Introduction to Digital Jockeying

Student Taught Course, spring 2010

Student instructor: Gabriel Mendoza (Junior, Independent Study in Physics and Computer Science)

Sponsoring Professor: Thanos Siapas

Course description:
The computer has become an important tool for advanced disk-jockeying technique. This course will introduce the fundamentals of digital jockeying (computer-based disk-jockeying), with an emphasis on music theory. Topics will include tempo, equalization, harmonics, mixing styles, music programming, and effects. Students will be exposed to several approaches towards computer-based DJing, including MIDI and time coded control. Some hands-on experience will be accomplished by using demo versions of software. Grades will be determined by attendance, participation, reading, homework and quizzes. Suitable for beginners with no experience.

Schedule: This class will meet seven times during the ten week term. Each class will last for 90 minutes.

Homework: assignments, required reading, and studying for quizzes will also constitute the 30 hours of work for the term, as detailed below.

Topics by class

1. Introduction, history, MIDI and time coded control, modern dance music genres
2. Basics of sound, tempo, beat matching, pitch shifting, time stretching, song structure, phrase matching, crossfade curves
3. Equalization, compression, volume leveling
4. Harmonic mixing, circle of fifths, energy boosts
5. Mixing styles, set programming
6. Discrete tempo changes, meter, tempo resolution, looping, effects
7. Advanced techniques, turntablism, future directions

Grading:
The course will be graded Pass/Fail. Grade composition will be 50% HW assignments, 10% participation, 40% quizzes, and attendance of all classes (except with valid excuse). A total score of 60% is required to pass.

Instructor qualifications:
I have four years of DJing experience with time coded vinyl and MIDI control platforms, and I have had the opportunity to DJ nearly every genre of modern dance music, ranging from jazz and waltz to hip-hop and house, in a wide range of environments. I have been hired for numerous public and private events, including Caltech Interhouse events, club events, and formal events, and I have played alongside many professional DJ's. In addition, I have significant experience with computer science, the physics of sound, music theory, and DAW software.

Details of the course

Class 1:

I will introduce the role that disk-jockeys play in global popular music, and motivate the use of computers for DJing. This will include a brief history of computer-based DJing, and an analysis the current landscape. Students will be introduced to the major approaches towards computer-based DJing, including MIDI control (using Abelton Live software and controllers) and time coded vinyl control (Using Deckadance software and Final Scratch). I will introduce major modern dance music genres, with an emphasis on rhythm, structure, form, and texture. The reading assignment will be on the history of digital DJing. The homework assignment will be to identify a song in each of the music genres, and analyze various aspects of rhythm, structure, form, and texture.

Class 2:

This class will start with the basics of sound from a physics point of view, including waveforms and frequency. I will explain the idea behind beat matching, which includes an introduction to tempo, meter, counting, time stretching, song structure and phrase matching. Pitch shifting will also be touched on. Students will be given a tutorial on "warping" in Abelton Live that is useful for beat matching using computers. I will talk about crossfade curves and power response. The quiz will cover the major modern music genres. The reading assignment will be an article on the evolution of the DJ crossfader. The HW assignment will be to find two songs with compatible tempos in the 70-100 BPM range, 100-130 BPM range, and 130-170 BPM range, warp these songs in the free demo version of Abelton Live, and demonstrate tempo changes.

Class 3:

This class will introduce the theory behind equalization, including high, low, and mid-range frequencies, and how they can be utilized for effective DJ mixing. I will demonstrate various computer tools to aid equalization. Subsidiary topics will include compression and volume leveling. A quiz will cover crossfade curves and the theory behind beat matching. The reading assignment will be about equalization and leveling. The HW assignment will be to use Abelton Live to create a simple transition between two songs using the techniques of beat matching and equalization developed in class.

Class 4:

This class will introduce the basics of harmonic mixing. This will include the twelve tones of the chromatic scale and associated major and minor keys. Using the circle of fifths, I will explain how to DJ "in key" and how to create energy boost and slowdown effects using harmonics. I will talk about how computers can aid this process. A quiz will involve identifying high, mid, and low range frequencies in a song when played individually. The reading assignment will be on pitch and harmonic mixing. The HW assignment will be to load a song into Abelton Live, demonstrate pitch shifting by changing tempos in Re-Pitch mode, demonstrate pitch shifting by +- 1 and 2 semitones in Complex Mode, and maintaining pitch when changing tempos in Complex Mode.

Class 5:

This class will cover various mixing styles, such as traditional DJ approaches, rapid-cut approaches, and mashup approaches. I will also talk about set programming and improvising, crowd psychology and mood on the dance floor. This will involve how to approach a DJ "set" by controlling energy levels. A quiz will be to fill in the circle of fifths. The assigned reading will compare and contrast different professional DJ's mixing styles. The HW assignment will be to listen to three different mixes and analyze the differences in mixing styles.

Class 6:
This class will cover discrete tempo changes, meter (half time), tempo resolution, looping, and effects such as reverb. I will explain how computers can be utilized to create more advanced effects. The HW assignment will be to use two sample audio clips that I provide to create a creative transition that maintains energy.
Class 7:
I will introduce some advanced techniques, turntablism, and comment on future directions.
A quiz will cover meter and tempo resolution.