New Course Request

1. School/Division: Department Music & Arts Technology
2. Academic Subject Code: MUS
3. Course Number: N320 (must be cleared with University Enrollment Services)
4. Instructor: Rees/Munson
5. Course Title: Music Technology II
   Recommended Abbreviation (Optional): Music Tech II
6. First time this course is to be offered (Semester/Year): Spring 2011
7. Credit Hours: Fixed at 3 or Variable from _______ to _______
8. Is this course to be graded S-F (only)? Yes _______ No _______ X
9. Is variable title approval being requested? Yes _______ No _______ X
10. Course description (not to exceed 50 words) for Bulletin publication: P: N310. An overview to the digital world behind music hardware and software, this course offers real-world examples of the use of computer music synthesis in academic and popular music, and in the music technology industry. Topics include audio software development, simple interactive systems, and custom audio plug-ins.
11. Lecture Contact Hours: Fixed at 3 or Variable from _______ to _______
12. Non-Lecture Contact Hours: Fixed at 0 or Variable from _______ to _______
13. Estimated enrollment: 16-32 of which 0 percent are expected to be graduate students.
14. Frequency of scheduling: Spring Semester Only
   Will this course be required for majors? Yes
15. Justification for new course: New Bachelor Degree Program (BSMT)
16. Are the necessary reading materials currently available in the appropriate library? Yes
17. Please append a complete outline of the proposed course, and indicate instructor (if known), textbooks, and other materials.
18. If this course overlaps with existing courses, please explain with which courses it overlaps and whether this overlap is necessary, desirable, or unimportant. No
19. A copy of every new course proposal must be submitted to departments, schools, or divisions in which there may be overlap of the new course with existing courses or areas of strong concern, with instructions that they send comments directly to the originating Curriculum Committee. Please append a list of departments, schools, or divisions thus consulted.

Submitted by: [Signature] Date 5/11/10
Department Chairman/Division Director

Approved by: [Signature] Date 5/11/10
Dean

Date
Chancellor/Vice-President

Date
University Enrollment Services

After School/Division approval, forward the last copy (without attachments) to University Enrollment Services for initial processing, and the remaining four copies and attachments to the Campus Chancellor or Vice-President.
Music Technology II  
(N320)  
Digital Signal Processing (DSP) Fundamentals:  
History, Theory and Techniques  
3 credit hours

Instructor: Jordan Munson  
Office: CE015  
Office Phone: 278-3240  
Office hours: By appointment  
Email: jtmunson@umail.iu.edu

Course description: P: N310  
This course is an overview to the digital world behind music hardware and software. Major scripting languages taught during this course are intended to provide you with a knowledge and appreciation of the broad genre of computer music, as well as a practical understanding of the fundamental techniques used in digital signal processing (DSP). Essays written by pioneering composers, theorists and philosophers in the field will fuel in-class discussions and provide context to the techniques practiced throughout the semester. In addition, this course will offer many real world examples of the use of computer music synthesis in academic and popular music, as well as the music technology industry. Topics include audio software development, simple interactive systems, and custom audio plug-ins.

Course Objectives/Outcomes  
- Think, speak and write clearly and effectively about major scripting languages; (PUL 1; NASM 1)  
- Understand fundamental techniques used in Digital Signal Processing (DSP); (PUL 1e, NASM 17)  
- Research essays written by pioneering composers, theorists and philosophers in the field; (PUL 5a, b, and c, 6, NASM 3)  
- Develop a working knowledge of technological developments. (PUL 1e, NASM 18)

Software Used in Course  
Max/MSP/Jitter 5.1 (or later)  
Ableton Live 8.1  
Max for Live

Required Materials  


Grading & Policy  
The final grade is determined by the following combination:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midterm Exam</td>
<td>30%</td>
</tr>
<tr>
<td>Assignments</td>
<td>20%</td>
</tr>
<tr>
<td>Attendance/Class participation</td>
<td>20%</td>
</tr>
<tr>
<td>Final Project</td>
<td>30%</td>
</tr>
</tbody>
</table>
Midterm Exam: This exam will cover terminology and synthesis theories presented in class. In addition, this test will include several essay questions focused on the philosophy and history of digital and computer music. Topics included will be found in the assigned reading and discussed at length in class.

Assignments: There will be four assignments due for the course. These assignments will be completed in Max/MSP and are meant to test techniques covered in class lecture/workshops. These assignments will be reviewed in class. It is crucial that you complete and learn from these assignments. Assignments will be due in class on the date specified. No late work will be accepted.

Final Project: Your final project will be a culmination of all the concepts and techniques of computer music synthesis presented during the course. This project will represent your particular interests and will be presented as a stand-alone audio application. Projects will be presented to the class at the end of the semester. Attendance and Participation: Attendance and class participation are mandatory. A large part of this course is the in-class discussion of assigned reading and the workshop-style fundamental tutorials, making attendance essential for success in the class. Please refrain from general rudeness during class, including talking, newspaper reading, using cell phones (unless asked), and so forth.

Academic integrity: “Any student engaged in cheating, aiding in cheating, plagiarism, or any other unfair practice, will be dealt with immediately and strictly according to University policies.”—Academic Handbook

Schedule

Week I: An introduction to computer operations.
Human computer interaction. The state of the modern PC.
Reading Assignment: Audio Culture pp. 76-81 & 94-97

Week II: Reading discussion: Modes of listening.
Operating systems: Windows/DOS, Mac OS, Unix, Linux
The command line interface, graphic user interface, Syntax and semantics.

Week III: An introduction to algorithms
The Application Programming Interface

Week IV: Machine code, assembly language, and interpreted languages
Third (C, C++, Java), fourth (SQL, PROLOG) and fifth (Visual Basics)
generation programming languages.
Reading Assignment: Audio Culture pp. 113-130

Week V: Reading discussion: electronic reproduction of sound.
Scripting Languages (JavaScript, AppleScript)
Object-oriented programming (JavaScript, C++)
Programming Languages (Csound, C, COBOL, BASIC, JAVA, Postscript).
An Introduction to digital signal processing (DSP)
Reading Assignment: Audio Culture pp. 131-156

Week VI: Reading discussion: Ethics and ownership in the recorded age.
Visual programming languages (VPL)
Introduction to MAX/MSP/Jitter.
Reading Assignment: Excerpts from The Computer Music Tutorial.
Week VII:  
Additive Synthesis Techniques.  
ASSIGNMENT 1 DUE.  
Exam review.

Week VIII:  
MIDTERM EXAM

Week IX:  
Modulation: Ring/Amplitude/Frequency  
Reading Assignment: Audio Culture pp. 157-164  
Reading Assignment: Excerpts from The Computer Music Tutorial.

Week X:  
Reading discussion  
Audio sampling.  
ASSIGNMENT 2 DUE  
Reading Assignment: Audio Culture pp. 329-340  
Reading Assignment: Excerpts from The Computer Music Tutorial.

Week XI:  
Reading discussion: History of computer music performance practice.  
Creating delay and time-domain processing.  
Reading Assignment: Audio Culture pp. 341-364

Week XII:  
Reading discussion: History of computer music performance practice (continued).  
FINAL PROJECT PROPOSALS DUE  
Granular synthesis.  
Reading Assignment: Excerpts from The Computer Music Tutorial.

Week XIII:  
Building simple interactive digital instruments.  
ASSIGNMENT 3 DUE  
Reading Assignment: Audio Culture pp. 365-380

Week XIV:  
Reading discussion: Composer and Developer.  
Introduction to OSC and current computer music user interfaces.  
Reading Assignment: Audio Culture pp. 381-398

Week XV:  
Reading discussion: Composer and Developer (continued)  
Building standalone music applications and plug-ins. (Max for Live)  
ASSIGNMENT 4 DUE

Week XVI:  
Demonstrations in Intermedia: Motion capture in interactive digital instruments.  
Building standalone music applications and plug-ins. (Continued)

Week XVII:  
FINAL PROJECTS DUE