

School for New Learning**DePaul University****Course Name: AI 160 It's Only Rock and Roll: Making Music the Old Fashioned Way**

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Location: Naperville
Day: Mondays, 6:30-9:30, 6/15, 6/29, 7/13, 7/27, 8/10
Competencies: A-5, A-2-X, S-1-X, S-2-X, F-X
Credit Hours: 2 or 4

Course Description

For many, music is an integral part of everyday life. It is also deeply ingrained in most cultures. Music is used by individuals, businesses and societies to entertain, soothe, excite, and arouse. Music is basically a series or combination of pleasing sounds but how is music made? How do we know what is pleasing and what is not? The answers to these questions and others demonstrate that music is also a field where science and art meet. In this class, we will explore how sound is physically created and how specific sounds have been turned into music over the centuries. Through experimentation, we will examine the physical and mathematical properties of sound and musical instruments. We will also create simple musical instruments and share the experience of creating musical pieces. No musical experience is needed to take this class.

This class is a hybrid course that will meet every two weeks for a total of 5 times. Students will be expected to attend every class meeting as well as regularly participate in the class using the Blackboard website.

About the Instructor

John Hemmerling began his career with SNL as an academic advisor in 1992. He began teaching courses at SNL in 1997 and has been nominated for an excellence in teaching award two times. He has a BS in Mathematics (Chicago State) and a MA in Math Education (DePaul).

Competencies

A-2-X Can create a musical instrument/scale and can discuss the creative process.

1. Can create a simple version of a musical instrument.
2. Can identify, analyze, and describe the components of creating a musical instrument.

3. Can explain how engaging in a creative process affects one's perception of the uses of this musical instrument.

Students demonstrate this competence by creating a musical instrument that can produce a musical scale. Students must demonstrate how the scale can be used to play a minor piece.

A-5 Can define and analyze a creative process.

1. Can define the concept of creativity.
2. Can identify, analyze, and describe the components of a creative process in making/performing music.
3. Can explain how engaging in a creative process affects one's perception of the uses of music.

Creativity is often associated with forms of human expression in the literary, fine, and applied arts. Because it involves the development of innovative ideas and fresh approaches to problems, however, the practice of creativity is no less integral a component of the social, physical, and technological sciences. In any field of human endeavor, the creative process requires an ability to question accepted and "acceptable" ways of perceiving and thinking, as well as a willingness to forge connections and refine knowledge through doubt, curiosity, and imagination. Through engagement, reflection, and analysis, this competence invites the student to understand how a creative process is born, how it functions, and how it changes our perception and experience of the world. Students can demonstrate this competence by creating a musical scale, musical notation and related musical pieces using the scale.

S-1-X Can use scientific and/or mathematical principles to make a simple musical instrument.

1. Uses mathematics and/or scientific principles to make a working musical instrument.

Students can demonstrate this competence by making a working musical instrument and demonstrates its use.

S-2-X Can use mathematics and science theory to describe basic musical principles.

1. Knows how basic mathematical theory is used to create a musical scale.
2. Uses scientific formula to describe how musical instruments create the sounds that make up a musical scale.

Students can demonstrate this competence by using mathematics and established physical formula to describe how a simple musical instrument works. Students can also describe musical scales using mathematics.

F-X Can describe how music/sound is used and/or abused in professional or public settings.

1. Identifies the different uses or abuses of sound in professional settings.

- 2 Explores how music can be used to set a mood or tempo in a professional setting.
- 3 Describes how sound can define a professional or public environment.

Students can demonstrate this competence by using basic theories of acoustics to describe the distribution of music in a professional setting. People also need to be protected from sound in certain public or professional settings. Exploring how prolonged exposure to sound and/or music can be detrimental in certain environments is another way to demonstrate this competence.

Learning Experience

Students will learn how sound is created by musical instruments and how music has been created over the centuries through readings, experimentation, discussion and demonstration.

Learning strategies include:

- Readings
- Lecture-discussions
- Class based experiments
- Independent research
- Group work.

Groups will be assigned by the instructor according to competence. The members of each group will be registered for a variety of competences. Group work will include the final project and discussion conferences.

- Individualized/group field trips
- Blackboard materials
- Blackboard journal and discussion
- Audio-visual presentations
- Final project

Required Reading

Measured Tones: The Interplay of Physics and Music 2nd Edition

Author: Ian Johnston

Publisher: Institute of Physics Publishing Bristol & Philadelphia 2003

ISBN: 0-7503-0762-5

Additional Resources include:

Isacoff, Stuart. *Temperament*. Alfred A. Knopf, New York. 2001

Levenson, Thomas. *A Musical History of Science*. Simon and Shuster. 1995.

Jeans, James. *Science and Music*. Dover Publications, New York. 1968.

Garland, Trudy Hammel; Kahn, Charity Vaughan. *Math and Music: Harmonious Connections*. Dale Seymour Publications. 1995.

Loy, Gareth. *Musimathics: Volume 1*. MIT Press. 2006.

Wiseman, Ann Sayre; Langstaff, John. *Making Music*. Storey Publishing 2003.

Hopkin, Bart. *Musical Instrument Design*. See Sharp Press. 1996.

Wade-Matthews, Max; Thompson, Wendy. *The Encyclopedia of Music*. Hermes House of Anness Publishing Ltd. 2005.

Edwards, David D. *How to be more Creative*. Occasional Productions. 1996.

Ruggiero, Vincent Ruggiero. *The Art of Thinking: A Guide to Critical and Creative Thought*. 6th edition. Addison Wesley Longman. 2001.

Firestone, Beverly K. *The Forms of Things Unknown: Creativity and Renewal in Higher Education*. First Ace/Alliance: 1996.

Meyer, Pamela. *Quantum Creativity*. Contemporary Books. 2000

Specific Learning Outcomes:

By the end of this class, students will be able to:

- Understand the origins of sound.
- Understand how we hear.
- Understand the connection between science and music.
- Understand the connections between science and creativity.
- Understand how basic acoustic instruments work.
- Understand the creativity of combining different sounds into musical scales and pieces.
- Appreciate how science is used in the creation of complex musical instruments.

Evidence the Students will Submit

This course has classroom and online participation requirements. Online participation will include individual and group assignments and take place in the class Blackboard website. All online assignments must be completed in the designated time frames. This part of the class will make up 60% of the overall grade.

The focus of the class will be the development of a final competence related project. This project is 40% of the final grade. Students must get at least a C on this project to pass the class.

The final project has three phases and is completed in groups selected by the instructor. Members of the group are combined based on the competences that they are completing in the course.

Phase 1: Creating a simple musical instrument.

Phase 2: Performing a written piece of music using the constructed instruments.

Presenting the class with a technical and creative description of the group's designated instrument.

Phase 3: Written summary of the project as a whole including the written piece of music and a description of writing technique.

Project criteria will be presented the first day of class. All phases will be discussed throughout the quarter.

Class Schedule

All class meetings are mandatory. You should drop the class immediately if you cannot attend the first session.

This class is divided into 4 modules.

Module 1 Creating a musical scale.

Module 2 Waves: The Science and Use of Sound

Module 3 Consonance and Dissonance: Why does this sound good?

Module 4 Making Music

This class meets 5 times on the following schedule:

Class 1: Meets 6/13/09 Start Module 1

Schedule:

- Introductions
- Review syllabus and course materials
- Review Blackboard website
- Assign groups.
- Introduction to origins of the relationship between science and music.
- Experiment 1: What “sounds” sound good together?

The quarter begins on 6/13 so please start the readings for Module 1 during the first week of the quarter.

Readings: Measured Tones, Chapters 1, 2 and 5.

Assignments: Blackboard Journal 1 and 2. Group discussion/assignment will be discussed in class.

Class 2: Meets 6/27/09 Wrap up Module 1 and start Module 2.

Schedule:

- Review results Module 1
- Review assignments.
- Lecture:
 - Basic wave theory
 - Mathematics behind wave theory.
 - Demonstration: Waves in water and on a string.
- Experiment 2: Waves in a pipe.

Readings: Measured Tones, Chapters 3 and 4.

Assignments: TBA

Class 3: Meets 7/13/09 Wrap up Module 2 and start Module 3

Schedule:

- Review results of Module 2.
- Review assignments.
- Lecture:
 - What is Consonance.

- What is Dissonance.
- How does science explain these concepts?
- Demonstrations .
- Project: Creating a stringed instrument.

Readings: Measured Tones, Chapter 7.

Assignments: TBA

Class 4: Meets 7/27/09 Wrap up Module 3 and start Module 4

Schedule:

- Review material from Module 3
- Review assignments
- Lecture:
 - Creating music.
 - The voice that binds us.
 - How do we hear?
 - Creating different musical scales.
 - Writing music.

Readings: None assigned

Assignments: TBA

Class 5: Meets 8/10/09 Wrap up Module 4

Schedule:

- Review Module 4
- Projects and presentations

Final Project Due Date: 8/17/08

DePaul University Academic Integrity Policy

- a. DePaul University is a learning community that fosters the pursuit of knowledge and the transmission of ideas within a context that emphasizes a sense of responsibility for oneself, for others and for society at large. Violations of academic integrity, in any of their forms, are, therefore, detrimental to the values of DePaul, to the students' own development as responsible members of society, and to the pursuit of knowledge and the transmission of ideas. Violations include but are not limited to the following categories: cheating; plagiarism; fabrication; falsification or sabotage of research data; destruction or misuse of the university's academic resources; alteration or falsification of academic records; and academic misconduct. Conduct that is punishable under the Academic Integrity Policy could result in additional disciplinary actions by other university officials and possible civil or criminal prosecution. Please refer to your Student Handbook or visit <http://studentaffairs.depaul.edu/homehandbook.html> for further details.

DePaul University Incomplete Policy

Undergraduate and graduate students have two quarters to complete an incomplete. At the end of the second quarter (excluding summer) following the term in which the incomplete grade was assigned, remaining incompletes will automatically convert to "F" grades. In the case of the Law School incompletes must be completed by the end of the semester following the one in which the incomplete was assigned. Ordinarily no incomplete grade may be completed after the grace period has expired. Instructors may not change incomplete grades after the end of the grace period without the permission of a college-based Exceptions Committee. This policy applies to undergraduate, graduate and professional programs. NOTE: In the case of a student who has applied for graduation and who has been approved for an Incomplete in his or her final term, the incomplete must be resolved within the four week grace period before final degree certification.

n.b. The SNL student who wishes to receive the grade of IN must formally request in writing that the instructor issue this grade. This request must be made before the end of the quarter in which the student is enrolled in a course.