

# Music 3734a – Digital Audio Recording

Dr R. Toft

This course provides an introduction to digital audio workstations, as well as the fundamental principles of digitally recording and editing acoustic music in ambient spaces, that covers every step of the process. We will focus on stereo microphone techniques to help musicians understand the processes involved in crafting acoustic classical and/or pop records. Many musicians spend thousands of hours preparing for the stage but relatively little time (if any) learning how to turn those performances into recorded sound. A public performance, replicated in front of microphones, rarely produces a satisfactory outcome on a distribution medium such as the compact disc or streaming service, for the methods engineers and producers use to shape what listeners hear through loudspeakers have an enormous impact on the way people react to recordings. By providing information on the art of committing “live” performances to disc, the course will enable musicians to turn sound into raw tracking data that can be digitally edited into cohesive listening experiences.

The course deals with both theory and practice and considers both classical and pop music – the nature of soundwaves and their behaviour in rooms, microphone types and the techniques of recording in stereo, tracking through a DAW, “in-the-box” editing and mixing with software plugins, and the preparation of finished tracks for delivery in compressed and uncompressed files.

After considering the theory behind sound recording and analyzing representative commercial recordings, the remainder of the term will be spent gaining hands-on experience in recording, editing, mixing, delivery, and the critical listening skills required for these activities.

## DAW

Our digital audio workstation can be Pro Tools, Logic, or Cubase. Class members need to have access to one of these DAWs (TC 200 has Pro Tools and Logic at each workstation.)

## TEXT

Robert Toft, *Digital Audio Recording*, 2021 – all the information in the book is directly applicable to the course, and you will need the book to prepare for tests. Available on OWL.

## REQUIREMENTS

- to ensure that everyone keeps up with theoretical principles, there will a mid-term test
- completed recording (exported 16/44.1 wav and mp3 files, plus a detailed written description of the procedures followed)

## GRADING

1 test – worth 50% of the final mark (early November)

Final project (completed recording and written description) – worth 50% of the final mark (due last day of classes)

## CLASS ATTENDANCE

Not everything covered in the lectures is included in the text for the course, and students will acquire much of the framework necessary for the course through material presented in class. Regular attendance is essential as part of the preparation for tests and the final project

## **CONSULTATION**

I am available for consultation outside class by appointment. Please contact me to arrange a time for a Zoom session. I prefer not to conduct course business by email, and I do not answer questions about course content by email. On the rare occasion that a student misses a lecture for legitimate and medically documented reasons, I will provide assistance with course material, but please be advised that I do not give private summaries of lectures. Students should rely on their peers to gather, and understand, material from classes they miss. See me only to clarify what you and your peers cannot grasp independently.

## **COURSE PREREQUISITES**

None

Antirequisite: 3771A/B if taken in 2017-18 or 2019-20

## **GRADING SCALE**

A+ = 90-100%, A = 80-89%, B = 70-79%, C = 60-69%, D = 50-59%, F = 0-49%.

## **ACADEMIC CONSIDERATION FOR STUDENT ABSENCE & MISSING WORK (≥10%)**

Students are responsible for making up any missed classes or assignments as soon as possible. The University recognizes that a student's ability to meet their academic responsibilities may, on occasion, be impaired by medical illness. Illness may be acute (short term), or it may be chronic (long term), or chronic with acute episodes. Academic Consideration provides students with consistent, fair, and pedagogically appropriate consideration, without compromising the academic integrity of the course or program, when they have been unable to complete some component of a course due to short-term extenuating circumstances. Students who have long-term or chronic medical conditions (physical or mental) that may impede their ability to complete academic responsibilities are directed to seek Academic Accommodation through Accessible Education ([Academic Accommodation for Students with Disabilities](#)).

Documentation shall be submitted, as soon as possible and no later than 48 hours after the end of the period of absence covered, to the Academic Counselling unit or Office of the Associate Dean, Undergraduate (TC210), of the student's Home Faculty together with a request for relief specifying the nature of the academic consideration being requested. Students are directed to read the Senate Policy on Academic Consideration for Medical Illness at the following website for further details regarding various requirements and procedures for the supporting documentation:

[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/academic\\_consideration.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration.pdf)

Whenever possible, students who require academic consideration should provide notification and documentation in advance of due dates, examinations, etc. Students must follow up with their professors and their Academic Counselling office in a timely manner.

## **ACADEMIC CONSIDERATION FOR MISSING WORK (<10%)**

In cases where students miss work that is worth less than 10% of the total course grade (ie. two or fewer assignments) due to medical illness or compassionate grounds, if documentation is voluntarily submitted to the Associate Dean's office and the Associate Dean grants an accommodation, then the missed assignment(s) or quiz(ze)s will be discounted in the calculation of the final grade for the course. If documentation is not voluntarily submitted then the missed assignment(s) will receive a grade of zero. Students who have been denied accommodation by an instructor may appeal this decision to the Associate Dean's office but will be required to present appropriate documentation.

## **ACADEMIC OFFENCES**

Submission of work with which you have received help from someone else (other than the course instructor or TA) is an example of plagiarism, which is considered a major academic offence. Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, as found at:

[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/scholastic\\_discipline\\_undergrad.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf)

## **MENTAL HEALTH & WELLNESS**

Students that are in emotional/mental distress should refer to the Health and Wellness at Western page (<https://www.uwo.ca/health/>) for a complete list of options about how to obtain help or to go to the Wellness Education Centre located in UCC room 76. **Students in crisis in need of immediate care are directed to go directly to Student Health Services in UC11 or to click on the green “I Need Help Now” button on the Health and Wellness page above.**

## **ACCOMMODATION FOR STUDENTS WITH DISABILITIES**

Students work with Accessible Education Western (AEW, formerly SSD) which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The accommodation policy can be found here: [https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/Academic%20Accommodation\\_disabilities.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic%20Accommodation_disabilities.pdf)

## **RELIGIOUS ACCOMMODATION**

Students should consult the University's list of recognized religious holidays (other than statutory holidays), and should give reasonable notice in writing, prior to the holiday, to the Instructor and an Academic Counsellor if their course requirements will be affected by a religious observance. The Diversity Calendar from the Canadian Centre for Diversity and Inclusion provides information on multifaith, multicultural and diversity related holidays and observances and links to resources for more information. <https://www.edi.uwo.ca/resources/2816-2023-Diversity-Calendar-PDF.pdf>

## **CONTINGENCY PLAN**

Although the intent is for this course to be delivered in-person, the changing COVID-19 restrictions may necessitate some or all of the course to be delivered online, either synchronously (i.e., at the times indicated in the timetable) or asynchronously (e.g., posted on OWL for students to view at their convenience). The grading scheme will **not** change. Any assessments affected will be conducted online as determined by the course instructor.

## **GENDER-BASED AND SEXUAL VIOLENCE**

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence, either recently or in the past, you will find information about support services for survivors, including emergency contacts at [https://www.uwo.ca/health/student\\_support/survivor\\_support/get-help.html](https://www.uwo.ca/health/student_support/survivor_support/get-help.html). To connect with a case manager or set up an appointment, please contact [support@uwo.ca](mailto:support@uwo.ca) or call 519 661-3568.

## **EXAMINATIONS & ATTENDANCE**

Any student who, in the opinion of the instructor, is absent too frequently from class or laboratory periods in any course will be reported to the Dean of the Faculty offering the course (after due warning has been given). On the recommendation of the department concerned, and with the permission of the Dean of that Faculty, the student will be debarred from taking the regular examination in the course. The Dean of the Faculty offering the course will communicate that decision to the Dean of the Faculty of registration.

## **ELECTRONIC DEVICES IN EXAMS**

Electronic devices of any type will not be permitted during Midterm Tests and/or Final Exam in this course (unless required for accessibility reasons based on an approved accommodation request from Accessible Education).

**ELECTRONIC DEVICES IN CLASSROOMS**

The in-class use of electronic devices (other than for instructor-approved in-class uses) is expressly prohibited. Students found guilty of disrupting the class with electronic devices will be asked to leave the class and may be subject to disciplinary measures under the Code of Student Conduct.

**PLAGIARISM DETECTION SOFTWARE USAGE**

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<https://www.turnitin.com/>).

**COMPUTER-MARKED MULTIPLE-CHOICE TESTS OR EXAMS**

These may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

## LEARNING OUTCOMES / COURSE OUTLINE

Participants will gain an understanding of:

### ***The Nature of Sound and Its Electrical/Digital Representation***

- complex soundwaves
- the reflection of soundwaves in enclosed spaces and the nature of reverberation
- the differences between analog and digital audio
- bits, bit depth, pulse code modulation, sampling, quantization, encoding, dither, resolution
- AD and DA converters

### ***Production***

- common microphone types: condenser (pressure and pressure-gradient), dynamic, ribbon
- frequency response of microphones, directional patterns of capsules, distance factor
- proximity effect and issues relating to phase
- stereo playback and stereo microphone techniques
- coincident pairs (X-Y, Blumlein, M/S), near-coincident arrays (ORTF, NOS, DIN, OSS), spaced microphones (A-B, Faulkner, Decca tree)
- tracking – principles of critical listening, setting levels, room ambience

### ***Post-Production***

- digital filters (high pass, low pass, band pass, parametric) and EQ
- control of dynamic range – compressors, limiters, dynamic EQ, de-essers
- artificial reverberation – digital reflection simulation, convolution
- commercial plugins

### ***Delivery***

- file types – containers & codecs, uncompressed (wav, aiff), lossless compression (flac, alac), lossy compression (mp3, aac)
- file size
- loudness and meters (measurement standards, terminology of metering, true-peak meters, target levels, loudness practices)
- commercial plugins

### ***Common Recording Strategies***

- stereo miking of solo instruments, small ensembles, singer-songwriters
- advantages and disadvantages of various techniques

### ***Digital Editing and the Preparation of a Master Copy***

- digital audio workstation – features and keyboard shortcuts
- compilation of the final version from various takes
- mixing, metering, and the production of a master copy (use of EQ, dynamic range control, reverberation)
- preparation of the master for delivery on CD and for streaming services