San José State University
Department of Computer Science
CS185C, Music Discovery through Computers, 03, Fall, 2015

Course and Contact Information

Instructor:	Vidya Rangasayee
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Office Hours:	TR 5:00pm – 6:00pm (Additional hours by appointment)
Class Days/Time:	TR 6:00pm – 7:15pm
Classroom:	Clark 216
Prerequisites:	CS 46B – Introduction to Data Structures or equivalent programming experience.

Course Description

We will explore various topics in Music Discovery through research articles and industry implementations. We will cover the background material needed to understand the research topic (For example, we will cover basics of feature extraction in general before delving into music realm). Each topic will be followed by small to medium programming assignments. There will be a culmination project that will be a team project. A team can consist of a maximum of 4 students. Students may choose to do the project individually, however, the requirements for the project will remain the same regardless of the number of team members..

Learning Outcomes

Upon successful completion of this course, students will be able to:

1. SLO 1 *Understand various music file formats*
2. SLO 2 *Understand the digital representation of music and the various low level features of audio signals*
3. SLO 3 *Use the low level features to infer higher level features such as rhythm and pitch*
4. SLO 4 *Understand the challenges involved in music discovery*
5. SLO 5 *Explore various machine learning techniques in the realm of music*

Required Texts/Readings

Textbook

There is no prescribed textbook for this course. All required reading material and notes will be provided by the instructor

Other Readings [Optional]

Additional Readings will be provided through Canvas.

Other equipment / material requirements (include if applicable)

None.

Course Requirements and Assignments

SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found in University Policy S12-3 at http://www.sjsu.edu/senate/docs/S12-3.pdf.

There will be several programming assignments some of which are team based. For team based assignments, all members will get the same grade. Each team is responsible for choosing a team lead and dividing up the work among the team members. You are personally responsible for participating and contributing to your team's work, and for understanding each part of the work for every assignment whether or not you worked on that part.

Programs must be appropriately documented via javadoc comments and should adhere to the coding style posted on the CS Department web page:http://www.cs.sjsu.edu/web_mater/java_code.html.

Unless asked for specifically, all assignments must be submitted electronically. Instructions for this will be on the first assignment.

To learn time management, each assignment is worth a maximum of 100 points. Late assignments will lose 20 points and an additional 20 points for each 24 hours after the due date.

Exams
There is one midterm for the course but no final exam. In lieu of the final exam, students will submit a team project at the culmination of the course
The current schedule for exams is
Midterm: Thursday, October 8th, 2015 during regular class

NOTE that University policy F69-24 at http://www.sjsu.edu/senate/docs/F69-24.pdf states that "Students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because active participation is frequently essential to insure maximum benefit for all members of the class. Attendance per se shall not be used as a criterion for grading."

Grading Policy

Your individual class grade will be weighted as follows:

Homework Problems and assignments (50%)
Midterm (20%)
Quizzes (10%)
Reading and Discussion (20%). Periodically I will assign research papers for you read and summarize.
My grading system allows some flexibility, but is not curved and generally follows the categories 85-100% = A, 75-85 = B, 60-75 = C, 50-60 = D, <50 = F.

Note that "All students have the right, within a reasonable time, to know their academic scores, to review their grade-dependent work, and to be provided with explanations for the determination of their course grades." See University Policy F13-1 at http://www.sjsu.edu/senate/docs/F13-1.pdf for more details.

Classroom Protocol

Please:
- Be on time!
- No texting!
- Set your cell phones in silent mode!
- Participate in the class activities as much as you can.
- Be patient about strange, easy questions from students.
- Let's make a comfortable and respectful environment for presenting any idea.
- Start on your homework early and stay on top of them
- Have fun learning.

University Policies

General Expectations, Rights and Responsibilities of the Student

As members of the academic community, students accept both the rights and responsibilities incumbent upon all members of the institution. Students are encouraged to familiarize themselves with SJSU's policies and practices pertaining to the procedures to follow if and when questions or concerns about a class arises. See University Policy S90–5 at http://www.sjsu.edu/senate/docs/S90-5.pdf. More detailed information on a variety of related topics is available in the SJSU catalog, at http://info.sjsu.edu/web-dbgen/narr/catalog/rec-12234.12506.html. In general, it is recommended that students begin by seeking clarification or discussing concerns with their instructor. If such conversation is not possible, or if it does not serve to address the issue, it is recommended that the student contact the Department Chair as a next step.

Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester's Catalog Policies section at http://info.sjsu.edu/static/catalog/policies.html. Add/drop deadlines can be found on the current academic year calendars document on the Academic Calendars webpage at http://www.sjsu.edu/provost/services/academic_calendars/. The Late Drop Policy is available at http://www.sjsu.edu/aars/policies/latedrops/policy/. Students should be aware of the current deadlines and penalties for dropping classes.

Information about the latest changes and news is available at the Advising Hub at http://www.sjsu.edu/advising/.

Consent for Recording of Class and Public Sharing of Instructor Material

University Policy S12-7, http://www.sjsu.edu/senate/docs/S12-7.pdf, requires students to obtain instructor's permission to record the course and the following items to be included in the syllabus:

- "Common courtesy and professional behavior dictate that you notify someone when you are recording him/her. You must obtain the instructor's permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material."
    - o It is suggested that the greensheet include the instructor's process for granting permission, whether in writing or orally and whether for the whole semester or on a class by class basis.
    - o In classes where active participation of students or guests may be on the recording, permission of those students or guests should be obtained as well.
- "Course material developed by the instructor is the intellectual property of the instructor and cannot be shared publicly without his/her approval. You may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor consent."

Academic integrity

Your commitment, as a student, to learning is evidenced by your enrollment at San Jose State University. The University Academic Integrity Policy S07-2 at http://www.sjsu.edu/senate/docs/S07-2.pdf requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The Student Conduct and Ethical Development website is available at http://www.sjsu.edu/studentconduct/.

Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 at http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf requires that students with disabilities requesting accommodations must register with the Accessible Education Center (AEC) at http://www.sjsu.edu/aec to establish a record of their disability

Course Number / Title, Semester, Course Schedule

This is a tentative schedule for this semester. This is subject to change with sufficient notice and will be informed through Canvas.

Course Schedule

Week	Date	Topics, Readings, Assignments, Deadlines
1	NA	
1	8/20/2015	Music File Formats
2	8/25/2015	Digital Representation of Music
2	8/27/2015	Digital Representation of Music
3	9/1/2015	Frequency Domain representation
3	9/3/2015	Fourier Transform
4	9/8/2015	Fourier Transform - DFT, FFT, STFT
4	9/10/2015	Fourier Transform - Applications
5	9/15/2015	Fourier Transform - Implementation
5	9/17/2015	Low level audio features
6	9/22/2015	Low level audio features
6	9/24/2015	Audio Feature Extraction
7	9/29/2015	Audio Feature Extraction
7	10/01/2015	Rhythm and pitch estimation
8	10/06/2015	Rhythm and pitch estimation
8	10/08/2015	Midterm Exam
9	10/13/2015	Feature Segmentation - Feature Vectors
9	10/15/2015	Librosa library for low level audio features
10	10/20/2015	Librosa library for low level audio features
10	10/22/2015	Self Similarity Matrices
11	10/27/2015	Supervised Learning
11	10/29/2015	Supervised Learning
12	11/3/2015	Supervised Learning
12	11/5/2015	Supervised Learning Decision Trees
13	11/10/2015	Unsupervised Learning - K Means Clustering
13	11/12/2015	Unsupervised Learning - Spectral Clustering

14	11/17/2015	Model Selection and Feature Selection
14	11/19/2015	Echonest API
15	11/24/2015	Echonest API and other external APIs
16	12/1/2015	Hidden Markov Model
16	12/3/2015	Computer Generated Music
Final Exam		No Final Exam. Terminal Assignment due 12/8/2015