

Audio Recording and Production 12

Guide

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Audio Recording and Production 12

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Audio Recording and Production 12

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Acknowledgments

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Introduction

From Edison's invention of the wax cylinder to the latest digital recording software, the recording industry has captured our imaginations. Advances in recording technology have developed an industry with as many recording philosophies as there are uses of recorded sound. The history of recording provides insights into the history of popular culture, media, and musical trends. Audio Recording and Production 12 provides students with a creative program that will fulfill their interests in music, technology, and popular culture.

Students will have the opportunity to be creators, collaborators, and problem solvers. Technological and aesthetic decision-making is an integral part of the recording process. Indeed, the creative process is a large part of audio production which includes concepts used in film, television, and music industries.

Background

Students considering a career in an audio-related industry must have an understanding of the principles of acoustics and the physics of sound and their applications in the techniques and practices currently required in a range of industry settings. Effective practice in the arts is grounded in well-developed aesthetic sensibilities, an orientation to quality, precision, and innovation, and an understanding of socio-cultural context.

Audio Recording and Production 12 address the need for a program dedicated to the art and technology of sound. The recording industry has evolved from an elite studio system to the micro studio (home studio) universe. The cultural and economic impact of this evolution is increased variety in recordings, musical trends, and commercial and creative opportunities.

Rationale for Audio Recording and Technology 12

Applied Audio Production course will help bridge the gap for high school students looking at further study in the recording arts field. The essential elements of creative thinking, problem solving, aesthetic awareness, communication and lifelong learning are integral to the core of Audio Production and Recording.

Careers in Audio

The recording industry has expanded from a large commercial studio philosophy to include small home studios. The result is a greater variety of recordings, musical trends, and commercial opportunities. Audio Production and Recording 12 will help students to make informed career decisions involving audio production and recording.

Industry needs versatile artists and technicians who can work in film postproduction and location recording, music production, recording and engineering, radio and television, game design, and interactive media.

Students can explore a broad range of related careers, including

Music

Record Producer
Production Coordinator
Recording Engineer
Re-Mix Engineer
Mastering Engineer
Editor
MIDI Programmer
Studio Manager

Film & Television

Production Recordist /Mixer
Boom Operator
Playback Operator
Post-Production Supervisor
Sound Designer
Dialogue Editor
Additional or Automated Dialogue Replacement (ADR) Producer
ADR Recordist or Editor
Foley Recordist or Editor or Mixer
Sound Effects Editor
Sound Effects Pre-mixer
Film Composer
Music Editor
Score Mixer

Live and Location Sound

Monitor Engineer
Sound Crew
Acoustic Analysis Engineer
Line-Array Technician
Hotel and Resort Technical Services
Theater Sound Designer
Corporate Audio Visual Technician

Digital Media

CD ROM Author
DVD Author
Audio Programmer
Multimedia Engineer
Audio Technology Developer
Audio Design Engineer
Internet Audio Designer
Cellular Communications Sound Designer
Game Audio Sound Designer
Game Audio Sound Editor
CD-ROM Producer
Audio Software Designer

LifeWork Portfolio Development

Many post secondary institutions expect students seeking to pursue studies in new media to provide an entrance portfolio and to offer additional support to their applications through demonstration of both skills and attitudes aligned with an occupational profile. Indicators may include drawing tests, computer functionality tests, and personality inventories, as well as interviews. A typical entrance portfolio will include a specified number of copies of artwork, digital work, and an essay or rationale statement explaining the student's interest in the discipline. Multimedia 12 provides opportunities for students to collect and articulate their best work as they continue to build a LifeWork portfolio.

Portfolio development helps students to demonstrate their skills and commitment to the study, and helps institutions to meet the students at their current level of skill and interest. The components of the portfolio or pre-admission testing are often dependent on the approach to the subject, whether integrated into a fine arts program, a technology program, or as a commercial and vocational study. Students will have opportunities to examine admission requirements and the placement of the program within the institution's overall academic offerings to determine the fit with their own career goals.

The Nature of Audio Production and Recording 12

Audio Production and Recording 12 is a project-based course. Students work both individually and collaboratively to complete projects characterized by authentic products created for real purposes.

Audio Production and Recording 12 consists of four modules:

Module 1: Principles of Sound

Module 2: Technology and Sound Capture

Module 3: Audio Production and Manipulation

Module 4: Collaborative Project and Personal Portfolio

Course Designation

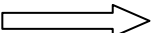
Audio Recording and Technology12 is an academic credit, and meets either but not both of the requirements for a technology or fine arts credit; Audio Recording and Technology does not, however qualify as the compulsory fine arts credit.

Students who complete two modules will receive a half credit, while all four modules must be completed to receive a full credit. Course codes for Multimedia 12 are

Audio Recording and Technology 12	200909
Audio Production and Recording 12A	TBA
Audio Production and Recording 12B	TBA

It is recommended that the course be organized in the following way:

Module 1	----->		
	Module 2	----->	
		Module 3	----->
Module 4	----->		

TIME 

Course Design and Components

Features of Applied Audio Recording 12

Applied Audio Recording 12 is characterized by the following features:

- an emphasis on integrating, applying, and reinforcing the knowledge, skills, and attitudes developed in other courses
- a connection to the Essential Graduation Learnings
- a refining of career-planning skills to explore a wide range of pathways from school
- a relationship to the community and workplace with a focus on using real community and workplace problems and situations as practical contexts for the application of knowledge and skills and for further learning
- hands-on, project based learning experiences
- development of personal and interpersonal skills required for personal and career success
- use of technology as an integral part of the course

Curriculum Components

Outcomes

This section provides specific curriculum outcomes for the unifying concept that appears across the top of the page. While the outcomes may be clustered, they are not necessarily sequential.

Suggestions for Assessment

This section provides suggestions for assessment of achievement of the outcomes. The suggestions are often linked to the Suggestions for Learning and Teaching. The suggestions are only samples; for more information, read the section Assessing and Evaluating Student Learning and see Appendix X for sample assessment tools.

Suggestions for Learning and Teaching

This section offers a range of strategies from which teachers and students may choose. Suggested learning experiences can be used in various combinations to help students

achieve an outcome or outcomes. The suggested strategies may also provide a springboard for teachers to choose other strategies that would be effective for their students. It is not necessary to use all the suggestions that are included, nor is it necessary for all students to be involved in the same learning experience.

Notes and Resources

This section contains a variety of information related to the items in the other columns, including suggested resources, elaborations on strategies, successes, cautions, and definitions.

Audio Recording and Production 12 and the Essential Graduation Learnings

The Atlantic Provinces worked together to identify the abilities and areas of knowledge that they considered essential for students graduating from high school. These are referred to as Essential Graduation Learnings. Details may be found in the document Public School Programs.

Some examples of learning in Audio Recording and Technology 12 which helps students move toward attainment of the essential graduation learnings are given below.

Aesthetic Expression

Graduates will be able to respond with critical awareness to various forms of the arts and be able to express themselves through the arts.

Students will be expected to

- 1.2 Explore recordings in a critical manner using musical and recording terminology and techniques
- 3.4 Apply the techniques of mixing and mastering to an audio recording

Citizenship

Graduates will be able to assess social, cultural, economic and environmental interdependence in a local and global context

Students will be expected to

- 1.4 Demonstrate an understanding of the evolution of recording technology and its impact on culture
- 2.4 Work co-operatively with organizations in the school and community that can benefit from live sound reinforcement or recording services

Communication

Graduates will be able to use the listening, viewing, speaking, reading, and writing modes of language(s) as well as mathematical and scientific concepts and symbols to think, learn, and communicate effectively.

Students will be expected to

- 1.1 Demonstrate an understanding of the language of electronics as it relates to audio
- 4.1 Analyze and develop a project plan, including the definition, scope, roles, resources, steps, and deadlines for a solution

Personal Development

Graduates will be able to continue to learn and to pursue an active, healthy lifestyle.

Students will be expected to

- 1.5 Demonstrate an understanding of hearing, audio safety and general workplace safety as it pertains to the recording and live sound reinforcement industries
- 1.6 Explore various music and recording industry career paths in audio production
- 4.2 Demonstrate the collaborative skills and behaviours required to work with others
- 4.5 Reflect on the solution, process and learning

Problem Solving

Graduates will be able to use the strategies and processes needed to solve a wide variety of problems, including those requiring language, mathematical, and scientific concepts.

Students will be expected to

- 4.1 Analyze and develop a project plan, including the definition, scope, roles, resources, steps, and deadlines for a solution
- 4.3 Identify, locate and evaluate information, resources and equipment to build and deploy a solution
- 4.4 Test, refine and present the solution

Technological Competence

Graduates will be able to use a variety of technologies, demonstrate an understanding of technological applications, and apply appropriate technologies for solving problems.

Students will be expected to

- 2.2 Demonstrate an understanding of basic sound system components including cabling, mixing boards, amplifiers, main speakers, monitors, & communication systems
- 2.3 Design and setup a variety of sound systems for various applications including live performance and recording
- 3.2 Apply techniques of signal and dynamic processing
- 3.3 Apply the techniques of editing to an audio recording
- 3.4 Apply the techniques of mixing and mastering to an audio recording

4.3 Identify, locate and evaluate information, resources and equipment to build and deploy a solution

Unifying Concepts

- Students acquire a broad understanding of the background and issues related to audio recording and production
- Students develop skills in the processes of creating recordings and providing support for live sound events
- Students design and manipulate recordings to create a variety of finished products
- Students design, plan, and complete a recording project which synthesizes the audio recording and production skills they have acquired

Specific Curriculum Outcomes

Module 1: Principles of Sound

- 1.1 Demonstrate an understanding of the language of electronics as it relates to audio
- 1.2 Explore recordings in a critical manner using musical and recording terminology and techniques
- 1.3 Determine the acoustic characteristics of a wide range of sound sources and environments
- 1.4 Demonstrate an understanding of the evolution of recording technology and its impact on culture
- 1.5 Demonstrate an understanding of hearing, audio safety and general workplace safety as it pertains to the recording and live sound reinforcement industries
- 1.6 Explore various music and recording industry career paths in audio production

Module 2: Technology and Sound (Capture) – Machines, mics & connections

- 2.1 Demonstrate an understanding of recording procedures for a wide variety of live and recorded situations
- 2.2 Demonstrate an understanding of basic sound system components including cabling, mixing boards, amplifiers, main speakers, monitors, & communication systems
- 2.3 Design and setup a variety of sound systems for various applications including live performance and recording
- 2.4 Work co-operatively with organizations in the school and community that can benefit from live sound reinforcement or recording services

Module 3: Audio Production and Manipulation

- 3.1 Manage acoustic environments using equalization
- 3.2 Apply techniques of signal and dynamic processing
- 3.3 Apply the techniques of editing to an audio recording
- 3.4 Apply the techniques of mixing and mastering to an audio recording
- 3.5 Demonstrate an understanding of MIDI

Module 4: Collaborative Project and Personal Portfolio

- 4.1 Analyze and develop a project plan, including the definition, scope, roles, resources, steps, and deadlines for a solution
- 4.2 Demonstrate the collaborative skills and behaviours required to work with others
- 4.3 Identify, locate and evaluate information, resources and equipment to build and deploy a solution
- 4.4 Test, refine and present the solution
- 4.5 Reflect on the solution, process and learning

Module 1: Principles of Sound

Students will be expected to

Demonstrate an understanding of the language of electronics as it relates to audio

Suggestions for Assessment

Students can

- Create a glossary of basic audio and electronic terms
- Describe and connect audio system components
- Analyze a selection of sounds and describe their similarities and differences

Teachers can

- Work with students to develop a matrix to organize the characteristics of sounds

Suggestions for Learning and Teaching

Students can

- Scan texts, websites, and magazines to identify terms related to audio and identify those with which they are familiar and those which needed explanation, discussion, or further research
- Listen to a range of audio applications, identifying variations in stereo placement, use of signal processing, and tonal characteristics, then
- Discuss the impact good audio has on a story line or message
- Discuss the impact of audio and, conversely, the negative effect of badly produced audio.
- list the circumstances where audio production equipment is required including radio stations, stage productions, video and film productions, and multimedia presentations.

Teachers Can:

- Provide examples of a range of audio applications, including narration, voice-overs, TV advertisements, live action, and animation audio
- Compare and contrast recordings, prompting students to listening for stereo placement, use of signal processing, and tonal characteristics
- Discuss, using examples, how good audio helps drive the story, increase the dramatic effect, and clarify the story line or message.
- Discuss the impact of audio and, conversely, the negative effect of badly produced audio.
- Discuss the importance of critically analyzing the various sound elements.
- Coach students in listening for similarities and differences to develop their sensitivity to the sound elements
- Demonstrate how to record an acoustic instrument with different microphone types and compare and contrast the results using correct terminology

Notes and Resources

Audio in Media

Modern Recording Techniques

Students will be expected to

Explore recordings in a critical manner using musical and recording terminology and techniques

Suggestions for Assessment

Students can

- conduct a simple, 30-second radio interview with a peer, audio expert, or person from the community using one microphone and a tape recorder
- maintain a listening diary

Teachers can

- provide a rubric for critically analyzing the similarities and differences among various sound elements

Suggestions for Learning and Teaching

Students can:

- write a research paper on a favourite producer and bring examples of their work for class discussion (Brian Eno, Daniel Lanois, George Martin)
- explore the ethics of using copyrighted material

Teachers Can:

- work with students to develop a rubric for evaluating an interview
- compare stereo and mono mixes of the same recorded material
- listen to and analyze recordings of various eras to illustrate the advancement of recording technology

Notes and Resources

Students conduct a simple, 30-second radio interview with a peer, audio expert, or person from the community. Equipment could be as simple as one microphone and a tape recorder. Allow students to discover the proper connections and operation of the equipment.

Students critique the interviews and discuss how they could be improved. Prompt students to consider microphone choice and placement, pick-up patterns, and room acoustics. Interview activities could include:

- a player or coach talking about a recent sporting event
- a community leader
- a teacher or student talking about a controversial school event or policy
- a performer talking about his or her work

Students will be expected to

Determine the acoustic characteristics of a wide range of sound sources and environments

Suggestions for Assessment

Students can

- assess the acoustic properties of a room and present their findings to a class
- do a basic initial recording using different types of microphones to illustrate the student's understanding of the mixing console and microphone types

Teachers can

- work with students to develop a rubric for assessing acoustic properties

Suggestions for Learning and Teaching

Students Can:

- create a graph showing various dB levels of everyday sounds and environments
- listen to a prerecorded CD use an EQ to hone frequency listening skills
- create a frequency CD using the tone generator contained in many software programs
- record sounds with different microphone types and present their results to the class
- create a presentation on speaker design
- re-EQ a pre-recorded musical program

Teachers Can:

- provide information and examples of a range of microphone types
- demonstrate the functions of a mixing console

Notes and Resources

Students will be expected to

Demonstrate an understanding of the evolution of recording technology and its impact on culture

Suggestions for Assessment

Students can

- research and write a report on how recording advances have affected the ways in which we store and present information
- record an instrument and incorporate various types of signal processing (chorus, flanging, phasing)

Teachers can

- provide a rubric for assessing a recording

Suggestions for Learning and Teaching

Students Can:

- present two recordings showing differing recording techniques (i.e. purist (classical/jazz) vs. multitrack recording (pop culture))
- compare stereo and mono mixes of same recorded material (historical recordings)
- analyze recordings of various eras to illustrate the advancement of recording technology
- write a brief response stating their views on the ethics of downloading for presentation
- record an instrument and using various types of signal processing (chorus, flanging, phasing)
- record voice and musical instruments using analog and digital means and the compare and contrast the perceived differences
- match important historical developments and dates on a chart or magnetic board
- research and present a brief creative project (i.e. model, poster board, comic book, etc.) to their peers on a specific innovation in sound production
- discuss perceived advantages and/or disadvantages of various recorded analog and digital sound files by reproducing sound from various recorded formats
- generate a list of inventors and their innovations

Teachers Can:

- introduce students to various recording innovations and advances throughout history
- discuss and reflect upon how these advances tie in to cultural events of that time
- demonstrate how to grade sound formats according to perceived sound quality and aesthetics

Notes and Resources

Students will be expected to

Demonstrate an understanding of hearing, audio safety and general workplace safety as it pertains to the recording and live sound reinforcement industries

Suggestions for Assessment

Students can

- create a checklist of safety precautions to be observed with introduction of a new piece of equipment or activity
- design, create and display posters illustrating specific hazards and how to avoid them

Suggestions for Learning and Teaching

Students Can:

- create a graph showing various dB levels of the sounds and environments that can be harmful to a person's hearing
- using a dB meter, monitor various environments in the schools comparing and contrasting sound levels
- research dB safety levels, proper safety practices and required safety equipment in a work environment
- use a dB meter on various instruments and playback/listening devices to illustrate the possible effects of long term exposure to loud noise
- receive WHIMS and Safety Orientation training

Teachers Can:

- give on-going and repeated safety instructions including concrete examples of potential hazards and visuals related to safety concerns (i.e. Taping cables down in heavy traffic areas)

Notes and Resources

Students will be expected to

Explore various music and recording industry career paths in audio production

Suggestions for Assessment

Students can

- develop a career portfolio focusing on some specific careers in which they are interested

Suggestions for Learning and Teaching

Students can

- identify the roles of every person involved in a typical CD release
- select, research and interview a local recording industry person
- write a research paper on a favourite producer or engineer
- research career options in the recording and music industry
- define the roles of the various studio personnel

Teachers Can:

- provide resources for career exploration (websites, interest inventories)

Notes and Resources

LifeWork Portfolio, a Resource for Schools (Department of Education)

Career Cruising website

Career Options website

Module 2: Technology and Sound (Capture) – Machines, mics & connections

Students will be expected to

Demonstrate an understanding of recording procedures for a wide variety of live and recorded situations

Suggestions for Assessment

Students can

- individually or in groups, set up mics, amplifiers and speakers in various environment

Teachers can

- provide a rubric evaluating both the correct physical connections as well as the aesthetic quality of the amplified sound

Suggestions for Learning and Teaching

Students Can:

- design and illustrate the perceived polar (pickup) patterns of various types of microphones
- examine diagrams of cross-sections of microphones and compare and contrast different microphone elements
- practice connecting microphones to sound systems, testing and observing how each one affects their voice at different distances from the mic and with various obstructions or interferences
- attempt to determine microphone types by listening and illustrating the polar patterns based on what they hear
- listen to a live acoustic instrument miked by different microphones and discuss their preferences
- explore the phenomenon of feedback on stage by experimenting with mics, mixers, amplifiers and speakers by changing variables such as the angle or distance of the mics relative to the speakers
- examine diagrams of stage setups that may cause feedback and discuss the ways of correcting the situation

Notes and Resources

Students will be expected to

Demonstrate an understanding of basic sound system components including cabling, mixing boards, amplifiers, main speakers, monitors, & communication systems

Suggestions for Assessment

Students can

- identify various audio components by sight and direct questioning
- identify various unidentified components by completing a cable/plugs hands-on quiz using a 4-column numbered checklist
- use a checklist to connect various audio components together and demonstrate how each of the components work together in the complete audio system

Suggestions for Learning and Teaching

Students Can:

- compare and contrast each cable and plug with the equipment it would be used for
- match typed descriptions with the corresponding diagrams of various audio components
- demonstrate how a voice can be altered by a mixer in a live broadcast to create characters for a potential radio commercial or radio play

Teachers Can:

- demonstrate the correct method of connecting various audio components together
- observe students as they work together in pairs to reproduce the connections

Notes and Resources

Students will be expected to

Design and setup a variety of sound systems for various applications including live performance and recording

Suggestions for Assessment

Students can

- design and setup an audio installation (i.e. PA or recording equipment)
- create and use a rubric to evaluate the aesthetic sound coloration of various locales

Suggestions for Learning and Teaching

Students Can:

- design and setup an audio installation (i.e. PA or recording equipment)
- in pairs, design and sketch stage design plots for various environments
- create their own checklists of necessary components for various recording situations (i.e. A play, choir recital, concert, debate, remote broadcast, etc.)

Teachers Can:

Notes and Resources

Students will be expected to

Work co-operatively with organizations in the school and community that can benefit from live sound reinforcement or recording services

Suggestions for Assessment

Students can

- documents their community experience with a journal and related artifacts

Teachers can

- develop a checklist/rubric to evaluate a student's performance on work placement. Both the student and the workplace supervisor should complete the form

Suggestions for Learning and Teaching

Students Can:

- write a reflective report on any work experience gained outside the school
- In small groups, plan, organize, setup, promote, present and record a school variety show.
- write a résumé and cover letter introducing themselves and their skills to a local company involved in either the sound, radio or recording industry
- work alongside industry professionals for 2-5 days during which time they will maintain a learning log (diary) reflecting on their daily activities
- research and explore opportunities in the local community to practice and expand their skills with people that could benefit from sound reinforcement or recording assistance. (I.e. Church groups, town hall meetings, political debates, local concerts, etc.)

Teachers Can:

- organize community placements
- Coach students before and during the community activity

Notes and Resources

Module 3: Audio Production and Manipulation

Students will be expected to

3.1 Manage acoustic environments using equalization

Suggestions for Assessment

Students can

- in a performance environment, setup microphones to prevent feedback
- identify and correct tuning problems in an specific environment
- collaborate with other arts (for example, drama) to capture live voice and musical performance and make changes to enhance or optimize the results

Suggestions for Learning and Teaching

Students can:

- manage various frequencies on an equalizer (hardware or software-based).
- use an equalizer to manage room characteristics utilizing pink and white noise generators.
- use an equalizer to manage room characteristics using spoken word or recorded music.
- compare and contrast the unturned room to the tuned room.

Teachers can:

- play various frequency tones (20hz – 20,000hz) having students identify characteristics of different frequencies. (Commercially available CD)

Notes and Resources

Students will be expected to

3.2 Apply techniques of signal and dynamic processing

Suggestions for Assessment

Students can

- examine and critique different genres, generations of music to explore how the aesthetic expression is effected by dynamic processing. Students should provide at least two differently processed samples to critique.

Teachers can

- give students a pre-recorded sample (voice/music) with no effects, and ask them to apply certain effects at different times to the sample
- give students a live recording from an orchestra, and have them analyze and sketch in a simple graph diagram the wave form. They could also demonstrate where they would apply compression to normalize the sound

Suggestions for Learning and Teaching

Students can:

- using vocal and instrumental sources, experiment with different types of reverb and delay effects in live and studio situations
- use audio recording software to create experimental audio and voice files using various solo and combined effects and manipulations
- debate the relative merits of various effects and explain why they prefer specific examples
- using a sound source with large dynamic contrasts, explore the effect of compression and limiting (gain, threshold, ratio, attack, etc.) on the sound source
- examine the relative merits of varying aspects of compression/limiting and explain why they prefer specific examples
- present various created experimental audio files and describe how each was created
- apply specific effects to a recording
- apply dynamic processing to a recording
- describe the processing involved in specific recordings

Teachers can:

- introduce students to naturally reverberant situations by visiting various locations in or out of the school and listening to changes in specific sounds in each environment.
- demonstrate how to apply effects to a recording.
- demonstrate how to apply dynamic processing such as compression, gain, threshold, ratio, attack
- provide models of various recording techniques
- conduct a discussion on how the aesthetic qualities of music are affected by post-production processing. Example compare pre1985 live musical recording to contemporary studio cd; visual wave forms to compare saturation-compressed-uncompressed recording.

Notes and Resources

Students will be expected to

3.3 Apply the techniques of editing to an audio recording

Suggestions for Assessment

Students can

- extract and manipulate the audio portion of a video
- edit a soundtrack to a video clip
- script and produce a 30 second radio ad
- select a radio play (from the public domain) or chose to write and script an original play and then produce it using various sound effects, and musical backgrounds

Teachers can

- provide a rubric to assess the quality of the sound, use of effects, mixing and creativity of content

Suggestions for Learning and Teaching

Students can:

edit a multi-track recording using the following techniques:

- make selections in the frequency area to isolate specific frequencies
- add a loop (a repeated sound sequence) to the recording
- create repetitions of a loop within the multi-track
- create a loop from a larger waveform
- manipulate the source waveform of an audio clip
- use markers to define locations and sections
- change the length of an audio clip by time stretching or shrinking
- change the pitch of an audio clip
- change the tempo of the recording
- split audio clips and save selections
- add an effect with a signal processor
- apply data compression to reduce the size of files
- extract audio tracks from CDs (where legally permissible)
- set track properties (I.e. Naming tracks, colouring tracks, converting stereo to mono)
- produce a pod cast by recording an interview with some students on a topic of their choosing, with at least three samples
- edit the sample (remove pops, crackles and hiss)
- create opening soundtrack and add sound effects

Notes and Resources

Students will be expected to

3.4 Apply the techniques of mixing and mastering to an audio recording

Suggestions for Assessment

Students can

- create a “cleanly” mastered radio commercial
- create seamless DJ music mixes (beats, transitions, spoken word, pitch, tempo) with their own compositions

Suggestions for Learning and Teaching

Students can:

- normalize (adjust the relative volume) of a group of tracks
- apply equalization and limiting to an entire project
- save and convert audio projects into a range of formats suitable for a range of uses, for example, wav, Mp3
- apply appropriate effects when mastering the project
- pan the tracks in stereo space
- use a bus (a row of channels) to group tracks together
- remove pops, crackles, and hiss from a recording
- use markers to define locations and sections to support the organizational structure of a project

Notes and Resources

Students will be expected to

3.5 Demonstrate an understanding of MIDI

Suggestions for Assessment

Students can

- produce their own digital music
- import MIDI files into a multi-track recording program and add analogue tracks.

Suggestions for Learning and Teaching

Students can:

- insert a MIDI (Musical Interface Digital Interface) track into an audio recording
- create a MIDI sequence (audio recording program)
- manipulate a MIDI sequence
- use MIDI rhythm tracks as a resource for original loop composition ("remix")

Teachers can:

- demonstrate Tempo, Virtual instruments, musical background
- discuss the five basic elements of music (harmony, melody, rhythm, form, timbre) and how they pertain to musical compositions

Notes and Resources

Module 4: Collaborative Project and Personal Portfolio

Students will be expected to

4.1 Analyze and develop a project plan, including the definition, scope, roles, resources, steps, and deadlines for a solution

4.3 Identify, locate and evaluate information, resources and equipment to build and deploy a solution

Suggestions for Assessment

Suggestions for Learning and Teaching

Students can

read and respond to scenarios describing a range of processes, for example: team ground rules, roles and responsibilities, identifying helpful team behaviours, decision making, conflict resolution

- discuss as a group and decide upon a project topic
- form a team where roles and responsibilities are decided upon and team ground rules are established
- read a request for proposal and outline what the problem to be solved involves
- design a project plan outlining the resources, personnel, and time required to develop a solution
- develop a response for a request for proposal, to be submitted to a fictional or real organization, that will identify steps, sequence, and schedule
- hold interviews, with their client, where project particulars are discussed and the nature of the project is negotiated

Teachers can

- provide students with a request for proposals that outline a real-world problem that requires a programming solution
- play the role of a client for a fictional business or organization that wants to hire students to solve their programming needs
- help students choose appropriate projects and give advice on the scope of projects

Notes and Resources

Students will be expected to

4.2 Demonstrate the collaborative skills and behaviours required to work with others

Suggestions for Assessment

Teachers can

- provide students with peer and self-evaluation rubrics
- identify and address individual/team concerns as they arise
- set milestones for groups where portions of the project must be submitted for evaluation
- develop and maintain clearly understood task checklists for each student
- monitor students' collaborative behaviours using checklists and rubrics

Suggestions for Learning and Teaching

Students can

- maintain an ongoing project plan
- create a team identity document that contains the roles, responsibilities, and ground rules that the group decided on and implemented
- write journal entries discussing their experiences creating the project

Notes and Resources

Students will be expected to

4.4 Test, refine and present the solution

4.5 Reflect on the solution, process and learning

Suggestions for Assessment

Teachers can

- evaluate final projects based on a list consisting of acceptance factors and features
- provide students with formal/informal feedback on their projects
- invite community businesses and organizations involved in the project to take part in the presentations and acquire feedback from them

Suggestions for Learning and Teaching

- complete self- and peer evaluations
- present their final project
- write journal entries discussing their experiences in creating the project

Notes and Resources

Appendix A: Social, Ethical/Legal and Human Issues in Information Technology

The social, ethical/legal and human issues associated with information technology are an important part of this course. There are many issues past and present which have faced those who program and those who use information technology. Increasingly, collaborative and interactive Web 2.0 technologies are used by students. Intellectual property is to be used and modified within provision of Canadian Copyright Law. It is a legal requirement that teachers of this course are familiar with the requirements of the Canadian Copyright Act and work within available provisions.

Creation is the essence of learning. We all stand on the shoulders of those who have preceded us.

Creative Commons and Open Source works are an excellent source of materials from which students in this course may learn and collaborate with others to improve. The works are available and continue to improve because of individual commitments to intellectual honesty, credit sharing, and acknowledgement of the sources of the ideas and codes contained within the works. Similarly, our modifications of creative commons and open source materials are released back for others to continue to develop.

Spam, malware, viruses, protection of privacy, cyber bullying, identity theft, and the development of an ethical culture of technology use and development are issues students will require time and teacher support to discuss.

Copyright Issues

Students must respect the work of others and act in an ethically and legally responsible manner. Just as students would not think it appropriate to steal a book from a store to support their studies or interests, students must not steal the information or works of others in the electronic environment. We are in an age where the technology to do things such as download images, data or music files from websites is readily available. The legal right to use the technology for these purposes is, as students who pay attention to the news media understand, not always available. Students, using the school's equipment and Internet connection must follow Canadian Copyright and other laws. Students must respect the intellectual property of others and properly credit materials which are not their own original work.

Teachers and students will find many wonderful Internet resources to support learning. To ensure that these resources are used in an ethical and legal fashion, teachers should direct students to the following excerpt from *Copyright Matters! 2nd Edition*, Council of Ministers of Education, 2005.

Can teachers and students copy from the Internet?

From a copyright point of view, you should be aware of the following four rules:

1 Most material available on the Internet is protected by copyright. This includes text (for example, e-mail, discussion forums, collaboratively developed works), images, photographs, music, video clips, and computer software. Under the Canadian Copyright Act, reproduction and unauthorized use of a protected work are currently infringements. Therefore, reproduction of any work or a substantial part of any work on the Internet would infringe copyright unless you have the permission of the owner. Many Internet users are questioning the appropriateness of the rules in copyright law. Canada and other countries around the world are currently studying uses of copyright materials from the Internet. Many Internet users and service providers are asking for changes in copyright law that would allow uses of works on the Internet without infringing copyright. The CMEC Canadian Ministers of Education in Canada, Canadian School Boards Association (CSBA), the Canadian Teachers' Federation (CTF), and others in the education community are active participants in this ongoing work.

2 Copyright protects the way in which information is expressed. The information itself is not protected by copyright. Restating ideas, facts, or information in your own words is not copyright infringement.

3 Where a work has been placed on the Internet with the message that it can be freely copied, there is an actual licence to copy the education in Canada (except in Quebec), the Canadian School work. Sometimes the terms of the licence are subject to conditions. Common conditions are that the posting cannot be used for commercial purposes, must be circulated in its entirety, cannot be used out of context, and cannot be edited or reformatted. If you abide by the conditions, you may copy the work without infringing copyright. Search for the growing number of creative commons licensed and Open Source works and sites where permissions to use, and change works are available.

4 Any works protected by copyright that are on your school's or district's Web site require copyright clearance, unless the school or district already owns the copyright for them. If the school or district does not own the copyright, written permission must be obtained from the copyright owner. The same would apply for students accessing student Web sites.

Excerpted from *Copyright Matters! 2nd Edition*, Council of Ministers of Education, 2005

Appendix B: Rubrics

Course Outcomes Rubric

Module	Exceeds all expectations	Exceeds some expectations	Meets minimum expectations	Does not meet minimum expectations
<i>Module 1: Principles of Sound</i>	Demonstrates a broad understanding of the background and issues related to audio recording and production	Demonstrates knowledge of the background and issues related to audio recording and production	Demonstrates basic knowledge of the background and issues related to audio recording and production	Has minimal knowledge of the background and issues related to audio recording and production
<i>Module 2: Technology and Sound (Capture) – Machines, mics & connections</i>	Can identify and fully outline strategies to solve a range of problems	Can identify and outline strategies to solve a range of problems	Can identify but not fully outline strategies to solve problems	Cannot identify and outline strategies to solve problems
	Demonstrates broad range of problem-solving skills and a deep understanding	Demonstrates many problem-solving skills	Demonstrates limited range of problem-solving skills	Does not demonstrate a range of skills for solving problems
	Investigates a broad range of related career opportunities and prerequisites for entry	Investigates a range of related career opportunities	Investigates a limited number of related career opportunities	Does not investigate related career opportunities
<i>Module 3: Audio Production and Manipulation</i>	Demonstrates a mastery skills in the processes of creating recordings and providing support for live sound events	Is able to apply most skills in the processes of creating recordings and providing support for live sound events	Is able to apply some skills in the processes of creating recordings and providing support for live sound events	Is unable to apply skills in the processes of creating recordings and providing support for live sound events

	Demonstrates a deep understanding of the effectiveness of other people's work	Demonstrates an understanding of the effectiveness of other people's work	Demonstrates some understanding of the effectiveness of other people's work	Does not demonstrate an understanding of the effectiveness of other people's work
	Demonstrates advanced ability to design and manipulate recordings to create a variety of finished products	Demonstrates ability to design and manipulate recordings to create a variety of finished products	Demonstrates some ability to design and manipulate recordings to create a variety of finished products	Fails to demonstrate ability to design and manipulate recordings to create a variety of finished products
<i>Module 4: Collaborative Project and Personal Portfolio</i>	Develops a thorough and realistic plan that includes time lines and resources	Develops a realistic plan that includes time lines and most resources	Develops a plan that includes time lines	Plan does not include realistic time lines or resources
	Assumes leadership role in group when appropriate; demonstrates behaviours that encourage other group members to contribute	Contributes actively to the group; supports group leader	Contributes as member of a group	Does not participate in team
	Identifies and selects and evaluates a variety of relevant information resources	Selects and evaluates a minimal set of relevant resources	Identifies minimal resources appropriate to project	Fails to identify appropriate resources
	Is a lead contributor to the building and deployment of the solution	Is a strong contributor to the building and deployment of the solution	Is a minor contributor to the building and deployment of the solution	Does not contribute to the building and deployment of the solution
	Tests solution under a variety of conditions and modifies appropriately	Modifies solution to run under most test conditions	Makes minimal modification of solution to pass basic tests of functionality	Fails to modify solution as a result of test of solution

	Demonstrates thorough ability to design, plan, and complete a recording project which synthesizes the audio recording and production skills acquired	Demonstrates ability to design, plan, and complete a recording project which synthesizes the audio recording and production skills acquired	Demonstrates some ability to design, plan, and complete a recording project which synthesizes the audio recording and production skills acquired	Demonstrates minimal ability to design, plan, and complete a recording project which synthesizes the audio recording and production skills acquired
	Identifies possible improvements as a result of reflection on solution (4.9)	Identifies some improvements as a result of reflection	Demonstrates minimal impact of reflection	Demonstrates little evidence of reflection

Group Project Rubric

Name: _____

Project: _____

Part	Score (circle one)					Total
Part A: Team Building						
Team Player	0	1	2	3		
Took the activity seriously and worked appropriately	0	1	2	3		
Team Contribution	0	1	2	3	4	/10
Part B: Team Deliverable						
Design	0	1	2	3		
Functionality	0	1	2	3		
Impact	0	1	2			
Mission Statement	0	1	2			
Ground Rules	0	1	2			
Roles	0	1	2			
Content	0	1	2			
Performance/Effort	0	1	2	3	4	/20
Part C: Project Construction						
Use of Time	0	1	2	3		
Teamwork	0	1	2	3		
Consultations	0	1	2	3		
Professionalism	0	1	2	3		/15
Part D: Final Product						
Client Acceptance Factors	10	15	20	25	30	
Team Presentation	1	2	3	4	5	
Design	1	2	3			
Content	1	2	3	4	5	6
Individual Presentation	1	2	3	4	5	6
						/55

Comments:

Final Mark ____%

Team Project Self-Evaluation

This evaluation is to be taken seriously and is strictly confidential. Results will be viewed only by the teacher. This is your opportunity to relate how your group experience went.

Rank each statement from 0 to 5, with 5 being the highest.

Self-Evaluation						
Name:						
I was always on task	0	1	2	3	4	5
I was a strong team member	0	1	2	3	4	5
I feel I did my share of group work	0	1	2	3	4	5
I rate my overall effort as	0	1	2	3	4	5
Comments:						

Peer Evaluation						
Name:						
Was always on task	0	1	2	3	4	5
Was a strong team member	0	1	2	3	4	5
Did their share of group work	0	1	2	3	4	5
Overall effort	0	1	2	3	4	5
Comments:						

Appendix B: Group Work and Team Building

Establishing Team Ground Rules

The following activities are designed to help students work together as effective teams. When a group of people gets together to work on a task, they often carry with them certain expectations about how effective teams work. It is important that all group members feel part of the team and that their input and skills are valued. It is also important that all teams discuss their expectations for a project so that individuals have a sense of what is expected of them. One step in the process is establishing team ground rules that all team members agree to abide by.

Activity 1: Discussing Teamwork

Take five minutes to read the following statements, and for each statement, identify whether you believe it to be true or false. The purpose of this activity is to generate discussion about teamwork.

- Team members should always express what they are thinking and feeling, even when it might offend other team members.
- Teams need someone in charge in order to get work done.
- A team has reached consensus when almost everyone agrees with a decision that has been suggested.
- Teams always produce better work than individuals.
- In order to be effective, team members should have a personal liking for each other.
- Effective teams try to reach consensus on all issues.
- It is better to avoid discussing interpersonal disputes with team members—it always leads to more trouble.
- Teams are only as strong as their weakest member.
- If you don't have anything nice to say, you shouldn't say anything at all
- Being able to work on a team is a natural ability—you're either born with it or you're not.

Activity 2: Setting Ground Rules

As a group, you have decided which statements you believe to be true and which ones are false.

Make a list of ground rules that all members of your group agree to follow.

Activity 3: Identifying Helpful Team Behaviour

This activity is designed to help you understand that different people may see the same problem in different ways. It is important for teams to decide on a decision-making process and also to identify helpful and harmful team behaviours.

Read “Justice Deserved?” individually and complete the activities which follow.

Justice Deserved?

By Sean Bennett
(Reprinted with permission)

Rain, rain and more rain was the order of the day, making everyone cranky and disgusted. It had been a tough winter, with major blizzards, power outages and shoveling that had never been matched. Now the fleeting snow was being replaced with inches of rain, coming down in sheets.

Harley awoke late, having hit his snooze button three times. He rocketed out of bed, bypassed the shower, threw on his clothes and jacket and jumped out into the rain—without an umbrella. The bus stop was two blocks away and he needed to get there within a minute or so. Now in full sprint, water splashing up his legs, Harley could see the bus stop in the near distance, with the bus making its way in the opposite direction. Picking up his pace, Harley saw an old woman, hunched over and moving as quickly as a tortoise with a baby grand on its back, lumbering along the middle of the sidewalk. With the bus approaching the stop, his heart now pounding at a feverish pace, Harley made a split-second decision, buried his right shoulder into the lady's back, never missing a step. The old woman flew as if shot from a cannon, landing a good ten feet away, crumpled up against the side of the dry cleaner's front door.

"You idiot! Police, police! He just tried to kill me!"

Not missing a beat, Harley made it to the bus stop, never looking back to see if the woman was okay—the bus still about five hundred feet away.

At the same time, young Billy was walking towards school, having missed the school bus for the same reason as Harley—having slept in. He had been up all night online gaming, and was now paying for this by having to walk to school in the rain. Angry and soaked, Billy picked up a rock and skipped it atop a large puddle that had accumulated near his family's apartment. He biffed a few more stones as he ambled along, rain pounding off his rain jacket and Yankees ball hat. As he approached a bus stop along his route to school, he let a rock fly that took an unusually high skip and made its way onto the sidewalk, hitting an old woman who was slowly gathering herself from the pavement. Billy thought she must be a homeless person—just getting up from her spot in front of the dry cleaners. The rock caught her square in the forehead, sending her spilling onto her backside. She seemed stunned, and rightly so, but she also seemed fine, considering a rock had just been zinged and had smashed itself firmly between her eyes. She started hollering something about the police, but Billy was not going to stick around to see the conclusion to this, so he took off running past the bus stop, snickering to himself.

The driver of the Route 27 bus was a younger man, not overly happy with his spot in life. No one ever cared about his problems, but they'd always shower their misfortunes onto him as he drove them to their destinations. Who cares if you have to go to the doctors? Who cares if your cat has been missing a week? Certainly not the driver of bus number 27.

He was running a couple of minutes behind schedule on account of the rain being so heavy, and because of this the people getting onto the bus were giving him an unusually heavy amount of griping. He didn't care. He needed a laugh. He needed something to charge his day. Then, for reasons beyond his control, he drove his bus into a large puddle that had formed about a block from his next stop. The water flew onto the sidewalk like a tidal wave, dousing three poor, unsuspecting souls: a kid and man both running along the sidewalk and an old lady who was sitting on her behind in front of the dry cleaners. The bus driver let out a large and robust laugh, the people sitting on the bus sitting in disbelief at what they had just witnessed.

“Police! Police! Help me!”

Officer Jones grumbled as he turned from the counter of the coffee shop, strawberry filling from his doughnut running down his chin. An older woman was lying on the sidewalk while a man in his 20s ran past her quickly. Wiping the filling off his chin, Jones decided to “pretend” he hadn’t heard the woman’s cries for help. Not even a couple of minutes later, however, the same screams were heard; this time the woman was on her backside, rubbing her forehead.

“Hmm,” grunted Jones, sipping on his hot coffee, ordering another doughnut. Within seconds, the sound of the bus roared past the shop. As Officer Jones turned he saw the tidal wave smash onto the pedestrians on the sidewalk, the old lady once again an unwilling recipient of being in the wrong place at the wrong time.

The officer grudgingly decided that he could not sit idly by anymore, his coffee cup now empty of its liquid. Sticking his baton into its holster, rain gear on, he headed out into the elements to help the old lady, now rolling about, drenched, sore and angry. The police officer approached the lady and assessed her plight.

“Seems like you’re having a rough one, lady ...”

The lady did not find humour in her situation. Her body was soaked, a welt the size of an orange protruded from her forehead and she felt as if she had a Mack truck stuck between her shoulder blades. To top it all off, her voice was going from all the screaming she had let fly, all the while Officer Jones enjoyed his doughnut and fresh coffee.

“Listen here, I have a right to smack you one over the head. Where were you when I needed ya? Probably sitting in that coffee shop over there with strawberry jam filling running down your chin!”

Jones shuffled uncomfortably at the lady’s accuracy, yet was also getting more than a little tired of her ranting. “Look, do you need some help? I’m busy here, you know.” Officer Jones leaned over the lady and placed his hand on her left arm.

“Why you ...” was all he heard, as a massive handbag, certainly the lady’s equal in terms of weight, came crashing down on his head.

Being a large man and with pride that would not allow an old woman to do him harm, Jones stumbled up quickly and pushed the lady, now standing, up against the front window of the dry cleaners. Jones placed handcuffs on the elderly woman and called in back-up. “Lady, you’re going for a ride ...” As the old lady was placed in the police car, the young man stepped onto the bus, wet yet none the worse for wear. Billy trotted into first period mathematics, a little late yet also fine. And the bus driver whistled behind the wheel of the bus, oblivious to the passengers’ complaints about his tardiness, reliving in his head the “perfect puddle job” that he had accomplished minutes earlier.

Activity 3A: Rank the Characters in Order of Offensiveness.

Who, in your opinion, is the most offensive person in the story? Rank this person as #1 and record the name in the space below. Write a brief (two- or three-word) reason for your choice.

Who, in your opinion, is the second most offensive person in the story? Rank this person as #2 and record the name in the space below. Write a brief (two- or three-word) reason for your choice.

Who, in your opinion, is the third most offensive person in the story? Rank this person as #3 and record the name in the space below. Write a brief (two- or three-word) reason for your choice.

Who, in your opinion, is the fourth most offensive person in the story? Rank this person as #4 and record the name in the space below. Write a brief (two- or three-word) reason for your choice.

Who, in your opinion, is the fifth most offensive person in the story? Rank this person as #5 and record the name in the space below. Write a brief (two- or three-word) reason for your choice.

Activity 3B: Agree

Appoint an observer—someone who is prepared to not participate in the following discussion but simply to observe silently how your team works together in the next task. The observer is to make note of any behaviour that might be helpful or not helpful to team discussions.

Once you have appointed your observer, as a group, discuss your individual rankings. You and your team must reach agreement about who deserves to be #1, 2, 3, 4, and 5.

Activity 3C Report

Take some time to listen to what your observer has to say regarding how the group handled the task of ranking the characters. Feel free to offer your own observations after you have heard his or her report. As a group decide on a decision-making process for your team and make any additions or deletions to your team ground rules that you feel are needed.

Activity 4: Create a Team Identity Document

Treat your team as a software development company. Decide on a team/company name. As part of developing a team identity, your team should decide on a logo.

Make a list of roles and responsibilities that are required to make your team work efficiently. Decide who will fill the various roles. How long will each team member keep his/her title/role? Discuss the skills each team member brings to the collective and try to put people into roles where they can best help the team.

Include your team ground rules that you have already decided on.

Appendix C: Project Suggestions

Radio Show
Commercial (30 second "Radio Spot")
Foley sound Effects
Sound Collage
Poetry with music/sound atmosphere
Music composition (electronic or conventional)
Drum Loops (create original drum patterns)
Create a MIDI sequence
Editing Project
Mastering Project (E.Q., compression leveling practice)
EQ Project (EQ poorly EQ'ed audio tracks)
Radio Play (Audio Only)
Remix Project
Microphone Placement Project 15. Midi Editing Project

Appendix D: Resources

Audio files to REMIX and EQ are available online.
 Steinberg (Cubase) has educational tutorial resources available.
 SONAR (Cakewalk) has educational resources and suggested projects.
 Instrument and Vocal Recording, Bill Gibson, Hal Leonard Books
 Microphones and Mixers, Bill Gibson, Hal Leonard Books

Technology Requirements, DRAFT

Environment

4 workstation tables – FFE standard computer tables?
 square tables, chairs – FFE standard student chairs
 storage cabinet (lockable) FFE – need size for Bruce to do estimate

Computers

fairly fast processor, min 2ghz, dual-core – meets current specs
 substantial data storage, 7200 rpm, min 32 mb cache, 250gb main, data 500 gb – current specs plus additional drive
 high end sound card, minimum 4gb RAM, 24-bit capable, (e.g. standard Audigy card) – current spec is Creative labs x-Fi Fatal1ty model xfi 70SB046A00003
 dvd burner – meets current specs
 USB audio interface, external (with integrated sound card?) – See above sound card ports
 monitor min 22” wide - exceeds current portable HD spec – why ??
 4 workstations/lab, minimum, one station dedicated to mastering
 1 external HD (per classroom), min 1 tb - exceeds current portable HD spec

Peripherals:

1 pair studio active near-field monitors (per classroom) – not in any of our tender- need specs
 Printer – use classroom standard
 portable digital recorder – current model is Sony ICD-P620

Sound Related:

Headphones, 6 minimum - - need specs – may match tender
 headphone distribution amp, 4 outputs – not in any of our tender- need specs
 Speakers – not in any of our tender- need specs
 4 Mixers, minimum, 12 channels (with multiple inputs & outputs) – current model is SoundCraft Spirit FX8
 1 bass drum “kick-mic” – not in any of our tender- need specs
 1 electrostatic (large diaphragm condenser) microphone – not in any of our tender- need specs
 2 electrostatic (small diaphragm condenser) microphones – not in any of our tender- need specs – may be similar to Audio-Technica Pro-70
 4 dynamic microphones - - need specs
 4 wireless microphones – current tendered as system – Peavy #FP-12c
 8 XLR cables min, 25’ – current model Digaflex #N25XX
 8 boom microphone stands - - not in any of our tender- need specs
 Db Meter – not in any of our tender- need specs
 White Noise Generator – not in any of our tender- need specs

Software

recording, editing, mixing, and mastering suite: multi-track, MIDI capable, read and write a variety of formats

word processor

planning software

Consumables

CDs

DVDs

CD labels

CD storage

Appendix E: Glossary

Amplifier	A device used to boost the level of an audio signal
Attenuate	To reduce the level of an audio signal
Audio Snake	used to connect several microphones in one cable to send from mixer to stage
Bit Resolution	The number of binary digits used by a digital recording system. The higher the number the better the FIDELITY
Bus	The connection between several parts of a mixer.
Cardioid Microphone	A directional mic with a heart-shaped pick up pattern.
Clip	The audio signal exceeds the limits of the electronics (DISTORTION)
Compressor	Used to decrease the gain of an amplifier when the signal hits a certain level. It also boosts signals below a set Db level.
Crosstalk	Where one channel "bleeds" into another creating unwanted signal.
Db	An abbreviation for DECIBEL. The DB unit is expression of loudness in audio (sound pressure level).
Dynamic Range	The difference from softest to loudest in a given audio program (measures in Db).
Effects	Used to modify an audio signal (e.g. reverb E.Q., etc.)
EQ	Equalization (tone control). Adjusting the frequency response.
Feedback	A loop or regeneration caused by the speakers being picked up by the microphone, also caused by a regeneration of room reverberations.
Gain	The amount of level boost in an amplifier or audio system.
Headroom	The difference between the loudest level of an audio signal and distortion.
Hz	Hertz (cycles per second). Unit measuring frequency.
Impedance	the resistance to the flow of AC current. Low impedance (low voltage), high impedance (high voltage).
Input	The point the audio signals enter any audio device.
Khz	K stands for 1000, Hz for Hertz
Limiter	A device that will not allow the level of an audio signal to exceed a preset maximum.
Master Fader	Controls the overall level
Master Tape	Final version of the recording process
MIDI	Musical Instrument Digital Interface. Enable electronic devices to send messages to each other.
Mixer	A device with which multiple signals can be blended and manipulated.
Monitor	A speaker used to listen by the performers or recorders.
Noise Gate	A device that will turn off the audio below a certain preset level.
Omnidirectional Microphone	A microphone that picks up an audio signal from all directions (front or back)
Output	The point in an audio device at which the audio signal comes out.
Pan	A control to sweep the signal from left to right (see stereo)
Phantom Power	A power supply used to boost condenser microphones to live level (mixing board voltage level).
Preamp	An amplifier used to provide low level gain to a signal source
Power Amp	An amplifier used to boost the signal from line level to drive the speakers
Reverb	The sound waves bouncing off hard surfaces (the sound of the room).
Sensitivity	Signal to noise ratio. The difference between the noise floor (no signal) and loudest (undistorted highest level).

Stereo	Left and right channel separation (separate audio program in each).
Trim	A gain control.
VU	Volume unit
White Noise	A signal that contains a continually random sampling of all frequencies and amplitudes within the audio range.

Appendix F: Projects and Assignments

Recording a Radio Jingle (Commercial)

Due Date:

Value:

Jingle writing project. Jingle houses are common in most major centres. A jingle is a commercial. There is an art to writing effective jingles. Try to create a “Hook” or something strong to promote your product and attract consumer attention. Music can be a hook in itself.

Step1. Listen to several radio commercials and give a short report on what catches your attention. Is it the music, the script, the product, the voice, etc? Does the music enhance the product? Is it distracting? Do you walk away humming the tune? Is it memorable? Hand in a short summary of your findings. (250-300 words)

This project involves a radio commercial incorporating speech and a music background. This could be 30, 45 or 60 seconds. The music could be recorded live, Fruity Loops track, keyboard sequences but do not use prerecorded music (copyright issues here). You will be expected to include a professional looking label and a jewel case cover.

You will likely want to use adobe audition or the BR 1600

Your project will be assessed using the following rubric:

A written proposal with approximate timeline and cover page.	5
A CD with label and jewel case label	20
A completed track sheet including all necessary information.	3
Process evaluation, use of class time	12
Total	40

Your final product should include:

- cover page
- proposal sheet
- CD of jingle with professional looking cover. Include title, playing time and company name and contact info. (for example, Canadian Tire, 30 secs. Frank's Jingle House, 902-752-0000)
- franksjingles@hotmail.com)
- track sheet

Radio Commercial Time line Sketch

Group member names: _____

Set up a rough sketch of the timeline for your commercial. Include sound effects, music, speech etc. Layout the approximate duration of each segment.

Ex.: Atlantic Auto Glass

00:00-0:03	0:03-0:05	0:05-0:22	0:22-0:25	0:25-0:30
Sound blast (Gong)	Music starts and fades	Voice over	Musical statement (vocal lyrics)	Music fades in and plays out with fade out

Also determine what you are using for music or sound effects.

List:

Radio Commercial Reviews (student)

Name_____ Date_____

Title **cover (5)** **App. music (5)** **Clarity (5)** **Balance (5)** **Timing (5)** **Total**
(25)

Cover: Does the CD cover look professional and supply the appropriate information?

Appropriate music: Is the music suitable for the product or service being advertised? Is it distracting or complimentary?

Clarity: Are the vocals articulated clearly? Is the sound production of decent quality? Is there background noise interfering? Are effects used and do they help or hinder?

Balance: Is there a good mix between music and vocals? If more than one voice, are they all appropriately balanced? Does the music fade behind the voices enough and at the right time?

Timing: Is the commercial the proper length (30, 45, 60 seconds)? Is there too much/too little music? Is the dialogue timed well?

DJ mix Project

Date finished _____

Group members:

Mix Title: _____

Song title	Start time (CD)	finish time (CD)	Start time (mix)	Finish time (mix)

Stage Plot class project

Due Date: _____

Look up stage plots on the internet of several bands to study details of different layouts.

Design and draw your own stage plot for a band you play in, or an imaginary group.

Make your plot as neat as possible; computer drawings are encouraged but not mandatory. If done by hand, use unlined paper and a ruler.

Please include and show the location of a minimum (add more if like) of the following items with at least one of the optional extras included:

Drum set (full mic set up)

Bass guitar (with DI)

Keyboards (with DI)

Guitar

2 vocalist mics

3 monitors (supply monitor mix lists) ex. : *mix 1: lead vocal, keys, lead guitar*

Name of band ex.: "NNEC Rock Rebels"

Optional extras: back up vocals, horns (sax, trumpet, trombone), percussion (congas, timbales etc.), fiddle, Hammond B3 organ with Leslie's.

Do not draw in mic cables, speaker cables or extension cords.

Label **stage right/left** (as seen from performers view) and **front of stage**.

Final Project

Due date:

This project is a summary of the out of class work you have done this year. You must include the following:

1. Cover page

2. **A detailed stage plot** of one of your events, include stage orientation (SL, SR) microphones, (be specific, which type) monitors, DIs, AC requirements, amps, drums. List all channel assignments as well.

This must look professional, please do this on computer. Name of band, event, date, location etc.

3. Essay section. Include the following

- Describe your responsibilities on this project.
- Describe the tasks of other sound crew members you worked with.
- What difficulties did you encounter and how did you overcome them?
- How would you plan differently next time?
- Were you familiar with all equipment? If not, how did you solve this problem?
- Was there a stage plot for this event? Did it help?
- Was there a written program with this project?
- What suggestions would you make to future sound techs in this course?

4. **Conclusion:** do a brief write up on what you have learned in this course. Was it practical? What other things would you like to do in a course like this? Was there enough time to finish projects? Talk about what you may have enjoyed or not enjoyed about this class.

Your project will be assessed using the following rubric:

Cover page includes name, date and event title	5
Essay portion; minimum 1000 words	20
Typed, double spaced, font size 12	2
Style, organization, spelling, grammar	3
Stage Plot	5
Hours done (6 x 2.5)	15
Total	50

Stage Plot Assignment

Due Date: _____

- 1) Find two different stage plots on the internet and print them off.
- 2) Write a short description on things you learned by researching stage plots. (200 words)
- 3) Draw a stage plot of your own. Make this plot look as professional as possible. Please use a computer. If you do one by hand, use a ruler, make it neat.
- 4) Include this sheet.

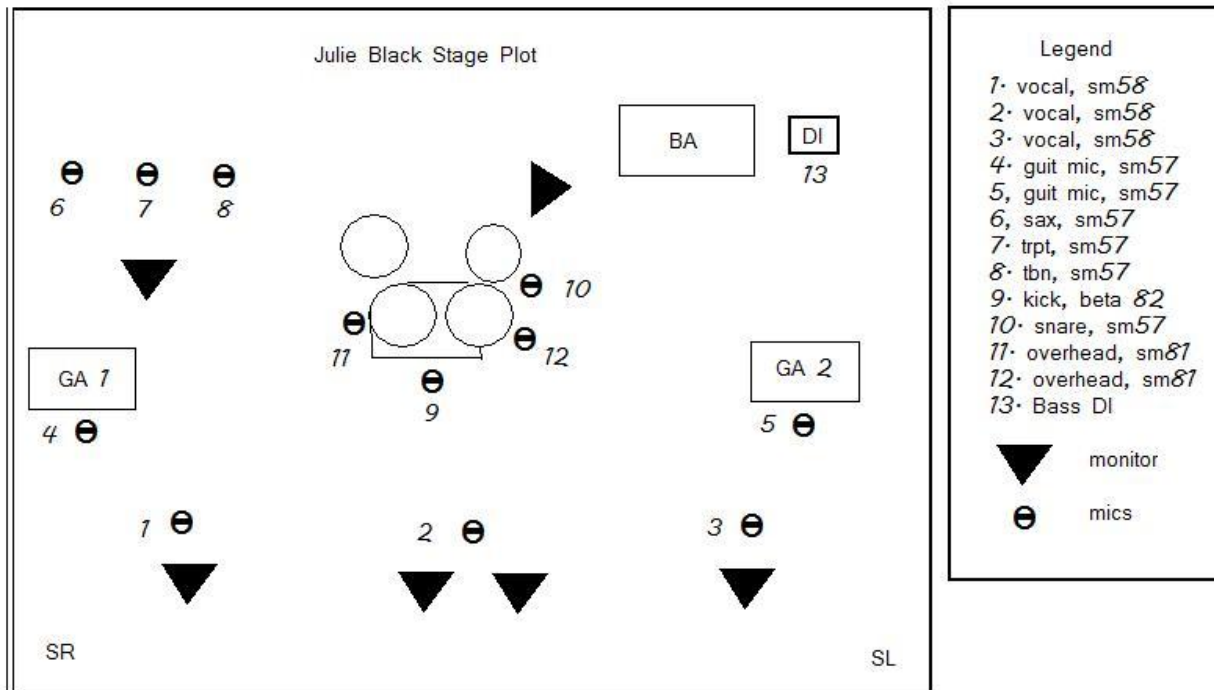
Possible things to include:

Name of your band (real or imaginary)
 Stage left, stage right, front of stage
 Drum set
 Amplifiers for bass, guitar, keyboard
 Percussion
 Back up vocals
 Horn section
 Location of DI boxes
 Microphones (be specific, what kinds of mics)
 Location of monitors
 Main speakers

You will be assessed using the following rubric:

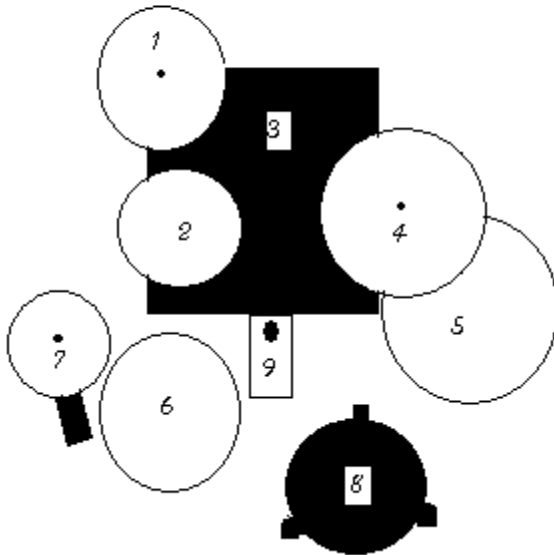
Cover	2
Internet stage plots	3
Write up	10
Original stage plot	10
Total	25

Sample Stage Plot: Julie Black

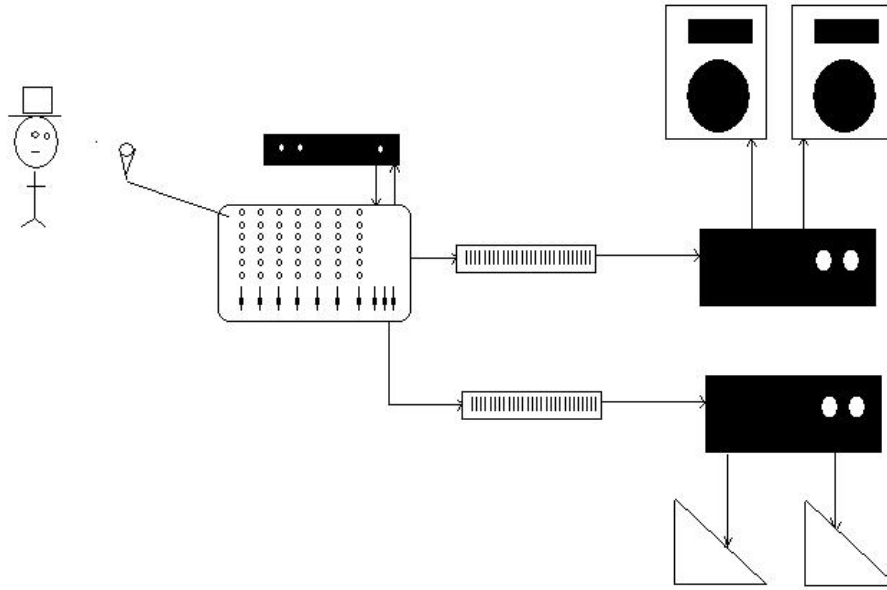


Sample Drum Setup

The drum set:



Signal Path



Research Assignment

With the aid of the internet (or other sources) you are to research one of the following 3 topics. You must use at least 2 sources and acknowledge them by providing a detailed bibliography. This is due on Friday, Sept. 17.

This may be typed or hand written, diagrams welcome.

Topics (choose only one)

1. Explain “MIDI” as it refers to music and computer technology. Please include short descriptions of:

- a) General midi (GM)
- b) Sequencers
- c) Wavetable synthesis

2. A brief history of recording technology from its beginning up to the present day.

Include reference to foil, wax cylinders, records, magnetic tape, compact disc, mp3 etc.

3. Give a detailed explanation of how speakers are constructed and how they operate. Please include:

a) This outline

b) Your essay of at least 200 words (your own, not a download!) 15_____

c) A detailed bibliography of at least 2 sources 5_____

d) A cover page with title, name and date 5_____

Total 25_____

Audio History Assignment:

Due date:

Research the history of recording technology.

Use at least three different sources to gather information on the history of the development of recording processes. You can use the internet, encyclopedias or other sources.

Give information on the timeline and various recording formats that have developed over the history of this technology.

You must provide a bibliography showing exactly where you found your information.

This paper must have the following:

cover page	_____3
content, a minimum of 500 words	_____10
spelling	_____3
typed, size 12 font double spaced.	_____2
bibliography.	_____2

(Diagrams are encouraged, hand drawn or printed)

Total	_____20
-------	---------

Copyright Infringement Research Project

Due Date: _____

Use the internet to research a case of copyright infringement. Look for a case that involves an issue dealing with the music recording industry. There are a number of areas you may wish to investigate such as

Piracy, illegal use of intellectual property such as lyrics, melodies etc.

Your task is to describe the case in your own words. Also give a brief description of what copyright infringement is as it pertains to the music industry. Include your own opinion of this issue as well.

Your typed paper should include:

- 1) Cover page with title and date of article, your name
- 2) 300-500 word summary and explanation
- 3) Bibliography showing where you found your information
- 5) This cover sheet!!

Requirements included	5_____
Spelling grammar	5_____
Essay content	15_____
Total	25_____

Fruity Loops Sequencing Project Number 1

Name(s): _____

Date: _____

Title: _____

Duration: _____ (should be close to 2:00)

Tempo _____

Track number	Pattern number	Time start/end	Instrument	Alterations
1	1	0:00-1:24	Kick drum	Panned left 10 o'clock

Fruity Loops/Garage Band Sequencing Project

Due Date: _____

Class time this week will be used by students to compose a 2 minute song on the “Fruity Loops” or “Garage Band” (Mac) sequencing programs. They should work together in groups of 2- 4 for Wednesday and Thursday to become familiar with the program. Students should work in smaller groups for the remainder of the week. (2-3 people). Try to develop an interesting composition of at least 3 patterns.

Rhythm track
Bass line
Melody as well.

Final project will consist of:

2 minute composition. (one per group) 10

Save on “hand-in” folder

Individual write up (one per student) including:

Cover page, title, name, date 3

Track sheet listing all instruments 5

250 word essay describing your process. You should discuss: 12

Your input, what did you contribute to the overall project

Other group members input.

Group dynamics (how you worked together)

Problems you encountered and how you overcame them

Ideas for future projects, how you might incorporate sequencing into a recording.

Total 30_____

All work may be done in class if time allows.

Please attach this sheet to the back of your essay.

Project conclusions:

Name _____

Please submit one write up for each project completed.

As you finish each project you must submit a final conclusion. This is a reflection on your work and the process you followed. This is a benefit to you for your next project and it helps me when evaluating the project.

Please discuss and include the following for each recording project.

Title of project

Date finished

Final Recording format: CD, DVD etc

Recording device: computer (and program used) BR 1600, CD burner etc.

Group members.

Time line

Track sheet

Stage plot if applicable

Written description of your recording process (length to be determined). This should include comments on your input, other group members input and suggestions for improvements. Problems you encountered and the solutions you came up with. A conclusion describing what you learned, advice to future sound techs etc.

Each student must submit one report for each project.

Projects:

Radio commercial

Own choice #1

Own choice #2

All of these projects should include the following:

a written proposal with approximate timeline (or lyrics)	2
A CD or DVD with label and jewel case label	20
A completed track sheet including all necessary information.	3
An individual write up describing your full process from start to finish. Include ideas on developing ideas, recording process, problems, new techniques used, equipment used and suggestions for future projects. (At least 500 words)	10
Process evaluation, use of class time	15
Total	50

Appendix G Assessment

Review for Recording Arts Quiz

- ☐ Cables: ¼" 1/8", TRS, XLR, RCA, MIDI, Speak on,
- ☐ XLR up to 1000' (Lo Z) ¼" patch up to 30' (Hi Z)
- ☐ High/low impedance (resistance) Hi Z, Lo Z
- ☐ Speaker wires, (2 equal gauge wires)
- ☐ Patch cord, signal wire with braided shield (shield reduces interference)
- ☐ Wire gauges, smaller number = thicker wire ex.: 12 gauge, 14 gauge, 16 gauge
- ☐ Signal paths (explain)
- ☐ Amplifier: boosts line level signal to speaker level
- ☐ Combination amp (various inputs, full range speaker)
- ☐ Equalizer (EQ) used to shape overall frequency response
- ☐ Mixing board, console, mixer, sound board, board (what does it do?) combines signals from various sources to a variety of controlled outputs.
- ☐ Sound source: the point where a signal originates
- ☐ Frequencies: measures pitch, how high/low
- ☐ Hearing range 20-20,000 hertz (cycles per second) or 20 Hz to 20 kHz
- ☐ A 440 Hz: International tuning standard pitch
- ☐ Kiloherztz (1000 hertz)
- ☐ Decibel: volume measurement (60 db quiet, 100 db very loud)
- ☐ Stage plots, stage right, stage left
- ☐ Direct boxes, DI, direct input (converts Hi Z to Lo Z)
- ☐ Speaker parts, magnet, cone, basket, voice coil, dust cap, spider
- ☐ Woofers, hummers, tweeters (low, mid, high speakers)
- ☐ Mixer controls: gain, (sets input level), pan, (hard pan), fader, EQ, aux, mute, PFL, solo
- ☐ Microphones, moving coil, condenser, ribbon (know operating principle and uses of each)
- ☐ Near field monitors (3 foot listening triangle) active and passive
- ☐ Crossover unit: divides frequencies for speakers (low, mid, high) (active, passive)
- ☐ Transients: hard percussive attacks
- ☐ Phantom power: 48 volts from mixer for condenser mics.
- ☐ Ambience: characteristics of room acoustics.
- ☐ Monitors: on stage performer reference speakers

Quiz

Name _____ Date _____

A) Multiple choice 40 points _____ (circle correct answer)

1. A transformer designed to convert high impedance to low impedance
 - a. condenser
 - b. ground lift
 - c. direct box

2. The opposite ends of a snake are known as
 - a. Flange and panel
 - b. Box and Fan
 - c. Broom and dustpan

3. Condenser mics are known for picking up
 - a. low frequencies
 - b. high frequencies
 - c. all frequencies

4. RCA stands for
 - a. Right Centre Axis
 - b. Radio Corp. of America
 - c. Resistant Cable Adapter

5. DC voltage that is supplied to a condenser mic
 - a. phantom power
 - b. ground source
 - c. line level DC

6. A three-point connector found on most microphones
 - a. MIDI
 - b. LCD
 - c. XLR

7. Using lots of reverb is known as a _____ signal
 - a. boomy
 - b. wet
 - c. boingy

8. A shield in a patch cable
 - a. reduces interference
 - b. changes polarity
 - c. strengthens signal

9. A regular patch cord can run up to _____ before losing signal.
 - a. 100 metres
 - b. 100 feet
 - c. 50 feet


10. A decibel is a measurement of
 - a. frequencies
 - b. volume
 - c. notes

11. The person in charge of set up for a show
 - a. director
 - b. stage manager
 - c. janitor

12. "Stage left" and "stage right" refer to the stage view from the
 - a. audience
 - b. stage

- | | |
|--|---|
| 13. A moving coil microphone sounds best when it is_____ the source. | c. box office
a. less than 12" from
b. more than 12" from
c. more than 12 feet |
| 14. The type of connector found on most guitar or "patch" cords | a. speak-on
b. ¼" phone
c. 1/8" phone |
| 15. A musical slang term meaning "no reverb" | a. passive
b. dry
c. unbalanced |
| 16. An example of a balanced cable is a ____ | a. guitar cable
b. speak on
c. TRS cable |
| 17. The optimum hearing range for humans is... | a. 20 Hz to 2,000 Hz
b. 20 Hz to 20,000 Hz
c. 20 db to 20,000db |
| 18. An abbreviation for "low impedance" | a. low l
b. lo Z
c. Limp |
| 19. Another name for a "sound console" | a. compressor
b. rack
c. mixer |
| 20. The ground in a TRS cable is the | a. Sleeve
b. Ring
c. Tip |

B) Label the parts of the Mic Stand _____ 8 points

	<p>1. _____</p> <p>2. _____</p> <p>3. _____</p> <p>4. _____</p>
---	---

D) fill ins 20 points

- 1.) Speakers used in recording control rooms are known as _____
- 2.) They should be placed _____ apart.
- 3.) A _____ attack means “hard” percussive attack..
- 4.) A _____ is a diagram of a band stage set-up.
- 5.) _____ is the term used to describe separate left and right signals .
- 6,7.) Two types of speaker connectors are, _____ and _____.
- 8.) Speakers that face performers on the stage are referred to as _____.
- 9.) The term that describes the tone colour or quality of an instrument or voice is _____
- 10.) **Dynamics** describes the _____ of music.
- 11.) The path that sound travels from its’ point of origin to its’ final destination is known as a _____.
- 12.) _____ is what we call unwanted frequency noise.
- 13.) A logical succession of musical tones is known as a _____
- 14.) An **analog** audio storage medium is a (an) _____
- 15.) A **digital** audio storage medium is a (an) _____
- 16.) _____ means one signal.
- 17.) A locking speaker connector is known as a _____ connector.
- 18.) The delay time of a sound in a room is known as _____
- 19.) A mic stand with a horizontal extension arm is known as a _____ stand.
- 20.) Unscramble this element of music word : THYHRM _____

Portfolio Requirements

- ☐ Weekly reflections
- ☐ Drafts of compositions
- ☐ Programs from concerts (2)
- ☐ Summaries of concerts
- ☐ Recording review
- ☐ Newspaper/magazine articles (2)
- ☐ Reviews of articles (2)
- ☐ Drawings, cartoons, stage plots, creative works (min. 1)

Students are expected to keep all materials in a pocket folder. These will be collected 2-3 times per term. This will account for 10% of your term mark

Radio Commercial Evaluation

Name(s) _____

Commercial _____

Timing (30 or 60 secs.) _____ (3)

Balance between voice ...music _____ (5)

Sound quality _____ (4)

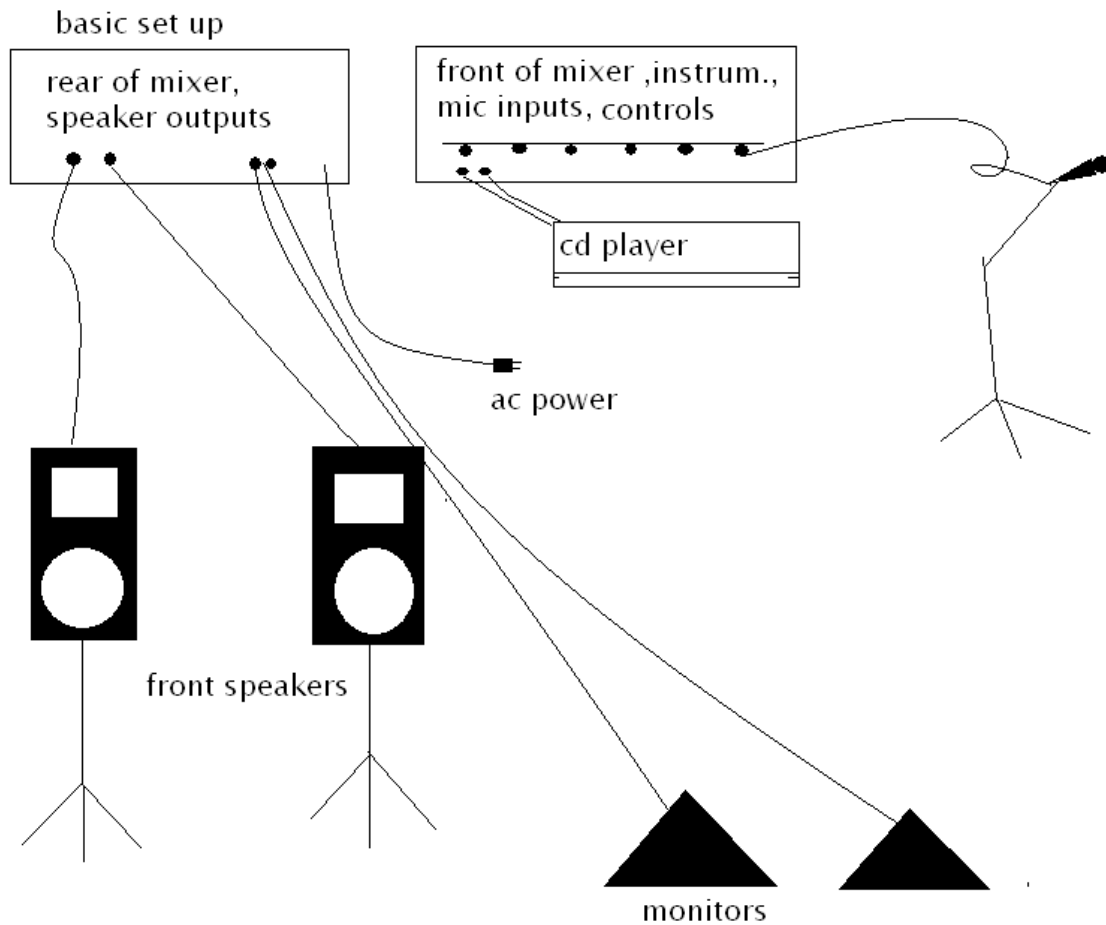
Creativity _____ (3)

Graphics (cover, CD) _____ (5)

Total _____ (20)

Appendix H Blackline Masters

Basic P.A. System



Make sure the “signal path” is logical. Follow from sound source (voice, instrument, CD) through to the speakers.

Make sure microphones go into inputs, and speakers come out of outputs.

Set all gain and volume controls to lowest possible level before powering up! (Use channel mute buttons if you have them.)

Leave mics off or turned down if not in use to avoid feedback.

Basic Sound information

- Rule # 1: Only use PA when absolutely necessary.
- Rule # 2: Keep it simple and neat for looks and safety.
- Rule # 3: Train students to help.
- Rule # 4: Look after the equipment.
- Rule # 5: Buy the best equipment you can afford!
- Rule #6: Location, location, location. (of equipment)
- Rule # 7: **Never** place microphones in front of speakers.
- Rule # 8: Get rid of distortion whenever possible.
- Rule # 9: Learn how to use the equalizer!
- Rule # 10: Good live sound = good recordings.

Minimum equipment suggestions for most applications:

- 1)*A simple “powered” 6-8 channel mixing console with:
 - Front speaker and stage monitor outputs.
 - Equalizer
 - Built in effects, reverb, delay
 - Phantom power (for condenser mics)
 - XLR, 1/4”, RCA
- 2) Lightweight, pole mounted 2 way speakers (sug. minimum 12”)
(Unpowered, unless you are using a non-powered mixer)
 - Mackie
 - Yamaha
 - JBL
 - Electro voice
 - Yorkville
- 3) Good quality microphones: (moving coil and condenser if possible)
 - shure,
 - audix,
 - AKG,
 - Sennheiser.
- 4) Best quality mike stands, boom with tripod preferred (KLM) (cheap stands fall apart quicky)
- 5) High quality XLR microphone cables and speaker cables, Digiflex, mogami, shure.
- 6) Good quality heavy, grounded extension cords and power bars. (with power indicator if possible)
- 7) Monitors: optional speakers for performers

“powered” means: complete with internal amplifier. Unpowered mixers require the addition of a power amplifier or self powered speakers (more set up time and expertise)

Some other suggestions, reminders.

Use condenser mics for broad pick up (choirs, bands)

Use moving coil mics for close pick up range (vocal/instrument solos, emcee less than 6" from the source)

Have a secure case for various components and a secure place to keep them. This kind of equipment is very appealing to vandals.

A padded case for microphones with numbered slots helps to keep track of inventory.

Always wrap cables and cords properly. This makes set up easier and protects cables.

Avoid any unnecessary strain when handling cables, will cause damage.

Use leather ties or Velcro to fasten.

Keep duct tape, electrical tape, masking tape on hand.

A few simple tools will come in handy as well, screwdrivers, pliers etc.

Arrange regular clinics with pros whenever possible. Make sure students attend as well.

Students enjoy the responsibility of looking after this type of job. Make them your DJs, sound techs etc. Buy them t-shirts.

Recording options:

Tape

MP3 player

CD recorder

Mini disc recorder

Computer software

D.J. Service Planning Sheet

Recording Arts Class DJ Service

Schedule (2 DJs per ½ hour shift)

8:00-8:30	_____
8:30-9:00	_____
9:00-9:30	_____
9:30-10:00	_____
10:00-10:30	_____
10:30-11:00	_____

Set up crew: _____

Tear down crew: _____

Sample Recording Review

Artist: “Maynard Ferguson and Big Bop Nouveau”

Album: *One More Trip to Birdland*

Song: “Milestones”

Composer: Miles Davis

Recorded by: Concord Records, Concord, Ca. 1996

Instrumentation: 4 trumpets
1 trombone
2 saxophones
drums
percussion
bass (acoustic and electric)
electric guitar

My observations:

This is a very complex big band jazz arrangement. The tune opens with a piano solo accompanied by the bass and drums. The tune is played by the horns before going into a muted trumpet solo, followed by a long tenor sax solo. The brass plays some background parts under the sax near the end of the solo.

The muted trumpet takes another solo then we hear a piano solo and the band comes back in with the tune. The solo trumpet screams over the top of the band and the tune plays out with the distorted guitar and bass taking a short interlude.

I thought there was excellent production on this album. All instruments were well balanced throughout and solos were always up front. The dynamics were heard throughout this album with minimum compression being used. I would say there was a transparent texture to the recording with little background noise and no unnecessary effects added. There did seem to be some reverb on the sax and trumpet solos and of course, we heard distortion on the guitar solo.

I would give this album a rating of five stars.

Introduce Yourself

NAME _____

PARTNERS _____

1.) WHAT STYLE(S) OF MUSIC DO YOU LIKE TO LISTEN TO?

2.) WHO ARE YOUR FAVORITE MUSIC ARTISTS?

3.) WHAT EXPERIENCE/BACKGROUND OR INTERESTS DO YOU HAVE IN SOUND TECHNOLOGY RELATED TOPICS?

4.) WHAT DO YOU HOPE TO LEARN/DO IN THIS COURSE?

Sound tech terms

Connectors

Rca
 ¼" phono 1/8"
 speak-on
 TR
 TRS (tip ring sleeve)
 MIDI
 XLR
 Banana connectors
 HiZ
 LoZ
 Sheild
 D.I.
 HZ
 Khz
 Frequency
 Db
 Dispersion
 Speaker parts
 Spider
 Flex wires
 Magnet
 Back plate
 Pole piece
 Top Plate
 Cone
 Voice coil
 Basket
 Surround
 Dust cap
 Separation

All slang terms

Mixer
 Console
 Board
 Mixing board
 Pan
 Hard pan
 Gain
 Strip
 Aux

Bus
 Mono
 Stereo
 Reverb
 Dry
 Transient attack
 Stager left
 Stage right
 Rack
 Road case
 Balance
 DC
 Accentuation
 Fader
 LED
 LCD
 VU
 EQ
 Roll off
 PFL
 AFL
 Compressor/limiter
 VCA (voltage control amplifier)
 Feed back
 Distortion
 Impedance
 Stage plot
 Boom stand
 Clipping
 Snake
 Adapter
 fan
 Phantom power (48V)
 Wire gauges: #12, 14, 16 etc.
 (corresponding lengths)

Microphones
 Condenser
 Moving coil
 Ribbon

FACTOR
 ECMA

ECMA

ACOA

Burning Audio CDs from Adobe Audition

This is after you have completed all recording of tracks of course

- 1) open “multi-track” view
- 2) Drag selected track from file list in the left window into a track in the multi-track view.
- 3) highlight track
- 4) under the file menu, select “export” (audio track)
- 5) name your new track in the save window and save type as “windows PCW.wav”
- 6) save this new file in a designated folder
- 7) repeat steps 1-6 for all desired tracks
- 8) open the folder containing these tracks
- 9) right click on a track in this folder and select “add to burn list”
- 10) repeat this for all tracks you wish to put on your CD
- 11) when all tracks are compiled in the media player burn list, proceed to “start burn”