COURSE CALENDAR DESCRIPTION

Introduces the concepts and techniques of digital signal processing and their application in both sound and image resulting in the development of works that are cross-modal hybrids between sound and image, such as found in the Visual Music aesthetic. Course credit exclusion: FA/FACS 2935 3.0. Prerequisites: FA/FACS 2930 6.00 or FA/DATT 1000 6.00.

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INSTRUCTOR(S)

<table>
<thead>
<tr>
<th>Name</th>
<th>Section / Format / Term</th>
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SPECIAL FEATURES

This course introduces the concepts and techniques of digital signal processing and their application in both sound and image domains. Techniques covered will include signal foundations, filters, frequency analysis, and synthesis. The focus of the instruction is on the development of a fundamental knowledge through the use of tools, such as Max, that facilitate digital signal processing in sound and image domains. Emphasis will be placed on the use of digital signal processing techniques in their creative applications with the ultimate outcome of the course to develop creative works. In particular works that are transmodal hybrids of sound and image, such as found in the Visual Music aesthetic. A portion of the instruction will focus on the historical foundations of AudioVisual art-making in order to establish a context for developing work in the course. While a portion of the content of the course will be an exploration of sound processing, no musical background is required.

TOPICS AND CONCEPTS

The following is an outline for the course. The course is 12 weeks long with 1.5 lecture hours and 2.5 lab hours per week. Readings and homework are to be completed before the start of class the day they are due.

Lectures: Wednesdays 10:00-11:20. Location: DB 0014

Labs: Fridays in ACW 103.
Lab 1: 10:00-12:20 Don Sinclair
Lab 2: 12:30-14:50 Michael Palumbo
Lab 3: 15:00-17:20 Michael Palumbo

Tentative Schedule:
Week 1 19-09-04: Course introduction and a look at sound.
Week 2 19-09-11: Colour organs, understanding light and colour, sound synthesis.
Week 3 19-09-18: Composition and more synthesis, quiz 1.
Week 4 19-09-25: Vectors, and 2D drawing.
Week 5 19-10-02: Sampling and sound analysis, project 1 due.
Week 6 19-10-09: Filtering, quiz 2.

Reading week

Week 7 19-10-23: Matrices and textures, project 2 due.
Week 8 19-10-30: Modulation and cross modal transformation.
Week 9 19-11-06: 3D materials, lighting and cameras, sonification, quiz 3.
Week 10 19-11-13: Spatial audio, using multiple projectors, FFT, project 3 due.
Week 11 19-11-20: GL, basis functions and Gen.
Week 12 19-11-27: Course wrap-up, quiz 4, concert (final project presentations).

Important assignment and quiz dates:
The following schedule is subject to change, please refer to Moodle for the latest information:
19-09-18          Quiz 1 (6%)
19-10-04          Project 1 (15%)
19-10-09          Quiz 2 (6%)
19-10-25          Project 2 (15%)
19-11-06          Quiz 3 (6%)
19-11-15          Project 3 (15%)
19-11-20          Final Project Proposals (6%)
19-11-27          Quiz 4 (6%), Final Project Due (25%)
19-11-29          Final Project Concert

LIST OF LEARNING OUTCOMES AND EXAMPLES OF

- Gain an understanding of digital signal processing techniques, such as filters, FFT analysis, and synthesis at the application-level in the domains of audio, image, and graphics.
- Understand the foundations of digital signal processing through concepts such as the sampling theorem, noise theorem, and audio and graphics pipelines.
- Understand the fundamentals of human perception, such as acoustics and colour theory, and their relationship to digital signal processing.
- Understand the historical and cultural use of digital signal processing and human perception in the creation of transmodal artworks, such as found in the domain of visual-music.
- Apply knowledge of application-level digital signal processing techniques, human perception, and its historical and cultural use in the creation of art-based studies and exercises in the form of assignments.
- Demonstrate understanding of application-level digital signal processing techniques and human perception through periodic tests.

Gain experience in the creation of an ambitious work in the domain of application-level digital signal processing in a final project.

GRADED ASSESSMENT

Assessment is based on projects, quizzes, readings, which will be given the following weight in the final grade:
45% Projects
31% Final Project
24% Quizzes
1. Projects

Projects will be given regularly throughout the course. Projects are evaluated on the following criteria:

1) The execution of the concept: How well instructions were followed and the goals of the assignment are met.

2) Aesthetic quality: A consistent, clear and well-articulated composition based on the constraints given in the assignment and framed by the readings and lectures.

3) Technical achievement: A reasonable technical extension of the assignment, showing an ability to comprehend and be creative beyond what is demonstrated in the lab.

b. Final project

Projects can be realized in groups and will be an experiment in AudioVisual media art, as informed by the discussions and exercises presented in the context of this course. Projects will be realized in Max and will be presented on the last day of the course in a concert setting.

In addition to the overall project outcome, projects will be evaluated in part based on your own assessment of the overall project grade. For groups you will also describe your individual contribution to the project, and each of your team member’s contribution.

Two-four projects from this course will be considered for the Digital Media Showcase, taking place at the end of Winter Term 2020.

c. Quizzes

Quizzes will be given periodically throughout the course. Quizzes can cover content covered in lectures, readings, and labs. Lectures and readings present theories that inform the labs and assignments.

A note on lectures, readings and labs:

Lecture slides are posted on Moodle for reinforcement of the concepts presented in the lectures, however it is advised that students take notes in the lectures because not all of the lecture content will be available online. Readings will be given in the form of short selections from books and articles. Readings will be provided electronically via Moodle. A bibliography (subject to change) from which the readings will be drawn from is provided below.

Labs will have content not available in the software tutorials, or any other supplementary source, so it is recommended that students take notes in the labs as well.

All Quizzes will be announced ahead of time. There is a no make-up policy for Quizzes, meaning that missed tests cannot be made-up unless there is a reasonable excuse related to access/disability, religious observance, or illness as described by the University Policy below.

Assignment Submission: Proper academic performance depends on students doing their work not only well, but on time. Accordingly, assignments for this course must be received on the due date specified for the assignment. Assignments are to be handed in via Moodle (https://moodle.yorku.ca/), an upload link will be made available by the course instructor. If there is an issue with using Moodle please contact your lab instructor. There is more on Moodle in the section below.

Grading Workstation Requirements

Assignments must be able to run on a typical workstation configuration in the lab. This means projects will be evaluated on a Macintosh computer running standard software.

Lateness Penalties

Assignments received later than the due date will be penalized one-half grade point per day that they are late. Exceptions to the lateness penalty for valid reasons such as illness, compassionate grounds, etc. will be entertained by the Course Director only when supported by written documentation (e.g., a doctor’s letter).

Missed Quizzes

Students with a documented reason for missing a course test, such as illness, compassionate grounds, etc., which is confirmed by supporting documentation (e.g., doctor’s letter) may request accommodation from the Course Instructor. Further extensions or accommodation will require students to submit a formal petition to
ADDITIONAL INFORMATION

Materials

Exercises and projects in this course will be realized in Max. Part of the recommended toolbox for research and related work in Digital Media, Max is a high-level multi-media software development environment that combines audio, visual (2-D and 3-D), and hardware control and computer interfacing. During this semester Max will be made available to you for use as part of this course.

Assignments, readings and other course materials for this course will be made available through Moodle. Therefore all students will be expected to check Moodle regularly for updates to this course. In addition to course materials, Moodle provides a means to facilitate online discussion between the students and the faculty related to this course. You are encouraged to take advantage of this great resource. For more info please visit: http://moodle.yorku.ca

Many courses utilize Moodle, York University’s course website system. If your course is using Moodle, click here to access it.

Moodle @ York University