2014) **(Highly Recommended)**

Dittmar, Tim. *Getting the Most Out of Your Project or Professional Recording Studio*.

Focal Press (2011). **(Recommended Reference Only)**

Edstrom, Brent. *Recording On a Budget*. Oxford University Press (2010).

**(Recommended Reference Only)**

Hosken, Dan. *An Introduction to Music Technology, 2<sup>nd</sup> Edition*. Routledge (2014).

**(Recommended Reference Only)**

Thompson, Daniel. *Understanding Audio, Getting the Most Out of Your Project or*

*Professional Recording Studio*. Berklee Press (2005). **(Recommended ref Only)**

### **Other resources:**

Lynda.com videos (<https://blackboard.usc.edu>, then look for the Lynda button)

Parsons, Alan. *The Art And Science of Sound Recording* (DVD). Keyfax New Media (2010).

*Sound on Sound* magazine (<http://www.soundonsound.com/>)

## Statement on Academic Conduct and Support Systems

### Academic Conduct

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Section 11, *Behavior Violating University Standards* <https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions/>. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct/>.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* <http://equity.usc.edu/> or to the *Department of Public Safety* <http://capsnet.usc.edu/department/department-public-safety/online-forms/contact-us>. This is important for the safety whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *The Center for Women and Men* <http://www.usc.edu/student-affairs/cwm/> provides 24/7 confidential support, and the sexual assault resource center webpage [sarc@usc.edu](mailto:sarc@usc.edu) describes reporting options and other resources.

### Support Systems

A number of USC’s schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* <http://dornsife.usc.edu/ali>, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* [http://sait.usc.edu/academicssupport/centerprograms/dsp/home\\_index.html](http://sait.usc.edu/academicssupport/centerprograms/dsp/home_index.html) provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information* <http://emergency.usc.edu/> will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.

### Blackboard and Communication

Course materials, assignments, documentation and grades will be posted on Blackboard at <https://blackboard.usc.edu/>. Please make it a habit to use/check your USC E-mail account. Any E-mails sent to the class will only use your USC E-mail account.

## **Class Schedule – (Schedule and Content Subject to Instructor Changes)**

### Module 1 - Course Introduction

#### *Introduction to Audio Recording and Production*

From bedroom to studio

Audio engineer jobs

Why do I need to know how this technical stuff works?

Reading: *Modern Recording Techniques* Ch. 1

### Module 2 - Physics of Sound

Sound wave fundamentals

Wave propagation

Sound color, timbre, overtones, and harmonics

Resonance

Exercise – Matching frequencies

Reading: *Modern Recording Techniques* Ch. 2

### Module 3 - Audio Levels and Cables

dB SPL, dBV, dBu

Balanced vs. unbalanced cables

Connection types

Reading: *Handouts*

### Module 4 - Monitoring

Speaker Types

Amp Types

Monitor Control

Room Layout

Speaker Setup

Reading: *Modern Recording Techniques* Ch. 17

### Module 5 - Microphone Basics

Microphone types/designs

Polar patterns

Transient and frequency response

Microphones preamps

Reading: *Modern Recording Techniques* Ch. 4

### Module 6 - Introduction to Microphone Technique

Matching microphones to the application

Close/spot, distant placement, multi-microphone setups

Proximity effect

Isolation vs. bleed

Proper cable, stand, clip/shock mount usage

Reading: *Modern Recording Techniques* Ch. 4

## @ Week 8 - Midterm Exam

### Module 7 - *The Audio Signal Path* - TBD

- Small format consoles, DAW emulation
- Input section and mic/line amp
- Inserts and auxiliary sends
- Fader, solo and mute

Reading: *Modern Recording Techniques Ch. 14*

### Module 9 - *Introduction to Audio Processing*

- Spectral devices
- Dynamic devices
- Time based devices

Reading: *Modern Recording Techniques Ch. 15*

### Module 10 - *Digital Audio Fundamentals*

- Sample rates
- Bit depth
- File compression
- File Types

Reading: *Modern Recording Techniques Ch. 6*

### Module 11 - *Computer Audio* - TBD

- Computer basics
- Data/transfer rates
- Storage media
- Backup systems
- File management

Reading: *Modern Recording Techniques Ch. 7*

### Module 12 - *Digital Audio Workstation (DAW)* - TBD

- Types and components
- DAW I/O and audio interfaces
- Representative hardware and software manufacturers
- Recording, editing and mixing
- Audio time compression/expansion

Reading: *Modern Recording Techniques Ch. 7*

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## Module 13 - *Introduction to MIDI*

Historical background

MIDI messages

MIDI sequencing: linear vs. non-linear

MIDI editing

Control change messages and musical performance

MIDI mapping

Linear vs. non-linear workflow

Reading: *Modern Recording Techniques Ch. 9*

“TBD” Modules may be excluded due to semester time constraint and shortening.

**Finals Week: Final exam day and time TBA – Published USC Final Exam Date**