

EE 008S – Introduction to Digital Music

Designation: Elective course for first-year students.

University Bulletin Description:

EE 008S (1): First-year seminar that discusses digital music from an electrical engineering perspective; topics include sampling, digital filtering, compression, and music synthesis.

Prerequisites by Topics:

First-year standing.

Textbook/Required Materials:

Essentials of Music Technology, Ballora, M., Prentice Hall, 2002 (optional)

Learning Outcomes:

As a first-year seminar course, the main purpose of this course is to engage first-year students through a hands-on introduction to digital signal processing. Students should be able to do the following upon completion of this course:

1. Understand the basics of how to use an oscilloscope and function generator.
2. Perform simple programming/simulation tasks through MATLAB.
3. Have a rudimentary understanding of sampling and aliasing.
4. Use basic software tools for manipulating digital audio files.
5. Appreciate the role of digital filtering and digital signal processing in the digital music field.

Topics:

1. Math of music and physics of sound
2. Sampling, reconstruction, and aliasing
3. Compression
4. Digital filtering
5. Music synthesis
6. MIDI format

Class/Laboratory Schedule:

One 75-minute class/week. The class is a mixture of lecture (30%) and lab (70%).

Computer Usage:

Computers are used in each of the lab experiments. Students are exposed to MATLAB, CoolEdit (an audio editing program) and Cakewalk (a MIDI sequencing program).

Laboratory Projects/Assignments:

There are a total of six laboratory assignments (each two-weeks long) and a final project (three-weeks long). The laboratory assignments are based on the six course topics. The final project is a design project in which students use a combination of the techniques learned in class to create their own unique version of the Penn State fight song, *Fight On, State*.

Contribution to Meeting the Requirements of Criterion 5. Curriculum:

This course contributes to the general education component.

Relationship to Program Outcomes: Not applicable

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