DIGITAL SOUND & MUSIC
CONCEPTS, APPLICATIONS, AND SCIENCE

CSC191 Digital Sound and Music, 3 credit hours
Fall 2011
Instructor: Dr. Jennifer Burg
Course Days, Times, and Place: 3:30 – 4:45 WF, Manchester 023 (Digital Media Lab)
Prerequisites: Permission of Instructor. Please contact Dr. Jennifer Burg at burg@wfu.edu.
Course URL: Sakai course website
Instructor's Office Hours: 3:30-4:45 M, MWF 1-2, or by appointment
Instructor's Office: Manchester 237
Instructor's Phone: 758-4465

Course Description:
By means of digital audio and MIDI applications, students will learn basic concepts of music, physics, electronics, and computer science. Students will learn how to record and edit digital audio, work with MIDI applications, and program a synthesizer. As a collaborative project, students will compose a short composition of synthesized music to be performed by a laptop ensemble. The composition will also be recorded and mastered for a CD. As far as possible, students will be assigned roles appropriate to their backgrounds in either music or science.

Book and Learning Supplements:
Digital Sound and Music: Concepts, Applications, and Practice with online supplements, including interactive tutorials and demonstrations, video demonstrations, and suggested exercises. See http://www.cs.wfu.edu/~burg/CCLI/Templates/curriculum_index.php

Music Concepts:
scales, keys, intervals, chords, harmony, dissonance, , timbre, chord sequences, meter, tempo, rhythm

Physics, Electronics, and Computer Science Topics:
analog vs. digital, analog to digital conversion, sampling, quantization, aliasing, quantization error, decibels, dynamic range, filtering, frequency response, impulse response, files vs. streams, file types, compression, a "program", levels of abstraction

Course Resources:
A computer lab (Digital Media Lab, Manchester 023) equipped with microphones, MIDI keyboards, headphones, monitors, and software including Adobe Audition, Cakewalk Sonar, Finale, Reason, Acid Pro, and MATLAB.

The lab will be open for student use all during the semester.

Basis of Evaluation:
Students will take pre- and posttests related to each pair of successive chapters. The pretests evaluate the students' knowledge prior to studying the material. Students receive scores but the scores do not count as part of the grade for the course. The posttests are taken after the chapters have been read and studied. The posttests do count as part of the final grade. Eight chapters will be studied, so there will be four graded posttests.

This material is based on work supported by the National Science Foundation under CCLI Grant DUE 0717743, Jennifer Burg PI, Jason Romney, Co-PI.

The major project for the semester will be a collaborative music composition performed as a laptop ensemble. Students will work in pairs. There will be four "instrument" pairs and one "producers" pair.

Instrument pairs: In each instrument pair, there will be one student with some background in music and one student with some background in computer science. Assuming there are ten students in the course, four of the student pairs will be assigned an instrument whose part they will create by means of a MIDI synthesizer. One instrument could be voice, in which case the voice pair would record digital audio rather than working with MIDI synthesis. Based on a chosen chord sequence, each pair will demonstrate their instrument with a short strain of music offered as an idea of motif to the composer.

Producers pair: In the producers pair, a student with computer science background will serve as the sound engineer while the student with music background will serve as the composer/conductor. The composer/conductor will be responsible for combining the sounds and pieces of music offered by each instrument into one composition. The sound engineer will be responsible for the technical aspects of combining the synthesized instruments into one live performance, recording the performance, and saving this performance in appropriate format on CD.

The final grade will be based in part on each student's demonstrated effort, experimentation, and contribution to the collaboration. Students will keep a journal or blog in which they record their work and thinking process, and this will be evaluated by the instructor.

Students will be asked to complete questionnaires regarding the perceived effectiveness of the curriculum material. These questionnaires are a requirement of the course but will not be counted toward the grade.

Grading:

Tests:	40% Tests will be weighted relative to each other according to how many items are on them. The points will be added, averaged, and converted to an overall percentage for this portion of the grade, which is in turn 40% of the final grade.
Exercises and class participation:	20%
Project, including blog documenting dxperimentation and collaboration	40%

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Grading Standards:

90-100%	A
80-89%	B
70-79%	C
60-69%	D
< 60%	F

Type of Instruction in the Course:
The first part of the course (approximately seven weeks) will be primarily lecture, demonstration, and question-answer sessions as the students go through chapters of the book. Students will know the concepts they are expected to master for each pair of chapters based on the associated pretest. They will be expected to read the book and explore the book's learning supplements to master these concepts. Students will *not* be asked to read Section 3 of the chapters, which involves computer programming.

The second part of the course (approximately seven weeks) will be primarily hands-on collaborative work in the lab as the students develop their instruments, musical composition, and laptop ensemble performance, and recording sessions.

Students will be observed and their collaboration will sometimes be recorded by videotape. These observations will be used by the instructor for her research in curriculum development. Students will remain anonymous in the research publications, and videotapes will not be viewed publicly.

Class Attendance:
Students are expected to come to class regularly. Class attendance will be taken into consideration in the final grade.

Proposed Schedule:
1 ½ weeks Chapters 1 and 2
1 ½ weeks Chapter 3 and 4
2 weeks Chapter 5 and possibly some of Chapter 6
2 weeks Chapter 7 and possibly some of Chapter 8
7 weeks – collaborative lab work

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Plan in Event of Extended Campus Closing

Please note the following plan to be followed in the event that the Wake Forest campus is closed for an extended period of time and we are unable to have our regularly-scheduled class meetings.

In normal circumstances, please contact me through my campus email address or campus telephone number.
campus email: burg@wfu.edu
campus telephone: 758-4465

In emergency situations or situations where the campus is closed, you may also use the following contacts:
alternate email: burgjj@gmail.com
cell phone number: (336) 407-3743

Your course information, including a schedule of assignments, will be posted at the Sakai website for the course.

If we are able to meet before the campus is closed, I'll give you an updated schedule at that time.

After leaving campus, you should consult the schedule website regularly for updates to the schedule.

Be sure to take your book, computer, and course notes home with you in the event that the campus is closed. We'll continue with tests and programming assignments, communicating through the internet, email, and/or hard mail.

Assignments that are of a manageable file size should be emailed to me at burg@wfu.edu, or, if you cannot reach that address, at burgjj@gmail.com. Larger assignments should be returned by hard mail on CD or flash memory drive to my home address, which I will send to you if necessary. I'll return the flash drive to you.

If the internet is down, I will mail your assignments to you in hard copy. By return address, you should mail back a CD or flash drive containing the source code for the implemented program. I'll return the flash drive to you.

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