

MUS-1130: MIDI TECHNOLOGY I

Cuyahoga Community College

Viewing: MUS-1130 : MIDI Technology I

Board of Trustees:

May 2024

Academic Term:

Fall 2024

Subject Code

MUS - Music

Course Number:

1130

Title:

MIDI Technology I

Catalog Description:

Basic audio signal flow, MIDI (Music Instrument Digital Interface) principles and techniques, the virtual studio concept, computer-based sequencing applied to music production and notation software and operation of modern keyboard equipment.

Credit Hour(s):

3

Lecture Hour(s):

2

Lab Hour(s):

2

Other Hour(s):

0

Requisites

Prerequisite and Corequisite

None.

Outcomes

Course Outcome(s):

Analyze the historical and technical evolution of MIDI, and its application in modern music synthesis.

Essential Learning Outcome Mapping:

Not Applicable: No Essential Learning Outcomes mapped. This course does not require application-level assignments that demonstrate mastery in any of the Essential Learning Outcomes.

Objective(s):

1. Explain the origin, history, and development of music synthesis and MIDI.
 2. Discuss MIDI terminology and concepts.
 3. Explain basic computer construction and installation of synthesis programming.
 4. Differentiate between decimal numbers, binary numbers, and hexadecimal numbers.
 5. Discuss the significance of bits, bytes, command (status) byte, and data byte in MIDI communication.
 6. Describe the MIDI specification, including channel messages, control change messages, and system messages.
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Course Outcome(s):

Explain basic audio signal flow and MIDI principles in audio production.

Essential Learning Outcome Mapping:

Not Applicable: No Essential Learning Outcomes mapped. This course does not require application-level assignments that demonstrate mastery in any of the Essential Learning Outcomes.

Objective(s):

1. Identify and describe the components of audio signal flow in the audio production environments.
 2. Identify and describe the specific components of MIDI signal flow in the audio production environment, including hardware, software, controllers, traditional MIDI hardware connections, and USB MIDI connections.
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Course Outcome(s):

Utilize computer-based sequencing and notation software to produce musical compositions.

Essential Learning Outcome Mapping:

Not Applicable: No Essential Learning Outcomes mapped. This course does not require application-level assignments that demonstrate mastery in any of the Essential Learning Outcomes.

Objective(s):

1. Integrate different virtual synthesizers effects (VST) and utilities within software in order to synthesize sounds.
 2. Explain basic sequencer features and organization.
 3. Organize sequencer operations to facilitate music production.
 4. Identify and describe the elements of music notation.
 5. Analyze and describe the arrangement and orchestration of songs in various genres.
 6. Create and edit musical compositions and multimedia audio content using Digital Audio Workstations (i.e. sequencing applications and Virtual Instrument plug-ins)
 7. Create and edit musical compositions using notation software.
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Course Outcome(s):

Demonstrate proficiency in using MIDI hardware devices for musical production.

Essential Learning Outcome Mapping:

Not Applicable: No Essential Learning Outcomes mapped. This course does not require application-level assignments that demonstrate mastery in any of the Essential Learning Outcomes.

Objective(s):

1. Set up and operate MIDI hardware controllers for music production.
 2. Create and edit musical compositions using MIDI hardware controllers.
 3. Integrate external MIDI hardware sound modules in music production workflows.
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Course Outcome(s):

Implement MIDI technology in varied audio production contexts.

Essential Learning Outcome Mapping:

Not Applicable: No Essential Learning Outcomes mapped. This course does not require application-level assignments that demonstrate mastery in any of the Essential Learning Outcomes.

Objective(s):

1. Create music for film and multimedia using MIDI technology.
 2. Use continuous controllers to shape the sound and feel of audio in film and multimedia.
 3. Trigger sound effect loaded in a sampler sound module.
 4. Create and modify instrument sounds using modular and FM synthesis techniques with plug-ins and emulations.
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Methods of Evaluation:

1. Examinations
2. Musical projects shared with class
3. Peer critiques
4. Sound design project
5. Drum machine project
6. Step sequencer project
7. Midi file arranging project
8. Dry stems mixing project
9. Music notation converted to MIDI file arranging
10. Final original composition project

Course Content Outline:

1. Introduction to MIDI
 - a. Definition of electronic and synthesized sound
 - b. Theory of methods of modern synthesis systems
 - c. Theory and evolution of MIDI
2. Computer application of MIDI
 - a. Personal computer architecture and operation
 - b. Compositional tools available to the modern musician
3. Music notation overview
 - a. Meter, Tempo, Time Signatures
 - b. Notes and Rests
 - c. Counting/Clapping Simple Rhythms
4. Representing music as data
 - a. How digital devices represent information
 - b. Decimal, binary and hexadecimal numbers
 - c. Bits and bytes
5. The MIDI Standard
 - a. MIDI Hardware and Connections
 - i. MIDI Cables, MIDI over USB, DIN, and USB connector types
 - ii. MIDI Jacks (In, Out, Through)
 - iii. Daisy Chain Devices
 - iv. MIDI Interfaces
 - v. Keyboard Controllers and other Types of Controllers
 - vi. Sound Modules (Hardware and Software)
 - b. MIDI Messages
 - i. MIDI Channels
 - ii. MIDI Commands and Data
6. MIDI Sequencing and Routing in Pro Tools
 - a. How Pro Tools stores MIDI data
 - b. Tracking Types associated with MIDI data
 - c. Use of Instrument Tracks vs. MIDI and Aux Tracks
 - d. Importing MIDI files
 - e. Click Track
 - f. Setting Meter and Tempo
 - g. Count off
 - h. Utilizing Multiple Voices with Channels
 - i. Printing Audio Tracks of Instruments
 - j. What is a Pro Tools Session?
 - k. Session file structure
 - l. Pro Tools Session File (.ptx)
 - m. Best Practices for transferring Pro Tools Sessions
 - n. Creating New Session and session set up
 - o. Metering and Track meters
7. Master Fader Tracks
 - a. Save functions in Pro Tools
 - b. Bouncing a mix

8. Editing MIDI data in Pro Tools
 - a. Using the Pencil Tool
 - b. Grid Value
 - c. MIDI Notes
 - d. Velocity
9. Recording MIDI Data in Pro Tools
 - a. Midi Thru
 - b. Keyboard Controllers
10. "Event Operations" in Pro Tools (batch editing notes)
 - a. Quantizing
 - b. Transposing
 - c. Batch Note Selection
11. Songs Arrangement
 - a. Composition parts (Verse, Chorus, Bridge)
 - b. Arrangement Strategies
 - c. Creating a song diagram
12. Synthesizers
 - a. Definition and functions of a Synthesizer
 - b. Components
 - i. Control Voltages (CV)
 - ii. Gate/Trigger Signals
 - iii. Oscillators
 - iv. Waveform Shapes
 - v. Filters
13. Samplers
 - a. Definition
 - b. Patches
 - c. Multi-sampling vs. Single Samples
 - d. Modulation and Sound Manipulation
 - e. NN-XT Sampler and Reason
14. Drum Machines
 - a. Step sequencers
 - b. Redrums and Reason
15. Control Change Messages
 - a. Standard CC values
 - b. Mapping Physical Controls and Software Parameters (CC Values)
16. General MIDI Specification
17. Miscellaneous MIDI Applications
 - a. MIDI for Video/Film
 - b. Control of "non-instrument" devices
 - c. Synchronization and MIDI Timecode

Resources

Holmes, Thom. *Electronic and Experimental Music: Technology, Music and Culture*. Sixth ed. Oxon, Routledge, 2020.

Hepworth-Sawyer, Russ. *Innovation in Music: Future Opportunities*. Oxon, Routledge, 2021.

McGuire, Sam . *The Art of Digital Orchestration*. Oxon, Routledge, 2021.

Pressing , Jeff. *Synthesizer Performance and Real-time Techniques*. Clarendon Press, 1993.

Anderton, Craig. *The Musician's Guide to MIDI*. Milwaukee, WI: Hal Leonard Corporation, 2021.

Jones, Heath. *Music Technology 101: The Basics of Music Production in the Technology Lab or Home Studio*. Milwaukee, WI: Hal Leonard Corporation, 2021.

Huber, David Miles. "(Audio Engineering Society Presents)" *The MIDI Manual: A Practical Guide to MIDI within Modern Music Production*. Routledge, 2020.

Huber, David Miles. *The MIDI Manual: A Practical Guide to MIDI in the Project Studio*. Routledge, 2019.

McGuire, Sam. *Modern MIDI: Sequencing and Performing Using Traditional and Mobile Tools*. Routledge, 2020.

Allen, J. Anthony. *Music Theory for Electronic Music Producers: The Producer's Guide to Harmony, Chord Progressions, and Song Structure in the MIDI Grid*. Slam Academy Publishers, 2018.

Diduck, Ryan. *Mad Skills MIDI and Music Technology in the Twentieth Century*. Repeater, 2018.

Strong, Jeff. *Pro Tools All-in-One for Dummies*. 4th. For Dummies Publishing, 2018.

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Hoskin, Dan. *An Introduction to Music Technology*. 2nd. Routledge, 2014.

Valenzuela, Jose Chilitos. *The Complete Guide to Connecting Audio, Video, and MIDI Equipment: Get the Most Out of Your Digital, Analog and Electronic Music Setup*. Hal Leonard Books, 2015.

Gilreath, Paul. *The Guide to MIDI Orchestration*. 4th . Routledge, 2010.

Price, Zach. *The Beginner's Guide to Computer-based Music Production*. 2004.

Rona, Jeff. *The MIDI Companion: Complete Guide to Using MIDI Synthesizers, Samplers, Sound Cards, Sequencers, Computer, and More*. Milwaukee, WI: Hal Leonard, 1994.

Clackett, Dave. *Handbook of MIDI Sequencing*. Emoryville, CA: Mix Bookshelf, 1997.

Milano, Dominic. *Mind Over MIDI*. Milwaukee, WI: Hal Leonard, 1988.

Hurtig, Brent. *Synthesizer Basics*. Milwaukee, WI: Hal Leonard, 1987.

Massey, Howard. *A Synthesist's Guide to Acoustic Instruments*. NY: Amsco Publications, 1987.

Top of page

Key: 3093