

# CSC475 Music Retrieval Systems - G. Tzanetakis

## WEEK 1 Workplan

The workplans for this course are guidelines about the material to study and the work that needs to be performed between each weekly in-person meeting. They are structured for three different types of course engagement:

- Minimal (\*) - just want to pass the course
- Average (\*\*) - good understanding of the material
- Intense (\*\*\*) - going the extra mile, interested in pursuing graduate studies and learning deeper about the topic

Many of the resources mentioned in this workplan are available at the following website: <http://marsyas.cs.uvic.ca/mirBook/course> I strongly advise that you set aside specific regular time intervals to work on this course every week and stay engaged from the beginning to the end. We move very quickly through some complicated concepts so if you don't stay on top of it you will quickly get completely lost.

## Viewing

View the videos 2 (Introduction, 45 minutes) and 3 (Sinusoids and Phasors, 67 minutes). Write down at least three questions you have about the material. During our meeting next week I will randomly call students and ask for their questions.

## Reading

Read chapters 1, 2 of the MIR book as well as 3.1, 3.2, 3.3. (\* 3.3.1, 3.3.3, \*\* add 3.3.2, 3.3.4, 3.3.5, 3.3.6, 3.7, \*\*\* add 3.3.8, 3.3.9). The latest draft is available at <http://marsyas.cs.uvic.ca/mirBook/book/>.

Write down any questions you have and I appreciate hearing from you about any typos, mistakes and more general feedback you have about the textbook.

Look at the papers from the proceedings of ISMIR <http://www.ismir.net/proceedings/>. Sort by year and focus on the first year. Pick three papers that you find interesting and read them (\*\*\*)

## Tool learning

Although there is no specific requirement for a programming language/framework for this course I will be providing examples and doing live coding sections using *Marsyas* which is an open source framework in C++ with Python bindings for audio analysis and synthesis with specific emphasis to Music Information Retrieval. You can find more information at <http://marsyas.info>. In the next session we will be working on installing *Marsyas* on your laptops. You can certainly try to do so on your own but for this work plan I mainly focus on getting the right tools for building Marsyas working.

You will need to spend some time setting up your machine for development in this course.

- Make sure you have a compiler installed. For Linux gcc or llvm is fine, for OS X you need to have *XCode* installed, and for Windows Visual Studio or Visual Studio Express is the recommended choice (\*).
- Install *CMake* and read documentation about how it can be used to build and install software packages (\*).
- Install Python with NumPy/SciPy/Matplotlib and scikit-learn in order to do numerical processing, plots and machine learning stuff (\*).
- Install Weka which is a Java framework for machine learning (\*).
- If you have not used *git* and *github* before get them installed and learn how they work (\*).
- Install Doxygen for documentation generation and understand how it works (\*\*).
- Install the *Chuck* programming language and go over some of the tutorials (\*\*\*). *Chuck* is not required and might not be used at all but it is a really cool language for experimenting with sound. Alternatively or in addition explore *SuperCollider*.

## Programming

Write code that reads and writes buffers (arrays) of floating point samples of size 2048 from a .wav soundfile. Simply multiply each buffer with 0.5 and verify that the produced output .wav soundfile loads in Audacity and plays more quietly (\*, \*\*). You will have to find an appropriate library for reading soundfiles. The Python standard library has functions for reading and writing wave files for example.

Looking into the JUCE programming framework and how to write an audio plugin. Write a simple audio plugin that applies a Gain to incoming sound and test it using a Digital Audio Workstation program (DAW) (\*\*\*)

## Project Preparation

The project forms a significant part of this course. It will be done in groups of 2-3 students so it is a good idea to start thinking about it. If you know other students in the course that you would like to work with start contacting them and discussing possibilities. The textbook has an Appendix that has detailed information about possible projects that either other students have done in the past or I find interesting. Another good source of inspiration are papers from the International Conference on Music Information (ISMIR). Practically any paper from that conference can serve as the basis for a project. I am also completely open to new ideas as long as there is some connection to what we will be learning in the course. Take some time to think about it and read about the projects.