

# Technology for Music Educators (MUS1331) Spring 2018 Syllabus

Dear Musicians,

No matter what music field in which you find yourself, you have a better chance accomplishing your purpose if you can confidently and effectively use technology ... daily. Today's musicians (performers, teachers, composers, etc.) simply cannot be neo-[luddites](#) or label themselves as "not tech people". This course will provide hands-on experiences with the aim to shed technological hinderances, build technological confidence, and provide a foundation for lifelong technological self-directed learning. My aim is that you leave this course excited about new technologies and never again describe yourself as "not a tech person" ...

*... you will be more hireable and successful as a result.*

Below is the syllabus for MUS1331, Technology for Music Educators. Please email me (B\_Johansen) if you have any questions or would like to set up a time to meet to get assistance with an assignment or with prepping for an assessment. My office is 233 in the McCrary Music Building.

Sincerely,

Dr. Ben Johansen

Composition & Computer Music

## [Prerequisites and course materials]

There are **no** course prerequisites and **no** technological skill prerequisites; AND I will not assume you have any technology skills or knowledge ... so there's the baseline. This course is for music majors only; instructor consent is required for non-music majors to register for this course. It is important (but also negotiable in rare cases) that students do know how to read music notation and play a musical keyboard. Additionally, there are no required course materials (textbooks, equipment, supplies, etc.) for you to purchase for this course: all resources, materials, and equipment for participating in class and completing assignments will be supplied for you.

**[Course Objective]**

As a requirement for music education and music composition majors, this course's objective is to **empower future music educators and composers with digital and media literacy.**

- Literacy is defined by the Oxford English Dictionary as "The quality, condition, or state of being literate; the ability to read and write."<sup>1</sup>
- Digital literacy has been defined by a 2013 American Library Association (ALA) task force as "the ability to use information and communication technologies to find, understand, evaluate, create, and communicate digital information, an ability that requires both cognitive and technical skills."<sup>2</sup>
- Media Literacy is defined by the Center for Media Literacy (CML) as "[providing] a framework to access, analyze, evaluate, create and participate with messages in a variety of forms – from print to video to the Internet. Media literacy builds an understanding of the role of media in society as well as essential skills of inquiry and self-expression necessary for citizens of a democracy."<sup>3</sup>

The following quotes are from William I. Bauer's book, *A Conceptual Framework for Technology-Assisted Music Learning*.

"Like every other facet of life, music too has been greatly affected by technology. Technology is an integral part of the way much music in today's world is created, performed, preserved, and consumed, and it can be an authentic aspect of the expression of individual musicianship. Performing musicians use instruments, both digital and otherwise, that have been enhanced through technology. Popular musicians in particular have taken advantage of digital technologies to utilize unique sounds and effects in their concerts. Performances are recorded using sophisticated software and hardware that enable the captured sound to be easily mixed and edited. Composers and arrangers use sequencing and notation software to create printed notation and compositions. Some of these applications have experienced a remarkable transformation; as they grow more and more powerful, they also become easier to use—for example, professional-sounding recordings can now be created in basement music studios."<sup>4</sup> - [LINK](#)

"Today, teachers in all disciplines are actively making technology an integral aspect of their students' learning."<sup>5</sup> - [LINK](#)

"Being able to use technology effectively requires not only an understanding of technology itself, but also of effective pedagogical approaches for utilizing that technology in a particular content area."<sup>6</sup> - [LINK](#)

"Technology can also help to facilitate the critique process, performance of compositions, and sharing of works with others."<sup>7</sup> - [LINK](#)

<sup>1</sup> "literacy, n.". OED Online. March 2017. Oxford University Press, available at: <http://www.oed.com/view/Entry/109054?redirectedFrom=literacy> (accessed May 04, 2017).

<sup>2</sup> American Library Association (ALA) (2013), Digital Literacy, Libraries, and Public Policy, Report of the Office for Information Technology Policy's Digital Literacy Task Force, available at: [http://www.districtdispatch.org/wp-content/uploads/2013/01/2012\\_OITP\\_digilitreport\\_1\\_22\\_13.pdf](http://www.districtdispatch.org/wp-content/uploads/2013/01/2012_OITP_digilitreport_1_22_13.pdf) (accessed 4 May 2017).

<sup>3</sup> Center for Media Literacy (CML), Media Literacy: A Definition and More, available at: <http://www.medialit.org/media-literacy-definition-and-more> (accessed 4 May 2017)

<sup>4</sup> Bauer, William I. "A Conceptual Framework for Technology-Assisted Music Learning." In *Music Learning Today: Digital Pedagogy for Creating, Performing, and Responding to Music*. New York: Oxford University Press, 2014. Oxford Scholarship Online, 2014. doi: 10.1093/acprof:oso/9780199890590.003.0001. Chapter 1, pg. 6.

<sup>5</sup> Bauer - Ch. 1, pg. 6

<sup>6</sup> Bauer - Ch. 1, pg. 11

<sup>7</sup> Bauer - Ch. 3, pg. 66

### [Learning Objectives]

By the end of this course, you will be able to confidently, judiciously, and skillfully use technology hardware and software to:

- **Record** a variety of visual and aural content [onto digital media]
- **Edit** a variety of digital content
- **Create** a variety of digital content
- **Collaborate** with others on digital projects
- **Share** a variety of digital content
- **Teach** musical skills and concepts

### [Course Format]

We will meet as a class for 75 minutes, twice a week. The first meeting of each week (Monday or Tuesday) will be a lecture/demonstration day. I will talk a great deal and you will be expected to take very detailed notes. You will be tested on the material during midterm and final exams.

The second meeting of each week (Wednesday or Thursday) will be a class lab. My aim is not to address the class as a whole on lab days in order to encourage 100% active learning.

We will meet in a variety of places around campus as listed on the schedule:

- [Crouch Music lab](#) or Seminar Rooms (3rd floor of Moody Library)
- Alinea ([Marrs McLean Science Building Room 330](#))
- MMSCI 101 (Marrs McLean Science Building Room 101)
- VizStudio ([Graduate Research Center - Poage Library](#))
- Roxy Grove Hall
- Sid Rich 100 (Sid Richardson Building - Paul L. Foster Success Center)

### [Attendance]

The following is straight from the School of Music Undergraduate Handbook (I made the last sentence red):

School of Music policy requires that to earn credit in a course a student must be officially enrolled by the end of the second full week of the semester and attend at least 75% of all class meetings. Faculty members may establish additional attendance requirements as outlined in course syllabi. Any student who is not present for at least 75% of the scheduled class sessions for any course will automatically receive a grade of "F" in the course. **Any University-related activity necessitating an absence from class will count as an absence when determining whether a student has attended the required 75% of class meetings.**

We will meet 27 times total; so you must attend at least 21 classes to be eligible to pass the course. (If you miss 7 classes you fail the course). If you miss more than 20min of a class, you will receive a 1/2 absence.

**[Grading]**

Engage with the material.  
 Take risks with the technology.  
 Search and be curious.

50% Projects  
 20% Attendance  
 15% Midterm Exam  
 15% Final Exam

A = 90-100	B = 83-86	C+ = 77-79	C- = 70-72
B+ = 87-89	B- = 80-82	C = 73-76	F = 0-69

View your current grade and attendance in Canvas at any time.

**[Academic Success]**

We as faculty members have high academic expectations of you and believe every student who has been admitted to Baylor can be successful. I am a vigilant professor and will notice if you are struggling in my course. If your academic performance in this class is substandard, I will submit an Academic Progress Report to the Success Center during the sixth week of the semester. I will work to help you get the help you need to learn more fully, and I can assist you in finding the resources you need beyond my course. Familiarize yourself with the culture of success we have at Baylor by stopping by the Paul L. Foster Success Center in Sid Richardson or by going to: <http://www.baylor.edu/successcenter/>. Even if you don't need help, you can get involved by tutoring other students in the future or by telling a hall mate how and where to get help.

**[Academic Integrity]**

Plagiarism or any form of cheating involves a breach of student-teacher trust. This means that any work submitted under your name is expected to be your own, neither composed by anyone else as a whole or in part, nor handed over to another person for complete or partial revision. Be sure to document all ideas that are not your own. Instances of plagiarism or any other act of academic dishonesty will be reported to the Honor Council and may result in failure of the course. Not understanding plagiarism is not an excuse. As a Baylor student, I expect you to be intimately familiar with the Honor Code at: <http://www.baylor.edu/honorcode/>

[Students Needing Accommodations]

Any student who needs academic accommodations related to a documented disability should inform me immediately at the beginning of the semester. You are required to obtain appropriate documentation and information regarding accommodations from the Office of Access and Learning Accommodation (OALA). Contact Information: (254) 710-3605 - Paul L. Foster Success Center, 1st floor on the East Wing of Sid Richardson.

[Baylor University Title IX]

*Sexual and Gender-Based Harassment and Interpersonal Violence Policy*

Baylor University does not discriminate on the basis of sex or gender in any of its education or employment programs and activities, and it does not tolerate discrimination or harassment on the basis of sex or gender. This policy prohibits sexual and gender-based harassment, sexual assault, sexual exploitation, stalking, intimate partner violence, and retaliation (collectively referred to as prohibited conduct).

For more information on how to report or to learn more about our policy and process, please visit [www.baylor.edu/titleix](http://www.baylor.edu/titleix) or call the Title IX Office at (254) 710-8454.

The Title IX office understands the sensitive nature of these situations and can provide information about available on- and off-campus resources, such as counseling and psychological services, medical treatment, academic support, university housing, and other forms of assistance that may be available. Staff members at the office can also explain your rights and procedural options if you contact the Title IX Office. You will not be required to share your experience. **If you or someone you know feels unsafe or may be in imminent danger, please call the Baylor Police Department (254-710-2222) or Waco Police Department (9-1-1) immediately.** For more information on the Title IX Office, the *Sexual and Gender-Based Harassment and Interpersonal Violence policy*, reporting, and resources available, please visit the website provided above.

[Military Student Advisory]

Veterans and active duty military personnel are welcomed and encouraged to communicate, in advance if possible, any special circumstances (e.g., upcoming deployment, drill requirements, disability accommodations). You are also encouraged to visit the VETS Program Office with any questions at (254) 710-7264.

## [Schedule]

Section1	Section2	Location	Topic
M_01/08	T_01/09	Crouch Music Lab	How Computer Hardware Works
W_01/10	R_01/11	Alinea (MMSCI 330)	How Computer Hardware Works
M_01/15	T_01/16	NO CLASS	
W_01/17	R_01/18	<b>CLASS ONLINE, see = Project#2 - How Networking (the Internet) Works</b>	
M_01/22	T_01/23	Alinea (MMSCI 330)	How Computer Software Works How to Keep Current with Technology
W_01/24	R_01/25	Crouch Music Lab	Hour of Code
M_01/29	T_01/30	Crouch Music Lab	How Design Works
W_01/31	R_02/01	Crouch Music Lab	How MIDI Sequencing Works
M_02/05	T_02/06	Crouch Music Lab	How Notation Software Works
W_02/07	R_02/08	Crouch Music Lab	[work on notation project in class]
M_02/12	T_02/13	VizStudio (GRC)	[present 3min Google Slides Project]
W_02/14	R_02/15	<b>CLASS ONLINE, see = Project#8 - Charms Office Assistant</b>	
M_02/19	T_02/20	Crouch Music Lab	<b>MIDTERM EXAM</b>
W_02/21	R_02/22	Alinea (MMSCI 330)	How Copyright & Licensing Works
M_02/26	T_02/27	Alinea (MMSCI 330)	How Audio Recording Works
W_02/28	R_03/01	Roxy Grove Hall	[audio record]
M_03/05	T_03/06	NO CLASS	
W_03/07	R_03/08	NO CLASS	
M_03/12	T_03/13	Alinea (MMSCI 330)	How Audio Editing Works
W_03/14	R_03/15	Crouch Music Lab	[edit audio]
M_03/19	T_03/20	Alinea (MMSCI 330)	How Video Recording Works
W_03/21	R_03/22	Roxy Grove Hall	[multicam video record]
M_03/26	T_03/27	Alinea (MMSCI 330)	How Video Editing Works
W_03/28	R_03/29	Crouch Music Lab	[edit multicam video]
M_04/02	T_04/03	NO CLASS	
W_04/04	R_04/05	MMSCI 101	[record, edit, and share audio/video recordings]
M_04/09	T_04/10	Alinea (MMSCI 330)	How Live Streaming Works
W_04/11	R_04/12	Alinea (MMSCI 330)	[iPad experience]
M_04/16	T_04/17	NO CLASS	
W_04/18	R_04/19	Alinea (MMSCI 330)	How Interviewing Works
M_04/23	T_04/24	Sid Rich. 100	[interviews]
W_04/25	R_04/26	Sid Rich. 100	[interviews]

**FINAL EXAM** (Cumulative)

Location = TBA

**Section 1****5/4 9-11am****Section 2****5/3 9-11am**

## Project #1 - due January 10/11

You and three of your colleagues from this class are locked in a warehouse containing every type of computer hardware and software, but no assembled computers. It is highly possible that the warehouse will never be unlocked and no one will ever find you. You must make contact with someone to rescue you and your only way of contact is via an active broadband [coaxial] cable line you can see hanging out of the wall. Note: there is a power outlet as well.

Explain, as precisely as possible, how you would build a computer and contact someone to get rescued. Divide the project up among your group members as evenly as possible so each of you can thoroughly research a different aspect of your solution. You will have 10 minutes at the beginning of next class meeting to finalize your solution together before you formally present it to the class using whatever means you deem most effective.

## Project #2 - due January 22/23 (by beginning of class)

Do the following:

1. Watch the following in this order:
  - a. [The Internet: HTTP & HTML](#) (7min)
  - b. [The Internet: Wires, Cables & Wifi](#) (7min)
  - c. [The Internet: IP Addresses & DNS](#) (7min)
  - d. [The Internet: Packets, Routing, & Reliability](#) (7min)
  - e. *Optional* = re-watch [The Internet: HTTP & HTML](#) (7min)
2. Sign up for [000webhost.com](http://000webhost.com) (those are three zeros) and verify your account via email
3. Open either:
  - Mac = TextEdit - under the Format menu, click on "Make Plain Text"
  - Windows = Notepad (not Notepad++)
4. Type the what's on the right (don't worry about indenting) into either Notepad or TextEdit (the following screenshot is from a free text editor named [Atom](#))
5. Save the plain text file as "index.html"

```
1 <!DOCTYPE html>
2 <html lang="en">
3   <head>
4     <meta charset="utf-8">
5     <title>Hello World</title>
6   </head>
7   <body>
8     <h1>Hello World</h1>
9     <p>This is a web page.</p>
10  </body>
11 </html>
```

more on next page!

6. Navigate to [files.000webhost.com](https://files.000webhost.com) in your browser and login (this is your ftp server)
  - a. Upload the index.html file you just created into the "public\_html" folder

7. Navigate to [yourwebsitename.000webhostapp.com](https://yourwebsitename.000webhostapp.com) in your browser



8. Now upload an image to the "public\_html" folder on your ftp server

- a. Go back to Notepad or TextEdit

- b. add:

```
  
before </body>
```

```
9 <p>This is a web page.</p>  
10   
11 </body>
```

- c. Save the new "index.html" and upload it into the "public\_html" folder
- d. Navigate (or refresh) to [yourwebsitename.000webhostapp.com](https://yourwebsitename.000webhostapp.com) in your browser
- e. You should now see an image and look like = <http://mus1331.000webhostapp.com/>
- f. This is what my ftp looks like at this point:



9. Add your name and URL to [this BoxNote](#) so I can grade what you've done.

### Project #3 - due January 24/25 (by end of class)

Hour of Code ... more details coming soon ...

### Project #4 - due January 29/30 (by end of class)

Graphics and Photography ... more details coming soon ...

### Project #5 - due January 31 / February 1 (by end of class)

MIDI sequencing ... more details coming soon ...

### Project #6 - due February 12/13 (beginning of class)

Notation ... more details coming soon ...



**Project #7 - due February 12/13 (beginning of class)**

Presentation - find details here = <http://benjohansen.com/presenting>

**Project #8 - due February 19/20 (beginning of class)**

more info coming soon

**Project #9 - due February 21/22 (beginning of class)**

After completing the following, type up one question you still have about copyright or licensing (include your name on the paper). You will hand this to me at the beginning of class.

1. Read all = [Copyright Basics](#) provided by The Copyright Society of the USA
2. Study = Cornell chart "[Copyright Term and the Public Domain](#)" – especially:
  - Works Registered or First Published in the U.S.
  - Sound Recordings Published in the United States
3. Read the following definitions from On the Terms page of the CSUSA site:
  - License = <http://www.csusa.org/?page=Definitions#license>
  - Master Use License = [www.csusa.org/?page=Definitions#masteruselicense](http://www.csusa.org/?page=Definitions#masteruselicense)
  - Synchronization License = [www.csusa.org/?page=Definitions#synchronizationlicense](http://www.csusa.org/?page=Definitions#synchronizationlicense)
4. Watch = [intro video for Creative Commons Licenses](#)
5. Study = different license types at the [bottom of this page](#)

**Project #10 - due ?**

Record audio ... more details coming soon ...

**Project #11 - due ?**

Edit audio ... more details coming soon ...

**Project #12 - due ?**

Record video ... more details coming soon ...

**Project #13 - due ?**

Edit video ... more details coming soon ...

**Project #14 - due ?**

Record video ... more details coming soon ...

**Project #15 - due ?**

Record, Edit, and Share video ... more details coming soon ...

**Project #16 - due ?**

Interview ... more details coming soon ...

# Software Suggestions

Note: This is not a purchasing list = everything will be provided for you for MUS1331 assignments. This is a list of everything we cover in the class.

## Audio:

- Open Source Mac/Win/Linux = [Audacity](#)
- \$ = [GarageBand](#)
- Professional Mac only = [Logic Pro](#)
- Professional Mac/Win = [Pro Tools](#), [Ableton Live](#), [Reaper](#) (cheapest)
- Free Lossless Decoder for Mac = [XLD](#)
- Free easy Granular Synthesis Mac/Win = [Soundgrain](#)

## Video:

- Open Source Mac/Win/Linux = [Resolve](#)
  - [Editing multicam in Resolve](#)
- Professional Mac/Win = Adobe Premiere
  - [Editing multicam in Premiere](#)
- Tips
  - [TED Talk Editing Tool-kit](#)
  - [Classic Rules of Video Editing](#)
  - [Encoding Settings for Youtube](#)
  - [Encoding Settings for Vimeo](#)

## AV Streaming:

- Open Source Mac/Win/Linux = [OBS Studio](#)

## Music Notation:

- Free Online = [noteflight.com](#), [flat.io](#)
- Open Source Mac/Win/Linux = [musescore.org](#),
- Professional Mac/Win = [Dorico](#), [Finale](#)

## Chord Chart Accompaniment:

- [iRealPro](#)

## Tools for Sound, Graphics, and Interactivity:

- Mac/Win = [Max](#)
- Open Source Mac/Win/Linux = [Pure Data](#)

## FTP Clients:

- Open Source Mac/Win = [Cyberduck](#)
- Open Source Mac/Win/Linux = [FileZilla](#)
- \$ (what Baylor uses) = [Fetch](#)

## Image:

- [Image File Formats Primer](#)

## Vector Graphics:

- Free Online = [Gravit](#)
- Free easy Graphic Design Tool = [Canva](#)
  - [Canva Tutorial](#)
- Open Source Mac/Win/Linux = [Krita](#)
- Professional Mac/Win = Adobe Illustrator
- Free/Paid Diagramming = [Gliffy](#)

## Bitmap Photography:

- Free Online = [Pixlr](#)
- Open Source Mac/Win/Linux = [Gimp](#)
- Professional Mac/Win = Adobe Photoshop

## Presentation:

- Free Online = [Google Slides](#)
- Free Keep Computer Awake = [Caffeine for Mac](#)

## Note keeping:

- Free (and paid versions) = [Evernote](#)

## Computer Programming:

- Open Source Text Editor Mac/Win/Linux = [Atom](#)
- Learn JavaScript = [JavaScript.com](#), [JavaScript.info](#), [CodeAcademy](#)
- Learn Processing = [hello.Processing.org](#)
- Learn HTML, CSS, JS = [dash.generalassemb.ly](#)

## Band/Choir/Orch Program Management:

- Paid Online = [Charms Office Assistant](#)

## Password Managers: [Wirecutter Article](#)

## [Setting up a Secure Home Network](#)

# iPad apps covered in class

I will make it a priority to let you demo the highlighted apps during class

## Record

- **AVR PRO**
- GarageBand
- Voice Record
- RODE Rec LE

## Perform from a Score

- **forScore** (use "Cue" app for ensemble) - Pair with AirTurn Bluetooth pedal
- PiaScore

## Metronomes/Tuners

- **Tempo**
- **TE Tuner**
- **Beat Keeper, TuneWave, Pitch Please!**
- **Tempi** (get tempo of ensemble)
- Meowtronomie
- Pro Metronome

## Creativity

- Brainsparker
- Oblique Strategies

## Notation

- Notion
- TapNote
- Music Scanner

## Libraries

- **Henle Library**
- NoteStar

## Marching Band

- **3D Viewer**
- Drillbook Next

## Sight Reading

- **T-M-A-S-G**
- Dancing Line
- **On the line**

## Ear Training

- **Ear Trainer**
- **Aural Wiz**
- Better Ears
- Ear Worthy

## Rhythm

- **Rhythm Swing**
- **Rhythm Lab**
- Rhythm Notation

## Theory

- **MTP (Music Theory Pro)**
- Tenuto
- Music Theory

## Learn about ensembles

- **Orchestra**
- **Tutti Player**
- Biophilia
- Clapping Music

## Transcribe

- **ASD Lite**
- Chord Detector

## Note ID

- **Note Rush**
- Treble Game
- Music Tutor
- **Flashnote**
- **NinGenius**
- Dragon Scales
- TuneTrain

## Fingering Charts

- **Fingerings**
- **Strings**

## Misc. Fun Music Learning

- **Music Lab**
- **PianoMaestro**
- Amadeus

## Other useful apps for educators:

- [Various magazines], **Choral Director Mag HD**
- Whiteboard
- SproutBeat (music worksheets)
- **Remind** (secure community to send messages to parents and students)
- StageWrite

## Audio and MIDI Routing (from app to app within the iPad and external devices)

- **Audiobus 3**
- Midiflow

## Control

- MIRA: control Max (Cycling'74)
- TouchOSC
- Lemur
- Wingman: control SoundDevices MixPre

## Create

- Loopy HD
- **Model 15**, Filtatron, Animoog, ODYSSEi
- GlitchBreaks, Thor
- Bloom HD, ORO VisualMusic, Musyc, Reactable, Caustic

CUT

CUT

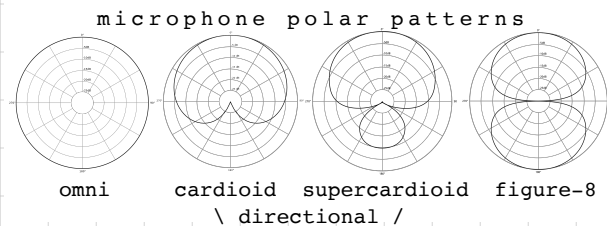
CUT

## Sound Reinforcement: a creative task! there is no right way!

- resource = Shure publication "Audio Systems Guide for Music Educators"
- when powering up = turn amplifiers (powered speakers) on LAST and off FIRST
- describing sound waves = frequency, wavelength, amplitude, envelope (ADSR), harmonic content

**Parts of the system** (in order from performer's mouth or instrument ==> audience)

1. mic
2. channel strip (top to bottom = signal path)
  - A. preamp = boosts mic level to line level
  - B. EQ = shapes tone
  - C. auxiliary sends = additional outputs  
→ (to stage monitors for example)
  - D. fader = adjust channel line level volume
  - E. pan
3. main output



4. amplifier = boosts signal from line level to very high levels designed for passive speakers ONLY
  - active (powered) speakers have amplifiers built into them
  - some mixers have amplifiers built in (called power mixers) and are sold along with passive speakers
5. loudspeakers (active or passive "main" speakers)

**Effects processors:**

- compressors/limiters = boost quiet sounds and attenuate loud sounds (keep distortion from occurring further down signal chain)
- special effects processors = add ambience (reverb), flange, delay, distortion, etc.

FOLD

- feedback = mic too close to PA speaker, mic too far from source being amplified, and/or too many mics
  - directional mics help minimize feedback by isolating sounds being picked up
  - rooms with less hard surfaces have fewer feedback issues ... no or full audience is very different too
- mic placement (requires experimentation and adjustment)
  - get the microphone as close to the source as possible (allows for max sound level before feedback)
- use a spectral analyzer = identify feedback frequencies and fine tune EQ

**Setup system and run sound check (proper gain structure):**

1. turn off amplifiers (main speakers and stage monitors)
2. set channel faders and main outs to Unity (0dB) & preamp gain (or trim) knobs to lowest setting
3. with headphones, set proper gain structure for each channel:
  1. press PFL/SOLO button on the channel
  2. engage HPF if source has no low end (always engage for vocals)
  3. slowly bring up preamp gain (or trim) knob as performer sounds into the mic to find "Goldilocks" setting = between noise floor and distortion (clipping) ... usually with the loudest sound peaking on the VU meter around Unity (0dB) or 2/3 of full scale
    - too low requires a boost further down the signal chain (which raises the noise floor)
    - too high allows for periodic distortion (clipping) ... going into the "red"
4. after all channels have been setup individually, have everyone perform together
  - with volume knob of amplifiers (main speakers and stage monitors) turned all the way down, slowly turn up volume knobs on amplifiers until you reach the desired volume in the space

**Additional concepts to research and work on:** mic 3-to-1 rule, using EQ to shape tone and prevent feedback, wireless mics, DI boxes, in-ear monitors, power management,

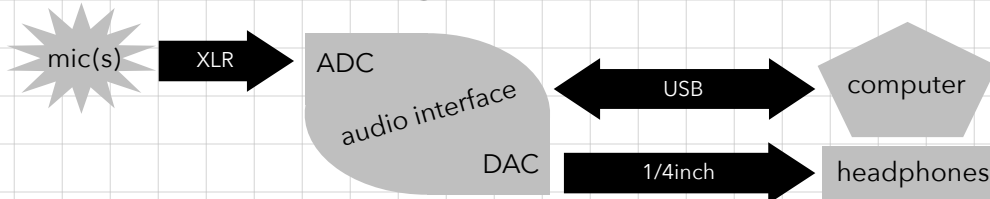
CUT

CUT

CUT

CUT

## Sound Recording: a creative task! there is no right way!



### Mic Placement (requires experimentation and adjustment)

- mono (single) mic individual instruments:
  - instruments need a certain distance from mic to create character and timbre
- stereo (two) mic ensemble or solo performance = **experiment with different stereo mic techniques!**
  - closer for less of the room's natural reverberation sound
  - further away for more of the room's natural reverberation sound
  - the further your mic is away from your source, the more preamp gain you need, and thus you end up raising your noise floor
  - classical music stereo mic placement = 4-20 feet away and 7-10 feet above performers' floor level

### Audio Interface

- sample rate = number of times per second that the signal voltage is measured
  - use 44.1kHz or 96kHz for recording audio alone
  - use 48kHz for recording audio to sync with video
- bit depth = use 24 bit = this is the resolution at which the amplitude of the signal voltage is measure

FOLD

### Gain Structure = finding the Goldilocks setting (utilizing the full resolution you have)

- slowly bring up preamp gain (or trim) knob as performer sounds into the mic to find "Goldilocks" setting = between noise floor and distortion (clipping) ... usually with the loudest sound peaking on the VU meter around Unity (0dB) or 2/3 of full scale
  - too low requires a boost further down the signal chain (which raises the noise floor)
  - too high allows for periodic distortion (clipping ... going into the "red")
  - give yourself enough headroom so unanticipated loud dynamics do not clip

### Computer

- lossless audio files (WAV, AIFF, CAF) = highest quality
  - use through entire recording/editing process (note different maximum size for each ... and make sure your DAW is setup to record unlimited time)
- lossy audio files (MP3, AAC, OGG) = these discard data in order to compress and save space
  - save as lossy ONLY when you are completely done with all editing and are ready to stream online (in which case use CBR) or to save space on a device (in which case VBR is better)
- bit rate = amount of data (bits) required to represent one second of audio
  - bit rate = bits per sample (bit depth) × samples per second (sample rate) × number of channels
  - bit rate of CD quality ==> 1411.2kbps = 44,100 × 16 × 2 (4min song would be 40MB)
- tips:
  - turn off all notifications and wifi
  - close any unnecessary programs
  - disable auto updates
  - use caffeine app

CUT

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## Audio Editing:

Record at a quality as close to what you want for a final mix as possible (spend time getting mic placement, room acoustics, preamp gains, etc. perfect!). Don't ever say you'll wait to make something better at a later stage. You can only do so much with your raw material. Use a great camera/lens and take time to get the settings perfect so you don't have to do much in Photoshop.

### Computer

- lossless audio files (WAV, AIFF, FLAC, CAF) = highest quality
  - use through entire recording/editing process (note different maximum size for each ... and make sure your DAW is setup to record unlimited time)
- lossy audio files (MP3, AAC, OGG) = these discard data in order to compress and save space
  - save as lossy ONLY when you are completely done with all editing and are ready to stream online (in which case use CBR) or to save space on a device (in which case VBR is better)
- bit rate = amount of data (bits) required to represent one second of audio (higher bit rate = better quality)

Use earphones and monitor speakers that are better than the listeners - they should be reference quality meaning they have a flat frequency response

FOLD

### Editing:

1. Destructive = changing the actual audio file
  - Most processes performed in an "audio file editor" (normalizing the audio file, for example)
  - Time stretch & pitch shift (but DAWs invisibly create new files so original audio files is not changed)
2. Non-destructive = just changing how the software reads the original audio file
  - Edits done to "regions" in the main timeline of the DAW (Cut, copy/paste)
  - Run audio through DSP (plugins)

### Mixing: putting all tracks of a single song together

1. Amplitude
  - Volume and panning automation (also envelopes such as fade in, fade out)
  - Dynamics Processing: [Compressor](#)/Limiter, Expander (ex. noise gate), Normalize
2. Frequency
  - Equalization (high pass, low pass, low shelf, high shelf, peak filter, notch filter)
3. Time = combine the original audio signal with delayed and modified copies of itself
  - Delay, Flange, Chorus
  - Reverb (convolution = make audio *sound* like it is in a specific hall or going through hardware)

### Mastering: fine tune each completed song to fit best with all other songs in an album

1. Slight adjustments to EQ, compression, limiting, and stereo image
2. Spacing and fades are added to the beginning and ending of each song
3. Make each song able to sound well played on any device

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## **Filming Concerts: a creative task! there is no right way!**

### **General tips:**

- clap your hands on film to help sync audio and multiple cameras
- get performers' permission and you may need a synchronization license
- use a tripod (holding the camera with your hand is too shaky)
- use only optical zoom (don't use digital zoom)
  - camera with 20x optical zoom minimum

### **Camera settings:**

- 24 frames per second (this gives the "film" look)
- MP4 and MOV are easy to work with (but AVCHD can produce higher quality video)
- uncompressed (AIFF, WAV) 48kHz sample rate for audio
- learn to use custom white balance if just shooting with one camera
- use same preset (such as "tungsten") on all cameras if doing a multi-camera shoot
- develop understanding of: shutter speed vs. frame rate, ISO ("gain"), and aperture (f-stop)
  - [exposuretool.com](http://exposuretool.com)

### **Editing software Suggestions:**

- Adobe Premiere (\$\$)
- DaVinci Resolve (free - BlackMagicDesign)
- after editing, use MPEG-4 as your video container (see what YouTube, etc. suggest)
  - audio = AAC & video = H.264

FOLD

### **Multi-camera shooting:**

- never stop recording on any of the cameras so aligning camera footage is easy
- don't put all your eggs in one basket:
  - have at least one fixed wide angle camera (with autofocus turned off) - called "safety"
  - use two manned cameras hunting for medium and close up shots
  - get b-roll footage = timeless reaction shots (of the audience, for example)
- don't shoot like spraying a garden hose = zoom only between shots and pan slowly

### **Composition:**

- use rule of thirds (turn on grid)
  - use lead space = space in front of where subject is facing
- avoid placing your frame edge on one of the body's joints
- avoid too much headroom (or person looks to be sinking)
- avoid too little headroom (or focus will be on the person's chin and neck)

### **Shot types** (each 5-10 seconds each)

- extreme long shot (XLS) = establishing shot - context for shots to follow
- long shot (LS) = person from head to feet
- medium shot (MS) = person from about waist up
- closeup shot (CU) = person neck and head
- extreme closeup shot (XCU) = one detail of person
- cut in = closeup shot of an object (such as face of watch or cell phone)

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## Video Editing:

Editing software Suggestions:

- Adobe Premiere (\$\$)
- DaVinci Resolve (free - BlackMagicDesign)

- after editing, use MPEG-4 as your video container (see what YouTube, etc. suggest)
  - audio = AAC & video = H.264

Multi-camera shooting:

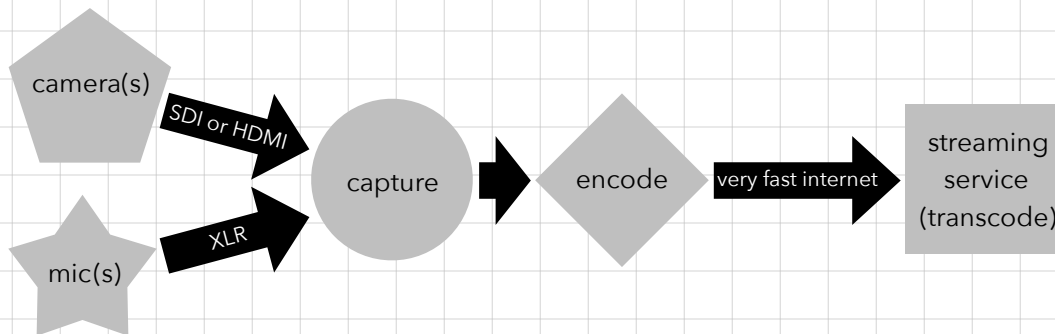
- never stop recording on any of the cameras so aligning camera footage is easy

FOLD

CUT



## Live Streaming Video (+Audio)



- Get a license to broadcast!
- Get performers' permission to stream their performance!
- Use professional lighting = the more light the better the video

### Suggested hardware/software:

- Blackmagicdesign capture/encode/switch/broadcast hardware & software
- Open Broadcaster Software (OBS) for encoding, switching, and broadcasting

### Live streaming components:

4. camera
  - output = SDI is best (very long cable runs), HDMI is good (short cable runs only)
  - zoom = high optical zoom (do not use digital zoom)
  - 4k will allow for cropping the picture without zooming/moving the camera
5. external mics = most camera mics are junk ... use external mics!
6. capture = plug video (SDI or HDMI) and audio (XLR) into hardware that plugs into your computer if you are using a software encoder
  - some hardware capture cards also encode video
7. encode = convert raw, uncompressed video into a streamable compressed format
  - use recommended encoding settings, bitrates, and resolutions of the streaming service [Youtube, Facebook, etc.]
  - software encoders require **a lot** of computer processing power
8. video switcher = switch from multiple camera angles in real-time
9. broadcast = send to streaming service using an internet connection with 2 times as much upload speed as the highest bitrate you want to stream
10. streaming services transcode video into many different resolutions and bit rates so your audience can view it on any device (desktop, tablet, and mobile)