The Science Behind the Music

1. What is the theme you propose for your group of courses? In what ways do you think this theme speaks to issues important to our freshman population? To the University’s mission?

The theme of this First Year Learning Community is the exploration of the truly beautiful, deep, and complex problem of the creation and perception of music, a problem which quite naturally spans the arts, humanities, and sciences. Our intent is to use students’ innate interest in music to motivate a detailed and thoughtful study of the science of sound and music. By taking advantage of the multidisciplinary approach of cluster courses we can offer a more detailed study of music based on both its physical/sonic properties and the psychology and neuroscience related to the mental perception of music.

Course work in Psychology and Physics will involve hands-on projects, student presentations, calculations, and data analysis. The exciting hands-on work using musical instruments and sonic devices that students can build themselves will stimulate interest both in science and music.

2. List the three courses (prefix, number, title, units):

Psychology 1002: General Psychology of the Mind and Music [5 units];

Physics 1200: Behind the Music [4 units];

Music 1085: Introduction to Audio Production [4 units].

3. Explain how the theme will be used to integrate course content in each course. If appropriate, please describe how students will be involved in researching the theme and when in the year that will happen.

The overall theme of The Science Behind the Music will be used to provide a framework for the understanding and execution of sound and technology as contemporary creative forces commonly understood as music. An understanding of the basic principles of the physics of sound (acoustics) underlies the techniques of audio production. PHYSICS 1200 will educate the student on the science of how sound works. Additionally, this course will begin to hint at how a firm understanding of this knowledge can lead to creative ventures by engaging the student in a project which will have them craft a custom musical instrument. This creation is formed by the student’s knowledge not only about the properties of sound but moreover how they wish to exploit, bring out, subdue, or in general, affect those properties to create something unique.

In MUSIC 1085, the student learns about how to practically apply acoustical principals to audio production. Students will learn the techniques of microphone placement and sound design editing/mastering in order to craft an artistic work in the form of a recording. Larger issues of style and aesthetic will be brought forward as a way to stimulate discussion regarding the nature of sound and the possibility of inherent associations. For instance, what does it mean to have the sound of machinery represented clearly in a work vs. the sound of machinery heavily processed and manipulated with sound...
design so as to be represented in a transformed way? These kinds of broader questions of the perception of music are teased out in MUSIC 1085 and more deeply explored in PSYCHOLOGY 1002.

In PSYCHOLOGY 1002, students will investigate a wide range of psychological principles that underlie the perception, appreciation, and production of music. They will study the physiological and psychological mechanisms that allow us to perceive sound and other information in the environment; learning and memory processes that are necessary for developing and retaining musical skills; and other basic topics in psychology that will enhance students’ appreciation of music (e.g., principles of social psychology inform how audiences can influence musical performance). All of these topics will be grounded in scientific research. The course will begin with an overview of the scientific method, and lessons will be drawn from published research.

4. Explain how each course in the proposed learning community will support student learning of each of the cluster’s lower division general education area learning outcomes.

PHYSICS 1200 (satisfies GE area B1)

(1) Students will demonstrate broad science content knowledge in the area of the physics of acoustics. The specific goal of PHYSICS 1200 is to develop a scientific framework from which students can understand how a variety of instruments make music. In the process of building this scientific foundation many general concepts in physical science will be explored. Students will learn Newton’s Laws and how particular types of forces can produce oscillatory motion. The general properties of waves will be explored in detail, including understanding the difference between transverse and longitudinal waves, defining a wave’s period, frequency, and amplitude, and looking at more advanced wave properties such as diffraction, interference, the Doppler Effect, and resonance. In-class demonstrations and hands-on projects and experiments will be used ubiquitously to give students first-hand exposure to these different concepts.

(2) Students will demonstrate the application of quantitative skills (such as statistics, mathematics and the interpretation of numerical graphical data) to problems in oscillations, waves, and acoustics. A key goal of this course will be to both develop students’ qualitative understanding of how physical systems work and their quantitative skills that allow them to predict the behavior of these systems. This will be accomplished by a lecture style that introduces students to physical phenomena with demonstrations, qualitatively describes the system, and then works through calculations of the detailed properties of the system.

(3) Students will demonstrate a general understanding of how the scientific method can be used to explore how different musical instruments work. The class will follow an inquiry-based model of learning. New ideas will primarily be introduced first with demonstrations. Students will be encouraged to discuss what they see and form a hypothesis. As a class we will come up with ways to test these ideas and uncover the physical principles underlying the demonstrations. Additionally, students’ special projects will give them independent and personal scientific experience.
MUSIC 1085 (satisfies GE area C1)

(1) For this class, the foundational works and corresponding cultural traditions are all much newer within the broader context of the history of western civilization. Students will study the role recording technology has played from being a means to document and capture and its difference uses as the source for inspiration for new works which would otherwise not have been possible. This will include the drawing of parallels between older practices, such as with Béla Bartók and Zoltan Kodaly’s use of the phonograph to record Hungarian folksongs in the early 20th century, with newer practices such as the use of hand-held digital recorders as ‘sampling’ devices which are used by DJs in order to create ‘fresh mixes’ that reflect upon contemporary issues and concerns in the setting of a dance ritual.

(2) Students will study the evolution of accessibility to the means to record sound and recording techniques and mechanisms of media distribution within the context of ‘closed’ and ‘open’ distribution systems. In the case of ‘closed’ distribution systems, students will study the struggle of the artist to be accepted by a conventional publisher of media and what artistic trade-offs may come with that struggle as related a ‘profits vs. ideas’ debate. In the case of ‘open’ distribution systems, students will study the struggle of the artist to be accepted by subverting conventional publishing mechanisms and trade-offs similar to those of a ‘closed’ system.

(3) To underscore the importance of technology as a means of expression in this class and the world at large today, students will use collaborative ‘Wikis’ within Blackboard in combination with sharing their of creative projects in sound via file upload to the wiki in order to critically employ concepts and execute the methods for crafting sound into personal expression. Larger sound projects in teams will involve collaborative music making with found objects and reports on how such objects affected the aesthetic quality of the recording and, more importantly, how the objects directly relate to the overall message being expressed.

(4) Through discussions on the influence of technology on new forms of musical expression and the increased accessibility of music through technological developments in audio production and distribution, students will be required to express their critical thoughts through reflective writings on historical figures and/or precedents and analysis of their own create works produced for class.

PSYCHOLOGY 1002 (satisfies GE area B2 or D)

Area B2:

1. Students should be able to demonstrate broad science content knowledge in the life sciences (such as cellular structure, the diversity and classification of life, or biological evolution) and be able to describe fundamental concepts in the life sciences that distinguish them from the physical sciences.

Psychology 1000 is a survey course of the entire field of psychology that includes broad content from both the social sciences and the life sciences. Much emphasis is placed on the physiological basis of behavior, and the evolution of physiological structure and
behavior throughout the animal kingdom (note the “songs of canaries” topic mentioned in the syllabus!). Evolutionary Psychology is dealt with in some sections. The structure of the brain and nervous system is dealt with in regard to sensation and perception, conditioning and learning, memory and states of consciousness, developmental psychology, and abnormal psychology. Assessment of knowledge of these topics will be done by class exams.

2. Students should be able to demonstrate the application of quantitative skills (such as statistics, mathematics, the interpretation of graphical data, etc.) to life science problems.

The course begins with a section on research methods, including statistical analysis. Data are consistently presented in graphical form and students are expected to interpret these graphs. Student’s ability to understand statistical concepts and interpret graphs will be tested in class exams.

3. Students should be able to demonstrate a general understanding of the nature of science, the methods applied in scientific investigations, and the value of those methods in developing a rigorous understanding of the physical world. Students should be able to identify the difference between science and other fields of knowledge. Students should be able to distinguish science from pseudoscience

The scientific method is emphasized in Psychology 1000, and there is constant attention paid to the value of this method in contrast to the more traditional ways of thinking about human behavior and perception. Different types of research methodologies used to conduct scientific experiments are dealt with. Belief in pseudoscience is possibly more prevalent regarding the subject matter of psychology than in any other natural science. Psychology 1000 deals with these beliefs directly; for example the section on sensation and perception deals with the topic of extra-sensory perception. Students understanding of these issues will be tested in class exams.

Area D:

1. Demonstrate, orally and in writing, recognition of the application of disciplinary concepts derived from a social or behavioral science in the study of human behavior, individually and in society.
   a. State at least two standard or basic theories and models: The class covers several theoretical approaches, including biological, behavioral, cognitive, and social.
   b. Define key disciplinary terms: Scientific method, behavior, learning, physiological psychology, cognitive processes, social psychology, abnormal psychology, development, individual differences
c. **Identify professional applications of disciplinary concepts:** An understanding of how knowledge of psychology is acquired through the scientific process, and how that knowledge is used in counseling, teaching, business, and everyday life.

2. **Demonstrate, orally and in writing, recognition of the inquiry methods used by at least one of the social or behavioral science disciplines**
   a. **Identify key research issues:** All material will be presented in the context of the scientific method.
   b. **Describe how hypotheses or research questions are formed:** Basics of the scientific method will be covered.
   c. **List examples of data that are examined:** Experimental, survey, correlational, and descriptive data are examined.
   d. **Describe how data are analyzed:** Students will be taught to read graphs and tables and to use data to distinguish between theories.

3. **Demonstrate, orally and in writing, the ability to describe how human diversity and the diversity of human societies influence our understanding of human behavior, individually and in societies, both local and global:** This course deals with the many causes of prejudice, discrimination, and stereotyping, and identifies methods to overcome these attitudes.

4. **Demonstrate, orally and in writing, some knowledge of the political, social, and/or economic institutions of a country other than the United States:** This course examines cross cultural differences in psychological attributes (e.g., effects of different languages on cognition).

5. **Demonstrate, orally and in writing, the ability to describe major positions and contrasting arguments made on one or more significant contemporary issue area confronting US society as applied to human behavior.** (Possible areas include: biomedical and health issues, class, crime, discrimination, education, energy, environment, gender, global economy, immigration, military intervention abroad, poverty, race, technology.) The course covers biomedical and health issues, discrimination, education, and gender issues.
Course title: Behind the Music
Course number: PHYS 1200

1. Students will demonstrate broad science content knowledge in the physical sciences such as the nature and structure of matter, Earth’s place in the Universe, or the conservation of energy and matter.

The specific goal of PHYS 1200 is to develop a scientific framework from which students can understand how a variety of instruments make music. In the process of building this scientific foundation many general concepts in physical science will be explored. Students will learn Newton’s Laws and how particular types of forces can produce oscillatory motion. The general properties of waves will be explored in detail, including understanding the difference between transverse and longitudinal waves, defining a wave’s period, frequency, and amplitude, and looking at more advanced wave properties such as diffraction, interference, the Doppler Effect, and resonance. In class demonstrations will be used ubiquitously to give students first hand exposure to these different concepts. Assigned reading from the textbook and weekly homework assignments will reinforce the ideas introduced in lecture.

2. Students will demonstrate the application of quantitative skills (such as statistics, mathematics and the interpretation of numerical graphical data) to physical science problems.

A key goal of this course will be to both develop students’ qualitative understanding of how physical systems work and their quantitative skills that allow them to predict the behavior of these systems. This will be accomplished by a lecture style that introduces students to physical phenomena with demonstrations, qualitatively describes the system, and then works through calculations of the detailed properties of the system. Mathematical problem solving will be a regular part of students’ homework. Most problems will involve some combination of numerical calculations, interpreting graphs, and solving algebraic equations. Additionally students will get exposure to more advanced mathematical topics such as Fourier analysis of complex waveforms. Students will be expected to interpret the frequency spectrum of a variety of instruments.

3. Students will demonstrate a general understanding of the nature of science, the methods applied in scientific investigations, and the value of those methods in developing a rigorous understanding of the physical world. Students should be able to identify the difference between science and other fields of knowledge. Students should be able to distinguish science from pseudoscience.

We will use the scientific method to explore how different musical instruments work. The class will follow an inquiry based model of learning. New ideas will primarily be introduced first with demonstrations. Students will be encouraged to discuss what they see and form a hypothesis. As a class we will come up with ways to test these ideas and uncover the physical principles underlying the demonstrations. Additionally, students' special projects will give them independent and personal scientific experience. Student will be encouraged to design, build and test their own musical instruments.
For this class, the foundational works and corresponding cultural traditions are all much newer within the broader context of the history of western civilization. Students will study the role recording technology has played from being a means to document and capture and its difference uses as the source for inspiration for new works which would otherwise not have been possible. This will include the drawing of parallels between older practices, such as with Béla Bartók and Zoltan Kodaly’s use of the phonograph to record Hungarian folksongs in the early 20th century, with newer practices such as the use of hand-held digital recorders as ‘sampling’ devices which are used by DJs in order to create ‘fresh mixes’ that reflect upon contemporary issues and concerns in the setting of a dance ritual. Within this study, students will grasp the different functions of music and how, historically, composers and songwriters have used certain musical techniques and devices to express themselves with much greater effect.

2. Students will demonstrate understanding of the interaction among historical and cultural contexts, individual works, and the development of humanities over time.

Students will study the evolution of accessibility to the means to record sound and recording techniques and mechanisms of media distribution within the context of ‘closed’ and ‘open’ distribution systems. In the case of ‘closed’ distribution systems, students will study the struggle of the artist to be accepted by a conventional publisher of media and what artistic trade-offs may come with that struggle as related a ‘profits vs. ideas’ debate. In the case of ‘open’ distribution systems, students will study the struggle of the artist to be accepted by subverting conventional publishing mechanisms and if there are trade-offs that are similar to ‘closed’ system. For example, for the contemporary artist who wished to be signed by a record label (closed distribution system) what matters of the label’s style or genre association can affect the artist’s aesthetic choices? How does this compare to the approach of releasing music straight to a community portal website?

3. Through oral and written work, students will demonstrate their ability to critically employ concepts, theories, and methods of analysis used in the humanities to interpret and evaluate enduring human concerns.

To underscore the importance of technology as a means of expression in this class and the world at large today, students will use collaborative ‘Wikis’ within Blackboard in combination with sharing their of creative projects in sound via file upload to the wiki in order to critically employ concepts and execute the methods for crafting sound into personal expression. Additionally, Wikis will be used to post research on mavericks in recording and producing (Motown records, The London Symphony Orchestra, and DJ Spooky, just to name a few) and share that research with their colleagues in class and with the university at large (the Wiki will be open for public perusal). Larger sound projects in teams will involve collaborative music making with found
objects and reports on how such objects affected the aesthetic quality of the recording and, more importantly, how the objects directly relate to the overall message being expressed. For example, a song literally using sticks and stones in combination with the taunting interval of a minor 3rd in parody could be directly related to artist’s efforts to express resilience in a time of great adversity.

4. Students will critically reflect on the formation of human goals and values, and will articulate an understanding of the creativity reflected in works of the humanities that influenced the formation of those values.

Through discussions on the influence of technology on new forms of musical expression and the increased accessibility of music through technological developments in audio production and distribution, students will be required to express their critical thoughts through reflective writings on historical figures and/or precedents and analysis of their own create works produced for class.
Application for General Education Credit
for Lower Division Life Science (Area B2)

Course title: General Psychology of Music and Mind
Course number: PSYC 1002

Courses approved for general education credit must provide students with explicit instruction in the approved student learning outcomes. Please be as specific as possible in your explanations, describing topics, readings, assignments, activities and assessments that illustrate how the course supports students’ acquisition of the learning outcomes. Remember, there may be no one on the review committees who has any knowledge of your discipline. Attach the course syllabus and any assignments and/or assessments needed to support your explanations.

Please use this template to address ALL of the following learning outcomes.

**Purpose of Science GE:** The goal of lower division general education in the natural sciences is to gain basic knowledge and learn key principles in the life and physical sciences as essential for an informed citizenry. In addition, students should recognize the experimental and empirical methodologies characteristic of science and understand the modern methods and tools used in scientific inquiry.

1. Students will demonstrate broad science content knowledge in the life sciences (such as cellular structure, the diversity and classification of life, or biological evolution) and be able to describe fundamental concepts in the life sciences that distinguish them from the physical sciences.

   Psychology 1000 is a survey course of the entire field of psychology that includes broad content from both the social sciences and the life sciences. Much emphasis is placed on the physiological basis of behavior, and the evolution of physiological structure and behavior throughout the animal kingdom (note the “songs of canaries” topic mentioned in the syllabus!). Evolutionary Psychology is dealt with in some sections. The structure of the brain and nervous system is dealt with in regard to sensation and perception, conditioning and learning, memory and states of consciousness, developmental psychology, and abnormal psychology. Assessment of knowledge of these topics will be done by class exams.

2. Students will demonstrate the application of quantitative skills (such as statistics, mathematics, the interpretation of graphical data, etc.) to life science problems.

   The course begins with a section on research methods, including statistical analysis. Data are consistently presented in graphical form and students are expected to interpret these graphs. Students’ ability to understand statistical concepts and interpret graphs will be tested in class exams.

3. Students will demonstrate a general understanding of the nature of science, the methods applied in scientific investigations, and the value of those methods in developing a rigorous understanding of the physical world. Students should be able to identify the difference between science and other fields of knowledge. Students should be able to distinguish science from pseudoscience.
The scientific method is emphasized in Psychology 1000, and there is constant attention paid to the value of this method in contrast to the more traditional ways of thinking about human behavior and perception. Different types of research methodologies used to conduct scientific experiments are dealt with. Belief in pseudoscience is possibly more prevalent regarding the subject matter of psychology than in any other natural science. Psychology 1000 deals with these beliefs directly; for example the section on sensation and perception deals with the topic of extra-sensory perception. Students understanding of these issues will be tested in class exams.
Application for General Education Credit
for Lower Division Social Science Course (Area D1-3)

Course title__ General Psychology of Music and Mind ___ Course number__ PSYC 1002__
Maximum enrollment ___ Facility Limits ________________

Courses approved for general education credit must provide students with explicit instruction in the approved student learning outcomes. Please be as specific as possible in your explanations, describing topics, readings, assignments, activities and assessments that illustrate how the course supports students’ acquisition of the learning outcomes. Remember, there may be no one on the review committees who has any knowledge of your discipline. Attach the course syllabus and any assignments and/or assessments needed to support your explanations.

Please use this template to address ALL of the following learning outcomes.

Courses in this area acquaint students with fundamental principles and methods of inquiry, theoretical problems, and applications grounded in social science disciplines whose field of study is human behavior in its social environment.

1. Students will demonstrate, orally and in writing, recognition of the application of disciplinary concepts derived from at least three social or behavioral sciences in the study of human behavior, individually and in society.
   State at least two standard or basic theories and models

   The class covers several theoretical approaches, including biological, behavioral, cognitive, and social.

   Define key disciplinary terms

   Scientific method, behavior, learning, physiological psychology, cognitive processes, social psychology, abnormal psychology, development, individual differences

   Identify professional applications of disciplinary concepts

   An understanding of how knowledge of psychology is acquired through the scientific process, and how that knowledge is used in counseling, teaching, business, and everyday life.

2. Students will demonstrate, orally and in writing, recognition of the inquiry methods used by at least one of the social or behavioral science disciplines.
   Identify key research issues

   All material will be presented in the context of the scientific method.

   Describe how hypotheses or research questions are formed

   Basics of the scientific method will be covered.
List examples of data that are examined

Experimental, survey, correlational, and descriptive data are examined.

Describe how data are analyzed

Students will be taught to read graphs and tables and to use data to distinguish between theories.

3. Students will demonstrate, orally and in writing, the ability to describe how human diversity and the diversity of human societies influence our understanding of human behavior, individually and in societies, both local and global

   This course deals with the many causes of prejudice, discrimination, and stereotyping, and identifies methods to overcome these attitudes.

4. Students will demonstrate, orally and in writing, some knowledge of the political, social, and/or economic institutions of a country other than the United States.

   This course examines cross cultural differences in psychological attributes (e.g., effects of different languages on cognition).

5. Students will demonstrate, orally and in writing, the ability to describe major positions and contrasting arguments made on one or more significant contemporary issue area confronting US society as applied to human behavior. (Possible areas include: biomedical and health issues, class, crime, discrimination, education, energy, environment, gender, global economy, immigration, military intervention abroad, poverty, race, technology.)

   The course covers biomedical and health issues, discrimination, education, and gender issues.
### Course Outlines

#### PHYSICS 1200

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>What is Music? What is Science?</td>
<td>Initiate the special project, put students into groups</td>
</tr>
<tr>
<td>2</td>
<td>Simple harmonic motion</td>
<td>Lab 1 Melde’s experiment (waves on string)</td>
</tr>
<tr>
<td>3</td>
<td>Wave properties</td>
<td>Hearing tests of frequency and amplitude</td>
</tr>
<tr>
<td>4</td>
<td>Energy in waves, perception of loudness</td>
<td>Lab 2 Velocity of Sound</td>
</tr>
<tr>
<td>5</td>
<td>Musical Scales, tuning theory</td>
<td>Resonance of room (stairwell)</td>
</tr>
<tr>
<td>6</td>
<td>Harmonics, Timbre and Fourier Theorem</td>
<td>Lab 3 Helmholtz Resonators</td>
</tr>
<tr>
<td>7</td>
<td>Percussive instruments, vibrations of solids</td>
<td>Chladni Plate</td>
</tr>
<tr>
<td>8</td>
<td>String Instruments, piano, violin, guitar</td>
<td>Lab 4 Vibrations of Metal Rod</td>
</tr>
<tr>
<td>9</td>
<td>Brass Instruments</td>
<td>Dismantle the piano in class</td>
</tr>
<tr>
<td>10</td>
<td>Wind instruments, pipes and reeds</td>
<td>Special Project presentation</td>
</tr>
</tbody>
</table>

#### MUSIC 1085

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Acoustics</td>
<td>Digital Audio Workstation (DAW) tutorials</td>
</tr>
<tr>
<td>2</td>
<td>Beats, rhythm, and drum beat</td>
<td>DAW Basics, audio collection/collage</td>
</tr>
<tr>
<td>3</td>
<td>Basslines</td>
<td>Bassline</td>
</tr>
<tr>
<td>4</td>
<td>Melody</td>
<td>Melody</td>
</tr>
<tr>
<td>5</td>
<td>Recording voice and microphones</td>
<td>Voice recording</td>
</tr>
<tr>
<td>6</td>
<td>Song structure</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Original songs</td>
<td>Song writing</td>
</tr>
<tr>
<td>8</td>
<td>Ringtones</td>
<td>Ringtone creation</td>
</tr>
<tr>
<td>9</td>
<td>Open lab</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Open lab</td>
<td>Final project</td>
</tr>
</tbody>
</table>

#### PSYCHOLGY 1002

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Research Methods</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>The Nervous System</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Sensation and Perception</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Conditioning and Learning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Memory</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>----------------</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>States of Consciousness</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Development</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Social Psychology</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Abnormal Psychology</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Review</td>
<td></td>
</tr>
</tbody>
</table>
Physics 1200: Behind the Music

WHERE: Room Sci S143 (Labs in N246)

WHO: "Dr. Bill" Pezzaglia (Pez-al-ya)

EMAIL: Bill.Pezzaglia@csueastbay.edu

Office: SC N142C (“the cave”)

TEXT: Donald E. Hall, Musical Acoustics (3rd edition) [Brooks/Cole 2002]

Supplemental Texts (not required):
- Similar level: Ian Johnston, Measured Tones (3rd ed)

ATTENDANCE: Showing up at all classes is a college requirement (you can be dropped for missing classes). Roll will be taken and attendance may influence your grade.

GRADES: Grade Weighting is approximately: Quiz (10%), Exams (25%), Comprehensive Final (25%), Homework (15%), Lab/Attendance/Participation (10%), Project/Paper (15%). A "typical" grade distribution for this course would be: A (20%), B (30%), C (35%), D/F (15%), however this varies pending class performance. From experience in previous years, if you average below 35% on my exams you may get a D, below 45% is probably a C, below 55% a B, but this is only approximate.

EXAMS: Your lowest quiz score will be dropped (which allows for one unexcused absence). You are required to attend the quizzes, midterm(s) and the final. Make up exams will not be given except for college accepted reasons (e.g. death in family, documented illness). There will be some example questions handed out before each exam. Any cheating on exams will automatically result with a “zero” score, and result in referral to the student discipline office. NO ELECTRONIC dictionaries on exams. NO CELL PHONES or Blackberries etc. If you need a calculator, it must be a simple calculator!

HOMEWORK: There will be regularly assigned homework problems. Its important for you to spend some time on them, even if you don’t get it all correct. I’ll be grading half for effort. While homework will not count much directly, indirectly people that do the homework do much better on the exams (by nearly a full grade!). Plagiarism on homework is also considered cheating.

LAB/ACTIVITIES: There will be tentatively 4 days that you will do a lab activity. If you miss more than one activity it may severely impact your grade as they cannot be made up and lab material will be included on the exams. Besides, they are fun! Most students think they are the best part of the class.

GROUP PROJECT: You will be divided into 10 groups of 5. Each group will build a didgeridoo from scratch, learn how to play it and provide a group written report at the end of the quarter. The report will include summaries of: (1) Construction, (2) Design (art, symbols), (3) Physical Measurements of sound properties (comparing to theory), (4) musical composition and (5) performance.

WEB: Essential material will be on Blackboard, but additional material is available at:
http://www.clifford.org/drbill/csueb/1200/

Some material is password protected: Login as "csueb", password= “mersenne”  (no quotes!)

MY PHILOSOPHY: The Lectures, Text, Lab and Homework are intended to supplement and complement each other. They do not necessarily cover the same ground (e.g. lectures will not "parrot" the text but rather provide a different perspective). Try not to get so lost in details that you lose the "big picture". Pay attention to note the "outline" format of my lectures for perspective.

THE CLUSTER PROGRAM (supersyllabus): All of you are taking this course as part of the cluster “Beats, Physics and the Mind”, in conjunction with Music 1085 and Philosophy 1303.
**TENTATIVE LECTURE SCHEDULE for Physics 1200 (MWF 1:20-2:30 pm)**

<table>
<thead>
<tr>
<th>Week</th>
<th>Meeting</th>
<th>Day</th>
<th>Date</th>
<th>Topic</th>
<th>Reading**</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Mon</td>
<td>31-Mar</td>
<td>HOLIDAY</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Fri</td>
<td>04-Apr</td>
<td>Lab 1, Video &amp; Project Discussion</td>
<td>Chap 2</td>
<td>Lab 1</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>Mon</td>
<td>07-Apr</td>
<td>II. Harmonic Motion</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Wed</td>
<td>09-Apr</td>
<td>Wave Phenomena</td>
<td>Chap 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Fri</td>
<td>11-Apr</td>
<td>Lab 1, Video &amp; Project Discussion</td>
<td></td>
<td>Lab 1</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>Mon</td>
<td>14-Apr</td>
<td>III. Wave Motion</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Wed</td>
<td>16-Apr</td>
<td>IV. Energy in Waves</td>
<td>Chap 5</td>
<td>Quiz 1</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Fri</td>
<td>18-Apr</td>
<td>Lab 2 &amp; Lecture</td>
<td></td>
<td>Lab 2</td>
</tr>
<tr>
<td>4</td>
<td>9</td>
<td>Mon</td>
<td>21-Apr</td>
<td>Decibels</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Wed</td>
<td>23-Apr</td>
<td>V. The Ear, perception</td>
<td>Chap 6, 17</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>Fri</td>
<td>25-Apr</td>
<td>Lab 2 &amp; Lecture</td>
<td></td>
<td>Lab 2</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>Mon</td>
<td>28-Apr</td>
<td>VI. Scales</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>13</td>
<td>Wed</td>
<td>30-Apr</td>
<td>Exam: Topics I-V ?</td>
<td>Chap 7, 19</td>
<td>Exam1</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>Fri</td>
<td>02-May</td>
<td>Lab 3 &amp; Lecture</td>
<td>Chap 18</td>
<td>Lab 3</td>
</tr>
<tr>
<td>6</td>
<td>15</td>
<td>Mon</td>
<td>05-May</td>
<td>VII. Tuning Theory</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>Wed</td>
<td>07-May</td>
<td>VIII. Timbre</td>
<td>Chap 8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>Fri</td>
<td>09-May</td>
<td>Lab 3 &amp; Lecture</td>
<td></td>
<td>Lab 3</td>
</tr>
<tr>
<td>7</td>
<td>18</td>
<td>Mon</td>
<td>12-May</td>
<td>Resonators (Lab Prep)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>Wed</td>
<td>14-May</td>
<td>Timbre and Fourier Theorem</td>
<td></td>
<td>Quiz 2</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>Fri</td>
<td>16-May</td>
<td>Lab 4 &amp; Lecture</td>
<td>Chap 3, 9</td>
<td>Lab 4</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>Mon</td>
<td>19-May</td>
<td>IX. Percussion, Drums</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>22</td>
<td>Wed</td>
<td>21-May</td>
<td>X. String Instruments, Piano</td>
<td>Chap 10, 11</td>
<td></td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>Fri</td>
<td>23-May</td>
<td>Lab 4 &amp; Lecture</td>
<td></td>
<td>Lab 4</td>
</tr>
<tr>
<td>9</td>
<td>X</td>
<td>Mon</td>
<td>26-May</td>
<td>HOLIDAY</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>Wed</td>
<td>28-May</td>
<td>Strings: Guitar, Violin</td>
<td>Chap 13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>Fri</td>
<td>30-May</td>
<td>Exam: Topics VI-X ?</td>
<td></td>
<td>Exam2</td>
</tr>
<tr>
<td>10</td>
<td>26</td>
<td>Mon</td>
<td>02-Jun</td>
<td>XI. Brass</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>27</td>
<td>Wed</td>
<td>04-Jun</td>
<td>XII. Woodwinds, pipes, Reeds</td>
<td>Chap 12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>28</td>
<td>Fri</td>
<td>06-Jun</td>
<td>Project Recital</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>[29]</td>
<td>Mon</td>
<td>09-Jun</td>
<td>Final Exam 2-3:50 pm</td>
<td></td>
<td>FINAL</td>
</tr>
</tbody>
</table>

***There may be one or more guest speakers that will modify the lecture schedule TBA***


* Exam schedule and coverage is approximate, but can’t vary much

†Lab activities will probably meet in **Science N246** (or N247)

Lecture Meets in **Science S143**

All handouts available at Web Site [http://www.clifford.org/drbill/csueb/1220](http://www.clifford.org/drbill/csueb/1220)

- **Some material is password protected**
  - Login as “csueb”, password= “mersenne” (no quotes! Case sensitive)

Tentative Lab Schedule (Instructors Jerlyn Swiatlowski, Caitlin Montcrieffe)
  1. Melde’s Experiment
  2. Velocity of Sound
  3. Helmholtz Resonators
  4. Singing Rods
STUDENT LEARNING OUTCOMES:

(1) **Students will demonstrate broad science content knowledge in the area of the physics of acoustics.** The specific goal of PHYSICS 1200 is to develop a scientific framework from which students can understand how a variety of instruments make music. In the process of building this scientific foundation many general concepts in physical science will be explored. Students will learn Newton's Laws and how particular types of forces can produce oscillatory motion. The general properties of waves will be explored in detail, including understanding the difference between transverse and longitudinal waves, defining a wave's period, frequency, and amplitude, and looking at more advanced wave properties such as diffraction, interference, the Doppler Effect, and resonance.

(2) **Students will demonstrate the application of quantitative skills (such as statistics, mathematics and the interpretation of numerical graphical data) to problems in oscillations, waves, and acoustics.** A key goal of this course is to both develop students' qualitative understanding of how physical systems work and their quantitative skills that allow them to predict the behavior of these systems.

(3) **Students will demonstrate a general understanding of how the scientific method can be used to explore how different musical instruments work.**
MUS 1085 - Introduction to Audio Production
Winter 2014
MWF 1:20-2:30 p.m.
Dr. Daniel Highman

Office: MB 2506
Hours: Wednesday, 3:00-4:00, and by appointment
Email: daniel.highman@csueastbay.edu

Materials: You will need a notebook and 4 gigabyte USB flash drive to backup your projects.

GOALS
The goals of this quarter’s Introduction to Audio Production
  ♦ Introduce you to music technology hardware and the basic concepts surrounding their use and application in recording and production.
  ♦ Develop a foundation for the use of digital audio workstation software (DAW), more specifically Ableton Live 7.
  ♦ Learn about how to listen to a song critically for its compositional qualities.
  ♦ Make you more aware of sound and sound in time as a creative force.

REQUIREMENTS
Texts: There is no text for this class. All readings are drawn from instructor notes, research on the internet, and Prof. Jeffrey Hass’ free electronic text, Introduction to Computer Music, Vol. 1 found at: http://www.indiana.edu/~emusic/etext/toc.shtml

Assignments and Examinations (subject to change at instructor’s discretion)

Week 1: Introduction and Acoustics, beginning Ableton tutorials, audio collection/collage project
Week 2: Beats, Rhythm and Drum beat project, more Ableton basics
Week 3: Basslines/bassline project
Week 4: Melody Basics/melody project
Week 5: Recording voice and microphone types, voice project
Week 6: Song Structure
Week 7: Midterm: original songs
Week 8: Ringtone Project
Week 9: Open lab week
Week 10: Final Project

Grading
Projects/homework: 60 pts
Midterm: 20 pts
Final: 20 pts

General familiarity with OS navigation: It is assumed that you have a basic knowledge of OS navigation concepts such as 'double-clicking', menu navigation, data saving and retrieval, and Internet browsing. Should you be completely new to computers, please see me immediately as this course does not start from the absolute beginning with computers.

THE GOLDEN RULE
Failure to complete an assignment or project due to a catastrophic loss of data is not an acceptable excuse for failure. The “golden rule” for data is:
Your data does not exist unless it exists in two different places. Backup your data in two or more places on at least two different types of media!

**ATTENDANCE**
You are allowed up to three unexcused absences for the quarter. Each absence after this limit will count as a 1/3 letter grade deduction from your final course grade average. Excuses for absences are considered on a case-by-case basis.

**Content**
When you are working on your own projects do not use material that can be construed as offensive or explicit.
Psychology 1002: General Psychology of Music and Mind

Instructor:
Office:
Office Phone:
Office Hours:
Mailbox:
E-mail:

Please review the course requirements for this course as printed in your catalog.
http://www20.csueastbay.edu/ecat/undergrad-chapters/u-psyc.html#undergrad

Student Learning Outcomes:
Upon successful completion of this course students will be able to:

- Demonstrate familiarity with the major concepts, theoretical perspectives, empirical findings, and historical trends in psychology.
- Understand and apply basic research methods in psychology, including research design, data analysis, and interpretation.
- Use critical and creative thinking and the scientific method to solve problems related to behavior and mental processes.
- Value empirical evidence, tolerate ambiguity, act ethically, and reflect other values that are the underpinnings of psychology as a science.
- Pursue realistic ideas about how to implement their psychological knowledge, skills, and values in occupational pursuits in a variety of settings.
- Explain the basic psychological processes that allow us to listen to, learn, appreciate, and create music.

Course Texts: Introduction to Psychology, Coon and Mitterer, 13th Ed. This text may be purchased as a paper version, or electronically from the publisher's web site. I will provide you the link to the electronic version of the text on blackboard. The e-version of the text is less expensive than the paper version new through the bookstore and includes interactive tools.

Blackboard: Syllabus, study-guides for exams, and homework assignments/quizzes for the course are available only electronically on Blackboard. We will discuss this further in class. Additionally, changes to the schedule will be posted as announcements on our class blackboard site. Be sure to check these announcements and your horizon e-mail regularly.

There will be 3 exams: 2 midterms and a final. Assignments for this course are quizzes posted on blackboard. Due dates for these assignments will be posted on blackboard.
**Topics and assignments (by week):**

**Week 1:** Introduction and Research Methods: Chp. 1

**Week 2:** The Nervous System and Sensation: Chps. 2 & 4 and Specter, M. (2001)  
Rethinking the brain; How the songs of canaries upset a fundamental principle of science. The New Yorker, 42-53.

**Week 3:** Sensation and Perception. Chp. 4

**Week 4:** Review and **Exam 1**

**Week 5:** Conditioning and Learning. Chapter 6.

**Week 6:** Memory and States of Consciousness, Chp. 7 & 5.

**Week 7:** States of consciousness continued and review

**Week 8:** **Exam 2** and Intelligence. Chp. 9

**Week 9:** Development and Social Psychology: Chap. 3, 16 and 17.

**Week 10:** Abnormal Psychology and Review: Chap. 14

**Finals:** Final

**Exam Dates:**

Exam 1 – TBD
Exam 2 – TBD
Final Exam – TBD

**Exams:**
You will need a #2 pencil and a Scantron form 882-E for each exam. You will be required to bring photo id with you to exams. Make-up exams will only be granted for documented emergencies. **Please review the exam dates now, and note them. Do not continue in this class if you cannot make the scheduled exams.** Exams will cover material from assigned readings, films and lecture material.

**Assignments:**
You will be assigned several chapter post-tests on line through the blackboard site. These chapter post-tests will be posted with their due dates at least one week before they are due. You are responsible for checking the site to insure that you do them on time.

**Grading:**
Each exam will be worth 100 points. The homework quizzes (4 of them) will be worth 10 points each. Total points available in the class is therefore 340. Grades will be calculated on percentages 93-100% is an A, 90-92.9% is a A-, 87-89.9% is a B+, 83-86.9% is a B, 80-82.9% is a B-, 77-79.9% is a C+, 73-76.9% is a C, 70-72.9% is a C-, 67-69.9% is a D+, 60-66.9% is a D, below 60% is an F. **I do not curve grades and I do not ‘assign’ grades – you earn your grades.** Note that an incomplete grade will only be considered in the event of a documented emergency, not as a way of avoiding a failing grade.

**Lecture notes:**
As a courtesy for you, I will have outlines of my lecture notes (excluding overheads of copyrighted material) online at the blackboard site for this class. Try and print and read these notes before class.
Films
There will be several films seen in class. These will be shown as convenient to me, and thus are (mostly) unannounced. There will be questions from these films on the exams, and we may not discuss them in class prior to the exam. These films are part of my personal library and may not be available elsewhere. Regular attendance in class is strongly advised.

In order to receive a grade in this course:
To get a fuller flavor of Psychology as an experimental science, one must have some direct contact with ongoing research. Consequently, as part of the requirements for this course you will participate as a subject in some research studies. If you do not complete the subject pool requirement you will receive an Incomplete in the course. If your grade at this point is a D or F, you will receive the grade rather than an Incomplete. You will be provided with a yellow “Research Participation and Reminder” sheet. Please read this yellow sheet carefully because it describes the subject pool requirement in more detail. Each time you participate, the experimenter will sign your yellow sheet and indicate the number of points you have earned. It is important that you keep your yellow sheet. In the unlikely event of an error in the subject pool records, your yellow sheet serves as proof of your research participation. Sign-up sheets for experiments are located on the bulletin board outside South Science 236. When you sign up to be in an experiment, you are making a commitment to arrive at the experiment at the stated hour and on time. **One point will be added to your point requirement each time that you miss an appointment (i.e., if the requirement for the quarter is 4 points and you miss one appointment then you would need to earn 5 points that quarter).** This means that you will need to earn an extra point later on in order to fulfill the requirement. The subject pool requirement is administered by the Subject Pool Coordinator, not by your Psychology 1005 instructor. Please direct questions regarding the subject pool to the Subject Pool Coordinator in the Psychology Department office (South Science 229).

Misc: -The best predictor of final grades in my classes is attendance. Students who do not attend my classes do not do well. You must be here if you wish to succeed. Additionally, if you do attend but spend your time in class chatting, or texting or using an electronic device for anything other than note taking, you are not absorbing the material from the course and may be distracting those around. If I observe you being a distraction, I reserve the right to ask you to leave until you can focus on the material.

Occasionally I find it necessary to send you information by e-mailing through blackboard. Be sure you check your horizon e-mail account regularly.

Class policy on plagiarism
Duplication of any material from another written work that is not in quotations is plagiarism. Plagiarism is cheating, and therefore, any instance will be considered grounds for an F in this class. This includes copying anyone else’s simulations. Cheating during exams will be grounds for an automatic F in the class. Additionally, I am required to put the following statement in my syllabus “By enrolling in this class the student agrees to uphold the standards of academic integrity described in the catalog at [http://www.csueastbay.edu/ecat/current/i-120grading.html#section12](http://www.csueastbay.edu/ecat/current/i-120grading.html#section12).”
Children
As part of this class, we will be discussing topics that are inappropriate for children (ie gender, reproduction, hormones, and use of postmortem brain material for study). Please do not bring your children with you to class without consent from me. Infants also are a huge distraction for me while I am lecturing and other students who are trying to listen. Please be courteous and do not bring them to class.

Accommodations for Students with Disabilities
Accommodations for those with a documented disability are available through Accessibility Services. Please see them as soon as possible to pick up the appropriate paperwork if you qualify for services.

Emergency Information
Emergency information: “Information on what to do in an emergency situation may be found at http://www20.csueastbay.edu/af/departments/risk-management/chs/emergency-management/index.html. Please be familiar with these procedures. Information on this page is updated as required. Please review the information on a regular basis.”
Approved by Department Chairs:

__________________________________________  Department  Date

__________________________________________  Department  Date

__________________________________________  Department  Date

Approved by College Dean/Associate Dean from each participating college

__________________________________________  Date

__________________________________________  Date

__________________________________________  Date

Signatures of three faculty members: Ideally, the person who will teach the courses will participate in the cluster planning. However, recognizing the staffing difficulties departments face, the faculty member who plans the cluster must agree to provide a thorough orientation to the expectations and methods developed for the learning community to the actual instructor. If monies are available, faculty should be available for meetings in the late spring to plan integration points in the yearlong curriculum.

__________________________________________  Date

__________________________________________  Date

__________________________________________  Date

Proposals should be submitted as soon as possible and no later than Friday, April 4, 2014. Please submit proposals to sally.murphy@csueastbay.edu and linda.beebe@csueastbay.edu.

9 While Colleges do not approve courses for GE, College approval assures support for departmental participation.