Department of Music
MP-207: Microphones & Amplification Systems

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3 class hours; 1 credit; Prerequisite: MP205
This class introduces students to the specifications and uses of microphones, power amps, and loudspeakers. Students learn the techniques of microphone placement. They also learn about the selection and setup of power amplifiers and match speakers for ideal system performance in studios and sound reinforcement.

This is a required senior-level course in the Music Production curriculum

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Attendance:
You will be setting up and breaking down a sound system during nearly every session of the class. Attendance for, and participation during the setup and breakdown of equipment in class will be noted. Attendance is not optional. Your participation, professionalism, and attitude (or lack thereof) in all activities will be noted and factored into your grade.

Standing Assignment:
You will be required to make yourself available during club hours to record or otherwise assist with production and recording of department events. **Don't blow it off**: this is a valuable opportunity for you to experiment, apply what you have learned, and to gain real experience. Your participation (or lack thereof) in these events will be noted and will factor into your grade.

REQUIRED:
You will need:

- a pair of headphones with a 1/4" -> 1/8" adapter
- a multitool (e.g. Leatherman/Gerber or Swiss Army knife and pliers)
- a small flashlight
- a Sharpie
- a pair of heavy-duty work gloves

YOU MUST BRING YOUR OWN HEADPHONES TO EVERY CLASS.
No – you can't borrow mine.

Other Considerations:

- **Lateness is not tolerated**: coming to class more than 20 minutes late will be considered an absence. According to QCC guidelines, missing more than 15% of a class results in a failing grade, regardless of how well the student is actually doing.
- **Cheating will result in an automatic F for the course**
- **Cell Phone use is not permitted in class. Use of a cell phone during an exam or quiz results in an automatic grade of zero for that exam/quiz.**
- **Leaving the room during an exam/quiz is not permitted and will result in a zero for the exam/quiz.**
- **Eating and drinking are not allowed at any time in the classroom.**

Course Objectives

Course objectives	**Learning outcomes**
Students will demonstrate proficiency at sound system design and implementation in a variety of sound reinforcement situations	• Students will choose the proper components and configure them in a way the addresses the needs and goals specific to each situation • Students will use printed specifications to predict how different components will interact, and be able to match speakers and amplifiers based on their predictions
Students will make informed, appropriate decisions about necessary equipment and techniques relevant to given situations	• Students will evaluate and identify the needs and limitations of a sound system given different variables of aesthetic goals and practical considerations • Based on printed specifications and calculations, students will make informed decisions on the needs for a given sound reinforcement situation. • Students will apply knowledge of basic electronics to calculate the effects that different system configurations will have on various parts of the system, and determine the power needs, both in terms of supply and amplification, of a given sound reinforcement situation.
Students will demonstrate the ability to make informed aesthetic judgments about a sound system and its implementation	• Students will listen critically and identify whether or not a system is fulfilling aesthetic goals while realizing its practical limitations
Students will demonstrate the ability to work efficiently and safely in the context of a variety of sound reinforcement situations	• Students will demonstrate good-judgment in the implementation of a system that takes into account the well-being of all involved as well as that of the equipment
Students will demonstrate the ability to interface successfully with other technical staff that they will encounter in real-life situations in their field	• Students will identify and understand the goals of others they are working with • Students will communicate effectively using proper terminology

Course Outline

Week 1: Basic Electronics
- Volts, Ohms, Amps, and Watts
- DC vs. AC
- Connectors and cabling
- Impedance
- Parallel vs. Serial
- Basics of electrical power
- Safety Considerations

Week 2: Basic Acoustics
- Review of Frequency
- Review of Decibels
- Speed of sound and delays
- Temperature and Humidity
- Inverse Square
- Reverberation Radius: Direct vs. Diffuse Field
- Room Resonance

Week 3: Basic Anatomy of a Sound Reinforcement System
- Elements of a basic sound system
- Signal flow and gain structure
- Simple setup and implementation
- Understanding system limitations

Week 4: Dante Level 1

Week 5: Wireless Basics I

Week 6: Wireless Basics II

Week 7: Video Basics I: Camera operation

Week 8: Video Basics II: Double System Sound

Week 9: Streaming Basics/Basic Video Post Production

Week 10: Loudspeakers & Amplifiers
- Basic speaker types: woofer, tweeter, subwoofer, Compression Driver
- Power handling & Watts: how much is enough?
- Calculating impedance and its impact on the amplifier

- Sensitivity
- Maximum SPL
- Coverage Angles and Directivity – use of arrays vs. single boxes
- Frequency Response
- Bi-amplification and crossovers
- Selection and placement considerations

Week 11: Monitor Concepts & System Equalization
- On-stage SPL's and how it effects the mix
- Understanding microphone/speaker interaction
- Stage Wedges – placement and considerations
- Sidefills
- Basic Monitor Mixing
- In-Ear monitoring
- Understanding potential acoustic gain and limitations of a sound system
- Understanding and controlling feedback using mic and speaker placement
- Role of the EQ in feedback control
- Role of the EQ in system implementation and tuning

Week 13: Subwoofer Concepts
- Role of the subwoofer
- Directional vs. Non-Directional
- Low end response of a room
- The "Power Alley"
- Coupling
- Subwoofer arrays
- Aux-fed subs

Week 14: Planning Ahead: Understanding Riders, Stage Plots and Tech Packages
- Reading and designing riders: Input Sheet, monitors, other audio considerations
- Reading and designing stage plots
- Reading Tech Packages: audio considerations
- Assessing your needs, making your demands

Week 15: Final (!?)