

Introduction to Music Technology

A course companion for students in Music Technology, covering the essential foundational concepts needed before advancing to deeper levels of study. The material spans 9 core topics, ranging from a technology overview and digital audio to MIDI, AI, and music distribution.



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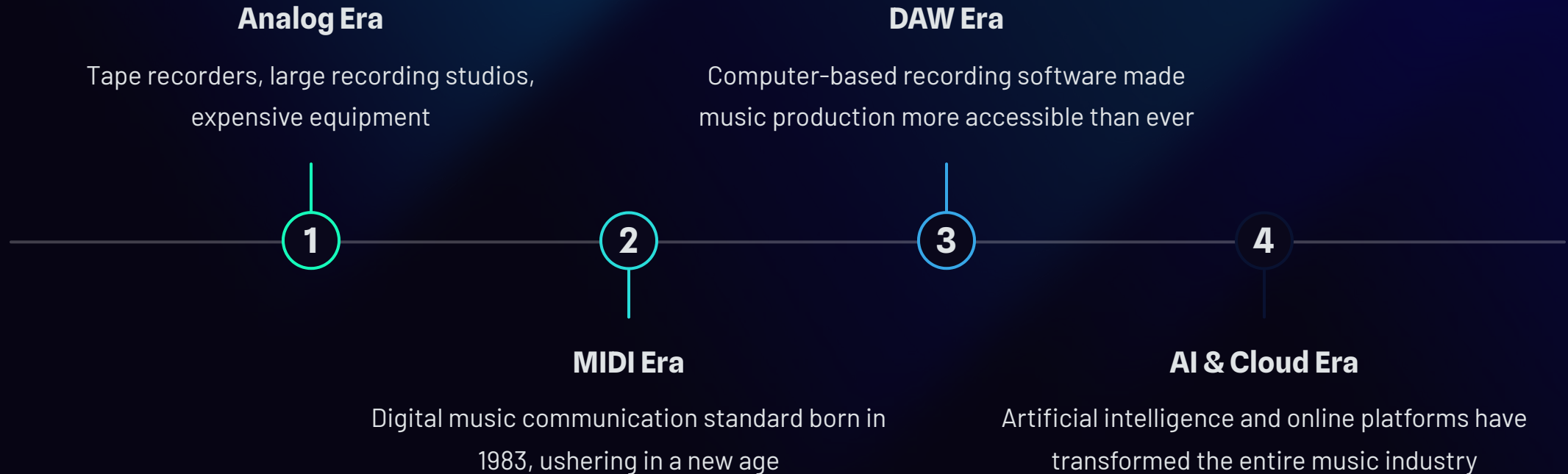
TOPIC 1

Overview of Today's Music Technology

Music technology has completely transformed the way humans create, record, and distribute music. From the era of analog instruments and large recording studios, musicians today can produce professional-quality work from their bedrooms using computers and affordable software.



Evolution of Music Technology



Understanding this evolution helps students see the broader direction music technology is heading and allows them to adapt quickly and effectively.

TOPIC 2

Fundamentals of Digital Audio

What is Sound?

Sound is the vibration of air that travels as waves. Its key properties include **Frequency**, which determines the pitch of the sound, and **Amplitude**, which determines the loudness of the sound.

Converting Sound to Digital

The **ADC (Analog-to-Digital Conversion)** process transforms continuous sound waves into numerical data, using the principles of **Sampling** and **Quantization** to store audio information in the form of a digital file.

Key Concepts in Digital Audio

Sample Rate

The number of times audio is sampled per second, measured in Hz. The standard is **44,100 Hz** (44.1 kHz) for CD quality, and 48,000 Hz for video.

Bit Depth

The resolution of data stored per sample. **16-bit** is used for CDs, while **24-bit** is used in professional studio recording.

Audio File Formats

Uncompressed files such as **WAV, AIFF** offer the highest quality, while compressed files such as **MP3, AAC** are smaller and ideal for online distribution.

i The higher the Sample Rate and Bit Depth, the better the audio quality — but the larger the file size. Choose the settings that best match your intended use.



TOPIC 3

What is MIDI?

MIDI (Musical Instrument Digital Interface) is a communication standard between digital musical instruments, developed in 1983. MIDI does not transmit audio signals – instead, it sends **musical commands** such as "press note C4 with velocity 80 for 1 second," which keeps file sizes very small and makes editing easy.

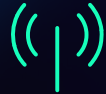


How Does MIDI Work?



MIDI Controller

A device that sends MIDI signals, such as a keyboard, drum pad, or MIDI guitar. It has no sound of its own but functions as a data transmitter.



MIDI Message

The data transmitted, such as Note On/Off, Velocity, Pitch Bend, and Control Change — allowing precise control over how sound is expressed and shaped.



Sound Module / DAW

The receiving end that interprets MIDI commands and converts them into real sound using Virtual Instruments or Synthesizers loaded within the software.

MIDI remains at the heart of modern music production, thanks to its flexibility and the ease with which musical content can be edited at any time.



TOPIC 4

Recording & Music Production Software (DAW)

DAW (Digital Audio Workstation) is the core software used for recording, editing, mixing, and mastering audio. It can be thought of as a "recording studio inside your computer," combining every tool in one place – including an Audio Editor, MIDI Sequencer, Mixer, and Effects Processor.

Popular DAWs and Their Key Features

Ableton Live

Ideal for electronic music and live performance, featuring a flexible Session View. Highly popular among DJs and producers.

Logic Pro X

Developed by Apple for macOS, with high-quality built-in virtual instruments. Great for musicians looking to produce music across a wide range of genres.

GarageBand

Free for Apple users and perfect for beginners, offering a full set of tools and an easy-to-use interface.

Pro Tools / Cubase / FL Studio

Other professional-grade options, each with its own strengths – Pro Tools is the industry standard in recording studios, while FL Studio is popular in Hip-Hop and EDM production.

Notation Software

What is Notation Software?

Software that helps musicians and composers create sheet music in digital format conveniently. These programs can print notation, play back compositions, and export files in multiple formats, including automatic conversion between MIDI and standard notation.

- **Finale** — An industry standard for several decades
- **Sibelius** — Easy to use, popular in educational institutions
- **MuseScore** — Free and open-source, ideal for beginners
- **Dorico** — A newer option from Steinberg, focused on flexibility

Key Benefits of Notation Software

- Create clean, print-ready sheet music
- Play back to verify musical accuracy
- Easily distribute parts to multiple musicians
- Instantly convert MIDI files to standard notation
- Export as PDF, MusicXML, and MIDI



TOPIC 6

Basic Audio Recording Equipment

High-quality audio recording requires the right equipment. While you don't need to invest heavily at the start, understanding the role of each piece of equipment will help you make cost-effective purchases and achieve the sound you're looking for.

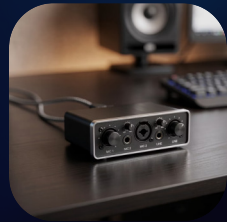
Essential Recording Equipment



Microphone

Condenser Mic captures high detail, ideal for vocals and instruments requiring precision.

Dynamic Mic is durable and suited for loud instruments with high sound pressure levels.



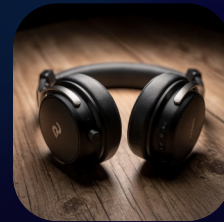
Audio Interface

A device that converts analog signals from microphones or instruments into digital audio for your computer. It is the heart of every home studio setup.



Studio Monitors

Speakers designed to reproduce sound accurately and neutrally, unlike consumer speakers that color the sound to make it more pleasing but less true to the original recording.



Monitor Headphones

Used to check audio during recording. **Closed-back** headphones prevent sound leakage into the microphone, while **Open-back** headphones offer a more natural sound stage, ideal for mixing.



TOPIC 7

AI & Music

Artificial Intelligence is rapidly and profoundly transforming the music industry – from automated composition and audio mastering to analyzing musical patterns and creating entirely new sounds never heard before.

Applications of AI in Music



AI Music Composition

Tools like **Suno, Udio, Mubert** can generate complete songs from text descriptions, ideal for Background Music and concept prototyping.



AI Mastering

Services like **LANDR, iZotope Ozone** use AI to automatically analyze and enhance audio, delivering professional-quality results without advanced mastering skills.



Stem Separation

Technologies like **Spleeter, RipX** can isolate vocals, guitar, drums, and bass from a mixed track, opening new possibilities for remixing.



Voice Synthesis

AI can generate and clone singing voices. This technology comes with important ethical and copyright considerations that require responsible use.



Using AI in music requires constant consideration of ownership rights, copyright, and ethical standards in creative work.

Music Distribution Platforms

Once production is complete, the crucial next step is distributing your work to reach listeners. Today there are many channels available, each with its own strengths and distinct audience. Choosing the right platform is an important part of any music strategy.

1**Create Your Work**

Produce, mix, and master in your DAW

2**Prepare Files**

Export high-quality WAV/MP3 files with Metadata

3**Choose a Channel**

Select the platform that fits your goals

4**Publish & Promote**

Upload and market your music on social media

Popular Platforms for Musicians



Spotify / Apple Music

Global streaming platforms reaching hundreds of millions of listeners. Use a Distributor such as DistroKid or TuneCore to upload your music.



YouTube / TikTok

Ideal for video content, Music Videos, and Short-form Content. Build a fanbase quickly by leveraging each platform's Algorithm.



SoundCloud / Bandcamp

Great for indie musicians and Demo Sharing. Bandcamp allows artists to sell their work directly and retain a higher share of revenue.



Social Media

Instagram, Facebook, and X are essential supplementary channels for building a Personal Brand and Engaging with fans.

TOPIC 9

Hands-On Workshop Activities

Learning music technology is only complete when you get to practice in real situations. Workshops are designed to give students hands-on experience with real tools and processes in a fun and friendly environment.



Recommended Workshop Activities

1 Try Recording with a Basic DAW

Open GarageBand or Reaper (free), record audio from a microphone, add basic effects, and export an MP3 file to get familiar with the entire workflow.

3 Experiment with AI Music Generation

Use free AI tools such as Suno or Udio, type in a description of the music you want, analyze the results, and discuss the advantages and limitations of AI in music creation.

2 Create a Simple Rhythm with MIDI

Use the MIDI Sequencer in your DAW to lay down a simple 4-bar drum pattern, then adjust Velocity and Timing to make it sound more natural.

4 Publish Your Work on a Platform

Upload the tracks created in class to SoundCloud or YouTube, then share the link for classmates to give feedback — practicing both music production and real-world distribution.



Summary & Next Steps

🎵 What You've Learned

An overview of music technology – from the fundamentals of digital audio, MIDI, and DAWs to Notation Software, AI, and publishing your work.

🚀 Your Next Steps

Explore the recommended tools on your own. Start with GarageBand or MuseScore (both free), then gradually develop your skills from there.

📖 Review Outside of Class

Use this document to review key concepts and find additional learning resources on YouTube, Coursera, or YouTube Music Production Channels.



Music technology evolves quickly, but a solid understanding of the fundamentals will help you adapt and learn new tools at any time. Enjoy the journey!