COURSE OVERVIEW

- **MUSI 3450 – Survey of Music Technology**
- **This course satisfies 3 semester hours in Core Area C: Humanities, Fine Arts, and Ethics.**
- **There are no pre-requisites for this fifteen-week course. No previous experience in music or with music technology is expected or required. It is not necessary to read music, play an instrument, or have experience with music technology of any kind to do well in this course.**
- **General Description**
  The course examines the broader creative practices and technical pursuits in the inherently interdisciplinary world of music technology. This will be done primarily through a variety of hands-on projects which explore key concepts, essential tools, and creative techniques. Through a sequence of short but carefully structured projects, students will be composing music, writing code, and developing practical skills with a wide variety of applications. Additionally, key historical figures, landmark compositions, and important aesthetic practices that have shaped the discipline will be explored.

SYLLABUS

DATE: Fall 2026 (August 24 to December 17)

COURSE NUMBER AND TITLE: MUSI 3450 – Survey of Music Technology

CREDITS & HOURS: 3 credit hours with humanities attribute

COURSE TYPE: Remote Asynchronous

INSTRUCTOR:

- Dr. Frank Clark – fclark@music.gatech.edu
  - West Village – Room 273 – (404) 894-8964
  - Office Hours: Tuesday and Thursday 2:00 pm to 4:00 pm EDT with scheduled appointment

PROCEDURES: The class is structured around five overarching modules which address the basics of sound, digital audio workstations (DAWs), working with MIDI, synthesis and signal processing, algorithmic composition, and key areas of future development in the discipline. Each module is comprised of multiple lessons, a quiz, and a creative project.

PREREQUISITE: There are no prerequisites for this fifteen-week course.

GENERAL OVERVIEW: Through a combination of lectures, readings, discussions, and creative hands-on projects, key concepts, technologies, and tools for the creation, production, and transformation of music with computers will be explored.

EXPECTATIONS:

1. No previous experience in music or with music technology is expected or required. It is not necessary to read music, play an instrument, or have experience with music technology of any kind to do well in this course.
2. The projects are short and designed to explore specific parameters, tools, and techniques related to the various modules.
3. Quizzes and Exams: there are quizzes at the end of each of the five module divisions. There are two exams: one during week 7, and the second during week 14. The written exams are not cumulative and cover the lecture and listening materials presented in the lessons.
4. There is no required textbook, but free online resources will be referenced for additional study and reference.
5. Participation in class discussions is strongly recommended.

COURSE GOALS: At the end of this course you will learn to:

1. Define and use a digital audio workstation
2. Create, edit, and deliver audio files
3. Create and edit MIDI data, and differentiate MIDI from audio data
4. Integrate and/or record digital audio in conjunction with MIDI sounds, sources, and tracks
5. Understand and apply terminology associated with digital audio and MIDI
6. Demonstrate basic audio recording and editing techniques
7. Explain and demonstrate the use of effects and filters in conjunction with the signal processing chain
8. Demonstrate multi-track audio editing and mixing in a DAW
9. Rationalize and apply the appropriateness of specific audio effects
10. Demonstrate familiarity and competency with software-based environments and/or object-oriented programming environments for music and sound such as Reaper, MAX, Python, EarSketch, and Ableton Live
11. Explain and demonstrate frequency domain theory and applications
12. Identify and/or define synthesis types and techniques
13. Define major trends, techniques, and events in the history of music technology
14. Listen to and identify known and unknown major works in electronic and computer music by style, genre, and composer
15. Demonstrate familiarity with sound effects libraries and the associated copyright limitations
16. Discuss copyright issues related to recording and distribution

IMPACTS: This is a Core IMPACTS course that is part of the Humanities area. Core IMPACTS refers to the core curriculum, which provides students with essential knowledge in foundational academic areas. This course will help master course content, and support students' broad academic and career goals.

- This course should direct students toward a broad Orienting Question:
    - How do I interpret the human experience through creative, linguistic, and philosophical works?
- Completion of this course should enable students to meet the following Learning Outcome:
    - Students will effectively analyze and interpret the meaning, cultural significance, and ethical implications of literary/philosophical texts or of works in the visual/performing arts.
- Course content, activities and exercises in this course should help students develop the following Career-Ready Competencies:
    - Ethical Reasoning

- Information Literacy
- Intercultural Competence

REQUIRED TEXT: None

REFERENCE TEXT:
- Burk, Polansky, Roberts, Rockmore, and Repetto. *Music and Computers: A Theoretical and Historical Approach*. Key College Publishing, 2004. This textbook, which once cost $50, is now available from the authors free of charge online at https://musicandcomputersbook.com/

RECOMMENDED TEXTS FOR DEPTH AND EXPLORATION:
- Hosken, Dan (2014). *An Introduction to Music Technology,* Second Edition, Routledge, ISBN 9781135966898.
- Manzo, V.J. (2015). *Foundations of Music Technology*, Oxford University Press, ISBN 9780199368297.
- Williams, David and Webster, Peter (2022) *Experiencing Music Technology*, Fourth Edition, Oxford University Press, ISBN 978-0190635794.

COMPUTER SKILLS USED: Word processing, e-mail, file management, Internet research and file downloading, digital audio and MIDI software usage, audio file format conversion, and basic Python code.

TECHNOLOGY/SOFTWARE REQUIREMENTS:
- Internet connection (DSL, LAN, or cable connection desirable)
- Adobe Acrobat PDF reader (free download; see https://get.adobe.com/reader/
- Reaper which is available for a free 60-day trial period at https://www.reaper.fm/
- EarSketch which is free and available at https://earsketch.gatech.edu/landing/#/
- Max which is available for a free 30-day trial at https://cycling74.com/downloads
- Ableton Live, version 12, which is available for a free 30-day trial at https://www.ableton.com/en/trial/

METHOD OF INSTRUCTION:
1. Lecture (recorded)
2. Online Discussion
3. Structured Listening
4. Selected Reference Readings
5. Original Creative Projects

METHOD OF EVALUATION:
The following evaluative tools will be utilized in measuring progress towards obtaining the class objectives:

Projects (5)	50%
Exam 1	20%
Exam 2	20%
Quizzes (5)	10%
TOTAL	100%

All quizzes, exams, and projects will be graded by points. The final grade for the course will be determined by dividing the total points earned by the number of points possible for each of the categories listed in Method of Evaluation. These numbers will be converted into a grade

according to the following scale: A=100-90%, B=89-80%, C=79-70%, D= 69-60%, F= 59% and below.

LATE WORK:
As concepts and projects in this class build on each other, it is imperative that all reading and listening assignments, and all projects, be completed on time. Projects will lose one full letter grade for each day they are late. For example, if a project is due on Monday and it is not turned in until Wednesday, then a grade of B would be lowered to a D. The only way to avoid this penalty is to obtain an extension in writing (or by e-mail) from the instructor in advance of the project deadline. In short, projects – as well as Quizzes and Exams – are due by the date listed in Canvas. Naturally, allowances can and will be made for documented illnesses, religious reasons, and family emergencies. Quizzes, Exams, and Projects cannot be made up unless there is a valid, documented excuse.

EXTRA CREDIT POLICY:
There is an abundance of Extra Credit available in this course. The MUSI 3450 Individual Grade Calculator should be used to determine how Extra Credit can positively impact your final grade. Please note that NO EXTRA CREDIT WILL BE COUNTED TOWARDS THE FINAL GRADE unless the following criteria are met:

1. The five creative projects are submitted earning an average grade of 70 or above.
2. Th two Exams are taken earning an average grade of 65 or above.
3. All five Quizzes are completed earning an average grade of 70 or above.

TIMING POLICY:
- The Modules follow a logical sequence.
- Assignments should be completed by their due dates.
- Exams must be completed during the time allotted.
- You will have access to the course content for the scheduled duration of the course.

ATTENDANCE POLICY:
- This is a fully online course. Thus, no attendance in the traditional sense is taken.
- It is strongly recommended that you log in on a regular basis to stay up to date on content and complete assigned Quizzes, Exams, and Concert Reports.
    - There are many Announcements in Canvas throughout the course. It is important to review them as they contain critical course and content information.

ACADEMIC INTEGRITY: Students must do their own work on assignments, projects, and tests unless collaboration is previously specified and approved by the instructor. Students caught cheating will receive zero credit for that assignment/quiz/test and may be subject to further sanctions through the Office of Student Integrity. Students are expected to abide by the Georgia Tech Honor Code and avoid any instances of academic misconduct, including but not limited to:

1. Possessing, using, or exchanging improperly acquired written or oral information in the preparation of a paper or for an exam.
2. Substitution of material that is wholly or substantially identical to that created or published by another individual or individuals.
3. False claims of performance or work that has been submitted by the student.

The Georgia Tech Honor Code and be reviewed at: http://osi.gatech.edu/content/honor-code and https://osi.gatech.edu/honor-advisory-council provides information about the Honor Advisory Council.

PLAGIARISM POLICY:
Plagiarism is considered a serious offense. You are not allowed to copy and paste or submit materials created or published by others, as if you created the materials. All materials submitted and posted must be your own or be properly cited and/or referenced. For more on citation and plagiarism, please refer to https://libguides.gatech.edu/research.

STATEMENT REGARDING STUDENTS WITH DISABILITIES:
In accordance with the Americans with Disabilities Act, students with bona fide disabilities will be afforded reasonable accommodation. The Office of Disability Services will certify a disability and advise faculty members of reasonable accommodations. The web site for a student seeking accommodation is: http://disabilityservices.gatech.edu/. The specific page to submit an accommodation request is: https://disabilityservices.gatech.edu/students/getting-started.

COMMUNICATION:
It is expected that we should ask questions, answer our fellow learners' questions when possible, and participate on the course discussions, opinion polls, and survey forums. Often, discussions with fellow students are the sources of key pieces of learning. It is also important to remember that communication with the instructor and/or teaching assistants is encouraged – this can be via e-mail and Microsoft Teams (https://oit.gatech.edu/email), Zoom (https://gatech.zoom.us/), in person during office hours, or by special arrangement. In short, there are a host of ways to communicate with other students, your teaching assistant(s), and/or your instructor. Please take advantage of the opportunity to connect to others as it will dramatically enhance your experience and connection to the course material.

NETIQUETTE:
1. Netiquette refers to etiquette that is used when communicating on the Internet. Review the Core Rules of Netiquette. When you are communicating via email, discussion forums or synchronously (real-time), please use correct spelling, punctuation and grammar consistent with the academic environment and scholarship[1].
2. For online sessions, it is recommended that you keep the video on, the audio muted, and "signal" that you would like to speak.

GRIEVANCES AND CONCERNS:
Students who have grievances or concerns may refer to the Georgia Tech Academic Policy (https://provost.gatech.edu/reporting-units/advocacy/academic-grievance-policy) for information and reporting details. Additionally, if you need formal assistance, please contact Dr. Kyla Ross at kyla.ross@gatech.edu. Dr. Ross serves as the Assistant Vice Provost for Advocacy and Conflict Resolution.

STATEMENT ON DIVERSITY, EQUITY, AND INCLUSION:
The School of Music community of faculty, staff, and students aspires to create and nurture an environment that is supportive of all backgrounds where different views and ideas are respected

[1] Conner, P. (2006-2014). Ground Rules for Online Discussions, Retrieved 4/21/2014 from http://teaching.colostate.edu/tips/tip.cfm?tipid=128

and encouraged. In all our pursuits, we commit to justice, diversity, equity, and inclusion with regard to race, national origin, language, age, sexual orientation, gender, religion, and ability. Moreover, we will encourage intellectual inquiry and respectful exchange that cements our dedication to these principles.

DIGITAL LEARNING DAYS, MODIFIED CAMPUS OPERATIONS, AND EMERGENCIES:
The following policies are intended to address the most common reasons for interruptions of campus operations. Please recognize that certain scenarios (e.g., natural disaster) may not allow for digital instruction. The information below concerns regularly scheduled class meetings. Since all lectures and assignments for this course are in Canvas, they are not typically impacted by weather events or modified operations. Regardless of the reason(s) for a potential digital learning day, always check Canvas for the most recent details and updates.

- Weather – In the event of a weather-related event impacting campus, information regarding plans for a digital learning day will be posted in Canvas. If conditions permit, digital learning will be held via Teams or Zoom, otherwise class will be cancelled.
- Short-term Modified Campus Operations – Should it become necessary for the Institute to modify campus operations for one-to-two days, information regarding plans for a digital learning day will be posted in Canvas. If conditions permit, digital learning will be held via Teams or Zoom, otherwise class will be cancelled.
- Long-term or Recurring Modified Campus Operations – If it is necessary for the Institute to modify campus operations for the equivalent of three or more days, information regarding plans for digital learning days will be posted in Canvas. Digital learning will be held via Teams or Zoom until campus has returned to normal operations for classes.
- Emergency – In extreme cases, such as an emergency – a serious situation with inherent risk that requires immediate action – modified operations can include the cancellation or temporary suspension of all in-person and digital instruction. In such a case, be sure to check Canvas for details and updates. Also verify the current status of the situation through the GTENS Emergency Notification System and should it be necessary, call (404) 894-2500 for immediate assistance.

LAST, BUT NOT LEAST:
Try to approach the course with a sense of discovery and make a conscious decision to enjoy the material and have fun. The study of Music Technology provides terminologies, frameworks, and systems to clearly and correctly understand and create music – music that you already know or that is already inside you. If you positively engage the material on its own terms, you may well discover that this is just the beginning of a long and rewarding journey. In fact, the more you learn, the more you may want to learn.

COURSE OUTLINE:

Modules 1–3 (August 18 – September 13, 2026)
- Introductions and Course Overview
    - Structure and Organization of Course
    - Projects
    - Software
    - Resources
    - How to Approach Exams
- Module 1: The Basics of Sound
    - Lesson 1: Sound Waves
    - Lesson 2: Psychoacoustics

    - Lesson 3: Timbre
    - Lesson 4: Digital Sound
    - Lesson 5: Sampling Rate
    - Lesson 6: Bit Width
    - Lesson 7: Channels and Spatialization
    - Lesson 8: Digital Audio Storage
    - Lesson 9: Frequency Domain Analysis
    - Lesson 10: Changing the Pitch and Speed of Sound

- Module 2: Digital Audio Workstations
    - Lesson 1: Digital Audio Workstations (DAW)
    - Lesson 2: Getting Audio into the DAW
    - Lesson 3: Editing Audio in the DAW
    - Lesson 4: Using Effects in the DAW
    - Lesson 5: Basic Audio Effects Part 1
    - Lesson 6: Basic Audio Effects Part 2
    - Lesson 7: Rendering Your DAW Project
- Module 3: Soundscapes
    - Lesson 1: Soundscape Composition
    - Lesson 2: Bernie Kraus
    - Lesson 2: Hildegard Westerkamp – *Cricket Voices*
- Quiz 1
- Project 1: Sound Collage Composition in Reaper

Modules 4–5 (September 24 – September 27, 2026)

- Module 4: Literature and Listening 1
    - Lesson 1: Pierre Schaeffer: *Étude aux chemins de fer*
    - Lesson 2: Jon Appleton: *Chef d'Ouevre*
    - Lesson 3: Jane Dowe: *Puzzles (Beck Deconstruction)*
    - Lesson 4: Jonathan Harvey: *Mortuos Plango, Vivos Voco*
    - Lesson 5: John Oswald: *The Great Pretender*
- Module 5: Working with MIDI
    - Lesson 1: What is MIDI?
    - Lesson 2: Types of MIDI Devices
    - Lesson 3: The MIDI Specification Part I
    - Lesson 4: The MIDI Specification Part II
    - Lesson 5: Sequencing in the DAW
    - Lesson 6: Editing MIDI in the DAW
    - Lesson 7: Effects and MIDI in the DAW
    - Lesson 7: Loop-Based Sequencing
- Quiz 2
- Project 2: Audio and MIDI in Reaper

Modules 6–7 (September 28 – October 11, 2025)

- Module 6: Algorithmic Composition
    - Lesson 1: Introduction to EarSketch
    - Lesson 2: EarSketch Part 1
    - Lesson 3: EarSketch Part 2
- Module 7: Filters
    - Lesson 1: Filters and Functions
    - Lesson 2: IIR and FIR Filters

- Quiz 3
- Project 3: EarSketch Composition
- Exam 1

Modules 8–10 (October 12 – November 1, 2026)

- Module 8: Synthesis Techniques
    - Lesson 1: Introduction to Synthesis
    - Lesson 2: Additive Synthesis
    - Lesson 3: Subtractive Synthesis
    - Lesson 4: Formant Synthesis
    - Lesson 5: Frequency Modulation
    - Lesson 6: Granular Synthesis
    - Lesson 7: Physical Modeling
- Module 9: Max/MSP/Jitter
    - Lesson 1: Introduction to Max
    - Lesson 2: Max Part 1
    - Lesson 2: Max Part 2
- Module 10: Literature and Listening 2
    - Lesson 1: John Cage: *Sonata V*
    - Lesson 2: Conlon Nancarrow: *Study No. 31*
    - Lesson 3: Karlheinz Stockhausen: *Studie II*
    - Lesson 4: John Chowning: *Stria*
    - Lesson 5: Barry Truax: *Riverrun*
    - Lesson 6: Paul Lansky: *Notjustmoreidlechatter*
    - Lesson 7: James Tenney: *For Ann (Rising)*
- Quiz 4
- Project 4: MIDI-based Synthesizer in Max

Modules 11–12 (November 2 – December 8, 2026)

- Module 11: Rock and Roll Remix
    - Lesson 1: Introduction to Ableton Live
    - Lesson 2: Ableton Live Part 1
    - Lesson 3: Ableton Live Part 2
- Module 12: Future Directions
    - Lesson 1: Music Information Retrieval
    - Lesson 2: Machine Musicianship
    - Lesson 3: Live Coding
    - Lesson 4: New Musical Interfaces
    - Lesson 5: Mobile Music
    - Lesson 6: Networked Music
- Quiz 5
- Project 5: Nine Inch Nails Remix in Ableton Live
- Exam 2
- Extra Credit Project (not required)