

**Associated Colleges of the South  
Mellon Foundation Faculty Renewal Grant**

**Interdisciplinary Music Technology  
Curriculum Design and Implementation**

**Rollins College  
Winter Park, Florida**

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Award Amount: \$5,500

**Summary**

Our research into "Interdisciplinary Music Technology Curriculum Design and Implementation" successfully resulted in a new curricular area of emphasis for Rollins College's Computer Science and Music majors. The new curriculum provides a study of the concepts and methodology employed in digital sound production. Three new Music Technology and Sound Recording courses were developed, approved, and taught during the 2009-2010 academic year. An existing Music Technology course was modified and integrated into the new emphasis area. Two existing Computer Science courses, along with an existing Physics course, were also adapted to satisfy the goals of the new curriculum. Our new area of emphasis was implemented nearly one year ahead of the proposed schedule. As a result of this project, we now plan to move forward with the creation of an Interdisciplinary Minor for our new curricular program. We plan to present this to our Academic Affairs Committee for review and approval in Fall 2010.

**Project Goals and Objectives**

Rollins College's two principle investigators originally proposed to research the development of an Interdisciplinary Music Technology curriculum. We have observed over the past several years numerous students who are double majors in both Music and Computer Science – yet we did not have a set of courses that focused on the blending of their interests. Therefore, we proposed to identify the requirements for an interdisciplinary curriculum that would allow students to explore the overlap of these two disciplines. We believe that liberal arts colleges with their emphasis on interdisciplinary studies are uniquely positioned to offer their students an opportunity to study the concepts and techniques used with sound systems and music production.

Due to the interdisciplinary nature of our research goal, we established multiple objectives for our investigation. Our prior knowledge with this topic focused our initial project objectives on

the following areas:

- *Music and Sound Recording*: investigate the existing music technology and sound recording courses in the Rollins' Music Department to identify those courses that may contribute to the new curriculum
- *Software Development*: investigate the existing software development courses in the Rollins' Computer Science Department to identify potential, supporting courses
- *Acoustics and Electronics*: investigate the existing courses in the Rollins' Physics Department for potential courses
- *Interdisciplinary Courses*: investigate other departments at Rollins for existing courses that could contribute to our goal. Our initial belief was that the Theater and Critical Media Studies Departments would have supporting courses.
- *New Course Development*: after the above investigation was complete, identify any new courses that would be required to satisfy the curricular goal as well as which department would be involved in new course development
- *Equipment, Software, Facilities*: investigate the current state of the equipment, software, and physical spaces in the Music and Computer Science Departments for updates necessary to meet the curricular requirements. Initially, we identified the following equipment as necessary:
  - \* Neumann D-series Microphones, KM184
  - \* RME DMC-842 8-channel AES 42 digital microphone computer interface with a MADI option
- *Capstone Course*: investigate the effectiveness of a capstone course

Our goals were not substantially revised during our research/development period. However, after reaching our conclusions on the new curriculum, we recognized that our anticipated equipment needs would be better met with a complete multi-channel sound recording system. Because of rapid technological development and market place conditions, we were able to increase the proposed equipment capabilities and purchase a complete multi-channel system. The grant's budget, however, was not exceeded when the equipment was acquired. Rollins provided more than three times the grant amount to see that facility updates, including an audio control room, are completed by the beginning of 2010-2011 academic year.

## **Discussion**

Our motivation for this research came from our observation that over the past several years many of our students were double majors in both Music and Computer Science. However, we did not have an integrated course of study that offered these students an opportunity to study the intersection of the two disciplines. After hiring a new faculty member in the Music Department (one of the Principle Investigators), the necessary "critical mass" of faculty talent and interest to pursue this particular curricular goal was achieved. The authors consider the term, Music Technology, to be only a working title for the overall curriculum that we developed. We plan to create a more liberal arts oriented title for the program in the near future.

Our pre-proposal activity revealed that while Music Technology is a major/minor at many institutions, it was not a common course of study within the Associated Colleges of the South (ACS). Only Birmingham-Southern and Furman had any curricular offerings in this area. This fact led us to apply for this grant to investigate both the establishment of an interdisciplinary curriculum at Rollins as well as how to provide guidance to other ACS institutes that may want a similar program.

We began our research by identifying the kinds of courses typically included in a curriculum for the music technology area. We identified that courses for a Music Technology curriculum needed to be offered in the following areas with the noted objectives.

### Digital Music Technology

Our initial plan was that we would need the following three digital music oriented courses introducing the noted software packages:

- Music Notation and MIDI – using Finale and Digital Performer software
- Digital Audio – using ProTools, Logic, and Acid software
- Synthesis and Advanced MIDI – using both software and hardware synthesizers, Reason and Reactor with Digital Performer, ProTools, Logic, and Acid software.

The desired student learning outcomes from this Digital Music Technology sequence include the knowledge of, vocabulary, and methodologies to use computers to create, compose, and arrange music compositions. We expect that students should be able to analyze and solve technical issues involved with the associate software packages. Students should be able to synthesize and apply concepts from this course sequence to new compositional tools and systems.

### Sound Recording

We also initially identified three courses to cover the required concepts in Sound Recording:

- Introduction to Music Recording and Production
- Stereo Recording Techniques
- Multi-track Recording and Mixing Techniques

Learning outcomes for the Sound Recording courses include the knowledge of, vocabulary, and methodologies to use microphones, small and large format mixing consoles, signal processors, and analog and digital recording systems. Students should be able to demonstrate proficiency with current, industry standard, hardware and software systems for sound recording. In addition, students should be able to diagnose and resolve technical issues relative to sound recording as well as be able to synthesize and apply their conceptual knowledge to new recording systems.

### Software Development

Due to the software-based nature of the systems used in the Digital Music Technology and Sound Recording courses, we determined that students needed to have a solid grasp of the concepts and skills required to develop software. The following two courses were identified as

being capable of solving this objective:

- Introduction to Computer Programming
- Data Structures

These courses explore the methodology for developing software programs using the Java programming language. Student outcomes include understanding the concepts underlying class design and definition, memory usage, flow of control constructs, and array data structures. In addition, students should understand algorithmic development and software development and testing methods.

### Physics

We initially identified that the following courses, typically taught in the Physics Department, would benefit students' overall understanding of the proposed curriculum:

- Acoustics
- Introduction to Electricity and Electronics

Student learning outcomes would include the knowledge of the physical properties of sound as well as signal flow and circuit theory as applied to both analog and digital audio devices.

### Interdisciplinary Electives

Because of the broad nature of Music Technology as a discipline, we initially envisioned elective courses from the following areas:

- Live Sound for Theater and Concerts
- Creating Electro-Acoustic Music
- Video Editing
- Audio Recording for Video
- Music Production

We believed that offering these electives to the Music Technology curriculum would offer students an opportunity to explore the unique aspects of the discipline.

### Capstone Course

Because we were investigating an interdisciplinary program, we planned to have a capstone course. This project-oriented course would provide students with an opportunity to witness the full spectrum of concepts involved in the new curriculum.

During the project we discovered that we had initially planned enough courses to have a complete major as opposed to an interdisciplinary minor or concentration. Discussions with our Department Chairpersons as well as with the Chair of the Academic Affairs Committee revealed that a minor, containing 6 or 7 courses, was the maximum size that could be approved.

Our final curriculum for an Interdisciplinary Music Technology emphasis and potential subsequent minor includes the following courses. Note that these courses all now exist within the

Rollins College catalog. The individual syllabus for each course is contained in the Appendix.

### **Music Department**

The following courses provide the requirements identified about for both the Digital Music Technology and the Sound Recording categories:

- MUS 190 – Introduction to Music Technology
- MUS 388 – Advanced Music Technology
- MUS 286 – Introduction to Sound Recording
- MUS 386 – Advanced Sound Recording

MUS 386 was first taught Fall 2009 as a special topics course and was approved as a permanent course during that term. MUS 388 was first taught Spring 2009 as a topics course in anticipation of this project, and taught again Spring 2010. MUS 286 had previously been taught as a special topic several times, was modified and approved during Fall 2009, and taught both Fall 2009 and Spring 2010 under the modified curriculum. MUS 190 was an existing course that was modified to fit the needs of our new emphasis area and taught during both Fall 2009 and Spring 2010. As a result of this grant project, each course was developed into a permanent course and approved by the Academic Affairs Committee (AAC) in Fall 2009.

### **Computer Science**

The following courses provide the necessary concepts, knowledge, and skills to support the Software Development topics:

- CMS 167 – Introduction to Computer Programming
- CMS 170 – Computer Science Principles I

Both of these are existing courses, however the CMS 170 course was modified slightly to expand the coverage of an array of data structures to include topics and lab activities on digital sound storage.

### **Physics**

The following course exists within the offerings of the Rollins Physics Department and will satisfy the Acoustic requirement:

- PHY 115 – Physics of Musical Instruments

In order to stay within the constraints typically imposed on a minor at Rollins, we decided to move forward with the new curriculum with the seven courses (maximum allowed) identified above. Therefore, plans for a course in electronics as well as the capstone course were eliminated. In addition, plans to include additional interdisciplinary courses have been put on hold until the minor is approved and taught.

The Interdisciplinary Music Technology course sequence is the following: Intro to Sound Recording, Intro to Music Technology, Advanced Sound Recording and Advanced Music Technology. Science courses to be taken concurrently are Intro to Computer Programming CMS

167, the second programming course, CMS 170, and PHY 115 – Physics of Musical Instruments. These seven courses present the body of knowledge required to address the methodologies and theory used in the field of music technology. This knowledge is designed to be useful well into the future, as it is not based on any specific hardware or software.

### **Evaluation/Assessment**

Assessment of the new curriculum will entail a multi-year process using Rollins' existing Course/Faculty Evaluation system. Students perform evaluations of their courses using this system at the end of each term. Since we have already taught all of the courses included in the new curriculum, we already have assessment data now. The critical courses are the new Music Department courses that were taught for the first time during the 2009-10 academic year.

The evaluation of the new Music Technology courses were as follows:

- Music Technology Courses Spring 2009 Averages: Course 4.63, Professor 4.81. (College averages: 4.17 & 4.34.)
- Music Technology Courses Fall 2009 Averages: Course 4.22, Professor 4.56. (College averages: 4.12 & 4.3.)
- Music Technology Courses Spring 2010 Averages: Course 4.55, Professor 4.64. (College averages: 4.22 & 4.39.)

As you can see by comparing with the college averages, the new courses were well-received by the students.

When we produce our first graduating class, we will meet individually with each student to obtain feedback to assist us in evaluating the program as a whole.

### **Institutional Impact**

Our new area of emphasis has explored a collaborative partnership between the departments of Computer Science and Music at Rollins. This partnership has successfully created an applied practical approach to the integrated study of several disciplines that is consistent with Rollins' liberal arts mission. This program was proposed in response to existing student interests, and has successfully addressed their desires as evidenced by the positive course evaluations.

There will be minimal impact on the faculty, because all of the courses for the program now exist and have been taught. Students in both our traditional degree track, Arts & Sciences, and evening Holt School programs, will be able to take this program. Our new emphasis area will provide Admissions with another student recruitment tool. Our emphasis and potential minor fits well within our existing Computer Science and Music majors. To support the program, a new Sound Control Room in our Keene Music Building is in the final stages of completion, and will be operational by the Fall 2010 term.

## **Lessons Learned**

An obvious lesson learned is that development of an interdisciplinary curriculum requires “buy-in” from the Chairs of all departments involved in the curriculum. Depending on the management style of the institution, this may or may not be a serious issue. At Rollins, we had strong support from the chairs of both Computer Science and Music departments before we began our investigation. Throughout our research activity we provided updates to both Chairs to keep them both informed of our progress and ideas as well as to ensure their continued acceptance of the curriculum we were developing. This was especially critical when we realized that the number of courses we originally identified may be more than would be acceptable to the Academic Affairs Committee (AAC), the governance committee at Rollins responsible for all curricula changes, as well as the faculty as a whole.

The early inclusion of the governance committee responsible for the curricula was another lesson learned. As mentioned earlier, we had originally planned too large a curriculum for what constitutes a minor at Rollins. We met with the Chair of the AAC individually to discuss our plans prior to submitting a proposal to the full AAC. This meeting clarified for us the number of courses that typically are acceptable for an interdisciplinary minor and led to our re-structuring of the curriculum to only seven courses. In addition, the meeting with the Chair of the AAC identified where in the curricula our new program would best fit. Instead of being a minor in the Math Department, our new curriculum would be placed with the several interdisciplinary programs already existing in the Rollins curricula.

Our final lesson learned is that naming this program is more difficult than it appears. We have used “music technology” as a working title but never felt that it was the proper title. Our discussions with others have affirmed our feeling. We need a “more liberal arts” title for our new program that would fit with our other interdisciplinary programs.

## **Financial Report**

## **Future Plans**

Our next activity is to present our new curriculum to the full AAC in the Fall. After meeting their requirements, our new interdisciplinary program (with a new name), will be incorporated into the

Rollins curricula. All interested students have been advised that the program is coming, and since all of the courses currently exist, the students have been making progress toward completing the program during the past academic year. We are hopeful that with a formal announcement about the program we will increase the number of both existing and new students studying this new area.

Originally, we had planned a multi-day workshop to assist colleagues at other ACS institutions with developing similar programs. However, given the current fiscal environment within higher education, a multi-day workshop may not now be economically feasible. We feel that our work resulted in an easily understood approach to establishing an interdisciplinary program involving Computer Science and Music. We hope that we will be able to disseminate our findings to others with this report and follow-up through direct communications with any interested colleagues. We have also considered hosting a Webinar on our research.

Over the next two academic years, we plan to closely monitor student assessments of these courses as well as the new interdisciplinary program to gain insights on possible improvements. As is typical with a new program, we fully expect to find that some of our ideas do not result in the outcomes we currently expect. After we graduate our first students from the program, we will do a complete assessment using their feedback to determine appropriate modifications.

## **Appendix**

Attached are individual syllabi for each course within the new program.

**Rollins College**  
**Department of Music**

**Intro to Sound Recording - MUS 286**

Spring 2010, TR 2-3:15 PM, in Keene Hall, Room 104

Professor: Sigmund Rothschild, Ph.D.

Office: Keene Hall, 211. Voice: 407-691-1148

Email: srothschild@rollins.edu

Office Hours: TBA and by appointment

**Course Syllabus**

**Course Description**

Intro to Sound Recording examines the methods and technologies used to record, edit, format, manufacture and distribute music. This course provides the musician with an understanding of how to produce their own recordings. This course follows the recording chain from the sound source to monitoring, storage, production, and distribution of the final product. Entrepreneurship within music production is emphasized throughout this class. This course also emphasizes direct to two-track recording techniques used for classical and chamber music.

**Prerequisite**

None

**Required Text**

*Modern Recording Techniques*, Sixth Edition (Paperback)

by David Miles Huber (Author), Robert E. Runstein (Author)

Publisher: Focal Press; 7th edition (2010)

ISBN: 978-0-240-81069-0

**Required Materials**

"Professor's Packet" provided online in .pdf files.

**Attendance Requirements**

The Music Department does not differentiate between excused and unexcused absences. You are urged to use absences carefully. You are granted three (3) absences gratis. After that, your term average will be reduced by 4% per absence, which will effectively lower your grade a degree (e.g., B to B-). Your three "free" absences cover everything including emergencies. Be sensible in using them. It is always a good idea to document all absences by informing the Dean of Student Affairs in Arts and Sciences or the Dean's office in Hamilton Holt. Those offices will send an e-mail to all professors in your class schedule informing them of your absence and the reason for it. Never will you be excused for a legitimate fourth absence (or more) without documented prior absences. Lateness to class will be recorded. Three late arrivals will turn into one absence. Missing more than twenty minutes of the class (i.e., arrival after 2:20), will count as an absence.

## **Lab Equipment**

Of particular importance is the proper care and use of the computer lab and recording studio equipment. Any improper treatment or use of the lab's equipment will not be tolerated. Classes are conducted with each student at a computer and music workstation. It is expected that you give your attention to the instructor and not to browsing the web, checking email, work for other classes, and other distractions afforded by computer access.

## **Research Paper**

Each student will write a research paper on how sound is produced and microphone placements for their major instrument or voice. If a student does not play an instrument or sing, a choice will be assigned by the professor. This paper is to be typed, double spaced and be of at least six pages in length. Each student will give a ten minute in class presentation of their findings.

## **Test and Quiz Formats**

Three tests will be given during the course. The three tests are weighed equally and cover concepts from the class discussions, reading and studio work. These tests may include multiple choice, true or false, short answer and fill in the diagram. The Final Exam/Test Three covers materials from the last third of the course and is not cumulative.

## **Grading Policy**

The total points you accumulate will be divided by the total number of points possible on tests, quizzes, the research paper and class attendance/participation. These are worth the following:

Tests and Quizzes 60%

Research Paper 25%

Participation /Attendance 15%

Perfect attendance, no missed classes for any reason, receives a 3% bonus to overall semester grade.

An extra credit project will be credited from 2-10%, added to overall semester grade, at the professors discretion.

The resulting percent will determine your final grade as follows:

90 -100% = A

80 - 89% = B

70 - 79% = C

60 - 69% = D

0 - 59% = F

Any percent ending with .5 or above will be rounded up, while those ending with .4 and below will be rounded down. (Example: 89.5 = A-, 89.4 = B+) Rollins' Catalog Grade Definitions:

Grade 'A' is reserved for work that is exceptional in quality and shows keen insight, understanding, and initiative.

Grade 'B' is given for work that is consistently superior and shows interest, effort, or originality.

Grade 'C' is a respectable grade. A 'C' average (2.00) is required for graduation. It reflects consistent daily preparation and satisfactory completion of all work required.

Grade 'D-' is the lowest passing grade. It is below the average necessary to meet graduation requirements and ordinarily is not accepted for transfer by other institutions.

Grade 'F' is failing.

## Course Outline

<u>DATE</u>	<u>TOPIC</u>	<u>READING</u>
Jan. 12	Introduction and Historic Overview	Ch. 1
Jan. 14, 19 Jan. 21, 26	Sound, Hearing and the Acoustics of Music	Ch. 2/Handouts
Jan. 21	Research Topic Due in Class	
Jan. 28 Feb. 2	Electrical Power and Cables	AC Power Handout Connectors Handout
Feb. 4, 9	Microphone Design	Ch. 4
Feb. 11	Paper Bibliography Due in Class	
Feb. 11, 16	Microphone Applications	Ch. 4
Feb. 18	Test 1	
Feb. 23, 25 Mar. 2, 4	Mixers and Recording Consoles	Ch. 13
Mar. 16, 18 & 23	Signal Processors	Ch. 14
Mar. 23	Paper Draft Due in class	
Mar. 25, 30	Amplifiers, Loudspeakers and Monitoring	Ch. 12 & 16
Apr. 1	Test 2	
Apr. 6, 8	Digital Recording	Ch. 6
Apr. 13	Term Papers Due	
Apr. 13, 15	Recording with Digital Audio Workstations	Ch. 7
Apr. 20, 22	Music Production and Studio Procedures	Ch. 20
Apr. 27	CD Mastering and Product Manufacturing & Term Paper Presentations	Ch. 18 & 19
TBA	Final Exam/Test 3	

## **Classroom Policies**

*Blackboard* is the course Web site. Access it at <http://blackboard.rollins.edu> or go to the Rollins home page (<http://www.rollins.edu>) and access it from the drop-down menu at "Campus Logins." Your login is your Rollins e-mail username. Your password is initially the last six digits of your R-number. Once logged in, you should change your password by clicking the **Tools** button and then **Personal Information**.

- a.) Announcements are posted on the opening page of Blackboard. Make it a point to login frequently.
- b.) Course documents are posted in the **Documents & Info** area.
- c.) You can check your grades in the **WebGrade** area.

## **Disabilities**

Rollins College is committed to equal access and does not discriminate unlawfully against persons with disabilities in its policies, procedures, programs or employment processes. The College recognizes its obligations under the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 to provide an environment that does not discriminate against persons with disabilities.

If you are a person with a disability and anticipate needing any type of academic accommodation in order to participate in this class, please make appropriate arrangements with Gail Ridgeway, Disability Services Coordinator, located in the Thomas P. Johnson Student Resource Center, 407.646.2354, e-mail. [gridgeway@rollins.edu](mailto:gridgeway@rollins.edu)

## **The Academic Honor Code**

Membership in the student body of Rollins College carries with it an obligation, and requires a commitment, to act with honor in all things. Because academic integrity is fundamental to the pursuit of knowledge and truth and is the heart of the academic life of Rollins College, it is the responsibility of all members of the College community to practice it and to report apparent violations.

The following pledge is a binding commitment by the students of Rollins College:

*The development of the virtues of Honor and Integrity are integral to a Rollins College education and to membership in the Rollins College community. Therefore, I, a student of Rollins College, pledge to show my commitment to these virtues by abstaining from any lying, cheating, or plagiarism in my academic endeavors and by behaving responsibly, respectfully and honorably in my social life and in my relationships with others.*

This pledge is reinforced every time a student submits work for academic credit as his/her own. Students shall add to all papers, quizzes, tests, lab reports, etc., the following handwritten abbreviated pledge followed by their signature:

**"On my honor, I have not given, nor received, nor witnessed any unauthorized assistance on this work."**

## **E-Mail**

You are responsible for checking your Rollins e-mail account for messages that I mail to the class. Your Rollins e-mail is your default e-mail address. Make sure it is active.

### **Courtesy**

Certain behaviors are disruptive to the class. Attend class on time — it is very distracting to have people walking in once class has started. Taking a rest room break during class will be recorded as a late arrival. If there are medical circumstances that interfere with your presence during a 50-minute class, those circumstances must be documented.

Turn off your telephone while in class. Food and drink is disallowed in Keene Hall. Bottled water in a screw-top bottle, however, is allowed.

### **Tests**

Tests are administered on the days marked in the course outline. In the case of a legitimate absence from a test with advance notification, a make-up will be offered. Excuses for a missed test after the fact will not be accepted.

### **Attendance Policy for Tests**

Failure to appear at an announced test/quiz will result in a grade of zero for that test unless you have been involved in an serious accident. Late arrivals at announced tests will have the remainder of the time to finish. Extra time cannot be granted, and normally audio examples will not be repeated.

### **Make-up Policy**

A make-up will be granted in the following circumstances: an official Rollins event that takes you away from campus; a religious holiday; personal or family emergencies. absence about which you know in advance must be communicated to me at the earliest possible time, and it must be documented. All make-up tests must be completed no later than 48 hours after the scheduled test. Make-up tests may be different from the scheduled tests.

### **Return of Student Work**

Papers, projects and tests grades will be returned directly to the students either during class time or in office hours.

### **Extra Credit Concert**

On a date TBA the Professor may give a concert of recent computer based compositions or speak publicly about current trends in music technology. You will have the opportunity to receive 2% extra credit for your attendance.

### **Final Examinations**

The 15<sup>th</sup> week of classes in the fall and spring terms is reserved for final examinations. All courses include a final examination, with possible exceptions for performance, writing, independent study, or seminar courses where other means of evaluation are more appropriate.

The final examination must be offered in the time period scheduled in the examination matrix prepared by the Office of Student Records, unless the Dean of the Faculty has approved a change. An alternative period for unusual examination procedures, such as an oral examination, may be used provided the students involved do not thereby encounter conflicts with other scheduled examinations.

Tests or examinations may be offered through the 13<sup>th</sup> week (penultimate) of classes but must not be employed in lieu of a final examination.

Final papers, research reports and other similar assignments, except those in lieu of a final examination, should be due before examinations begin to help students avoid conflicts.

If a student has more than two final examinations scheduled in one day, s/he has the right to reschedule one examination to an open date within the final examination period. Arrangements will be made through the Dean of Students or program Dean in consultation with the faculty members involved.

Department chairs are responsible for overseeing the implementation of the final examination policy. (Faculty Handbook)

**Rollins College**  
**Department of Music**

**Advanced Music Technology - MUS 388**

Spring 2009, MW 2:00-2:15 PM, in Keene Hall, Room 104

Professor: Sigmund Rothschild, Ph.D.

Office: Keene Hall, 211. Voice: 407-691-1148

Email: [srothschild@rollins.edu](mailto:srothschild@rollins.edu)

**Office Hours: TBA and by appointment**

**Course Syllabus**

**Course Description**

Advanced Music Technology - MUS 388, is a study of the principles and applications of digital technology to music composition. This class investigates intermediate and advanced concepts pertaining to the creation of electronic and electro-acoustic music then applies these concepts with hands-on lab work. Topics will include digital audio workstations, MIDI sequencers, digital signal processing programs, and music distribution on optical disc and computer based mediums.

**Course Prerequisites**

Introduction to Music Technology, MUS 190 or the permission of the instructor.

**Required Text**

Introduction to the Creation of Electroacoustic Music, 1st Edition

Samuel Pellman

ISBN-10: 0534214509

ISBN-13: 9780534214500

**Required Materials**

USB Flash Memory Drive

**Attendance Requirements**

The Music Department does not differentiate between excused and unexcused absences. You are urged to use absences carefully. You are granted three (3) absences gratis. After that, your term average will be reduced by 4% per absence, which will effectively lower your grade a degree (e.g., B to B-). Your three "free" absences cover everything including emergencies. Be sensible in using them. It is always a good idea to document all absences by informing the Dean of Student Affairs in Arts and Sciences or the Dean's office in Hamilton Holt. Those offices will send an e-mail to all professors in your class schedule informing them of your absence and the reason for it. Never will you be excused for a legitimate fourth absence (or more) without documented prior absences. Lateness to class will be recorded. Three late arrivals will turn into one absence. Missing more than twenty minutes of the class (i.e., arrival after 2:20), will count as an absence.

## **Lab Equipment**

Of particular importance is the proper care and use of the computer labs equipment. Any improper treatment or use of the lab's equipment will not be tolerated. We will spend some time in class working on assigned projects with assistance of the professor. But, it is expected that work on projects will be also pursued in the lab *outside of class hours*. Access times to the lab will be posted.

Classes are conducted with each student at a computer and music workstation. It is expected that you give your attention to the instructor and not to browsing the web, checking email, work for other classes, and other distractions afforded by computer access.

## **Class Assignments**

In addition to the assigned reading, each class member is expected to respond to specific assigned lab projects related to course content. As a rule, at least two (2) hours of preparation are needed for each hour of class. This time would normally be spent studying the text, perusing class notes and computer lab time in Keene Hall room 104. During the course of the semester, either a test will be given or a lab project will be due each week beginning with the fourth week.

## **Test Formats**

During the course, a total of three tests will be given, one after each unit. Each test is weighed equally and covers concepts from the reading, lab work and in class discussions. These tests will include multiple choice, true or false, short answer and fill in the diagram. The final exam is the last test of the four and is not cumulative.

## **Lab Formats**

Three lab projects are included in this class. All equipment, software and materials to complete the Labs are provided in Keene Hall room 104. Each lab project is weighed equally and applies material from the reading and class discussions to actual musical practice.

## **Extra Credit Project**

An extra credit project may be done as a fourth lab. Extra credit projects are due at the end of the Final Exam period. It is encouraged that the student pick materials they would like to work with at the beginning of the semester and that the extra credit project is a culmination and extension of procedures used during the semester. A student may present their extra credit project to the class before the final exam review to receive class participation credit. A student will only be able to use equipment available in room Keene 104 for extra credit projects. No special equipment arrangements will be made.

## **Extra Credit Concert**

On a date TBA the Professor may give a concert of recent computer based compositions or speak publicly about current trends in music technology. You will have the opportunity to receive 2% extra credit for your attendance.

## **Final Grade**

The total points you accumulate will be divided by the total number of points possible on tests, labs, final project and class attendance/ participation. These are worth the following:

Three Tests and Quizzes	45%
Three Lab Projects	45%
Participation	10%

The resulting percent will determine your final grade as follows:

90 -100% = A

80 - 89% = B

70 - 79% = C

60 - 69% = D

0 - 59% = F

Any percent ending with .5 or above will be rounded up, while those ending with .4 and below will be rounded down. (Example: 89.5 = A, 89.4 = B)

Grade 'A' is reserved for work that is exceptional in quality and shows keen insight, understanding, and initiative.

Grade 'B' is given for work that is consistently superior and shows interest, effort, or originality.

Grade 'C' is a respectable grade. A 'C' average (2.00) is required for graduation. It reflects consistent daily preparation and satisfactory completion of all work required.

Grade 'D-' is the lowest passing grade. It is below the average necessary to meet graduation requirements and ordinarily is not accepted for transfer by other institutions.

Grade 'F' is failing.

### Outline

<u>Date</u>		<u>Topic</u>
January	13	Introduction/Entrance Questionnaire
	18	Historical Perspectives - Early Acoustic Influences
	20	Historical Perspectives - Classic Analog Tape Music
	25	Historical Perspectives - Classic Analog Synthesis
	27	Historical Perspectives - Digital Synths and Computers
February	1	Lab 1 Demonstration
	3	Lab 1 Production Techniques
	8	Test Review
	10	Test 1 on Historical Perspectives
	15	Historical Perspectives on Synth Based Compositions
	17	Software Synthesis Demonstration
	22	Software Synthesis Techniques
	24	Lab 2 Demonstration
March	1	Test Review
	3	Test 2 on Synth Based Compositions
	15, 17	Film scoring examples
	22	Video Scoring Techniques with MIDI and DAWs
	24	Preparation for Film Scoring Session with MIDI
	29, 31	Preparation for Film Scoring Session with MIDI
April	5, 7	Recording Lab 3 student audio tracks with MIDI
	12, 14	Recording Lab 3 student audio tracks with MIDI

19, 21	Mixing Music and Bouncing Audio to QT Movie
26	Test Review
TBA	Final Exam, Lab 3 due during finals period

### **Classroom Policies**

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Any absence about which you know in advance must be communicated to me at the earliest possible time, and it must be documented. All make-up tests must be completed no later than 48 hours after the scheduled test. Make-up tests may be different from the scheduled tests.

**Return of Student Work**

Papers, projects and tests grades will be returned directly to the students either during class time or in office hours.

**Rollins College**  
**Department of Music**

**Introduction to Music Technology - MUS 190**  
Spring 2010, MWF 1:00-1:50 PM, in Keene Hall, Room 104

Professor: Sigmund Rothschild, Ph.D.  
Office: Keene Hall, 209. Voice: 407-691-1148  
Email: srothschild@rollins.edu  
Office Hours: TBA and by appointment

## **Course Syllabus**

### **Course Description**

Introduction to Music Technology explores the use of computers in music. This course primarily deals with the application of computer based tools as a means of expressing musical ideas. Several types of computer programs are used, including music notation programs, MIDI software sequencers, software synthesizers and digital audio editors. This class investigates concepts related to the use of computers in music and then applies these concepts with hands-on lab work.

### **Prerequisites**

MUS 151.  
Knowledge of both computers and music.

### **Required Text**

*Experiencing Music Technology*, Update (Paperback)  
by David Brian Williams (Author), Peter Richard Webster (Author)  
Publisher: Schirmer; 3rd edition (January 8, 2008)  
ISBN: 0-534-17672-0

### **Required Materials**

USB Flash Memory Drive

### **Attendance Requirements**

The Music Department does not differentiate between excused and unexcused absences. You are urged to use absences carefully. You are granted three (3) absences gratis. After that, your term average will be reduced by 4% per absence, which will effectively lower your grade a degree (e.g., B to B-). Your three "free" absences cover everything including emergencies. Be sensible in using them. It is always a good idea to document all absences by informing the Dean of Student Affairs in Arts and Sciences or the Dean's office in Hamilton Holt. Those offices will send an e-mail to all professors in your class schedule informing them of your absence and the reason for it. Never will you be excused for a legitimate fourth absence (or more) without documented prior absences. Lateness to class will be recorded. Three late arrivals will turn into one absence. Missing more than twenty minutes of the class (i.e., arrival after 1:20), will count as an absence.

### **Lab Equipment**

Of particular importance is the proper care and use of the computer labs equipment. Any improper treatment or use of the lab's equipment will not be tolerated.

We will spend some time in class working on assigned projects with assistance of the professor. But, it is expected that work on projects will be also pursued in the lab *outside of class hours*. Access times to the lab will be posted.

Classes are conducted with each student at a computer and music workstation. It is expected that you give your attention to the instructor and not to browsing the web, checking email, work for other classes, and other distractions afforded by computer access.

### **Class Assignments**

In addition to the assigned reading, each class member is expected to respond to specific assigned lab projects related to course content. As a rule, at least two (2) hours of preparation are needed for each hour of class. This time would normally be spent studying the text, perusing class notes and computer lab time in Keene Hall room 104. During the course of the semester, either a test will be given or a lab project will be due each week beginning with the fourth week.

### **Test Formats**

During the course, a total of four tests will be given, one after each unit. Each test is weighed equally and covers concepts from the reading, lab work and in class discussions. These tests will include multiple choice, true or false, short answer and fill in the diagram. The final exam is the last test of the four and is not cumulative.

### **Lab Formats**

Three lab projects are included in this class. All equipment, software and materials to complete the Labs are provided in Keene Hall room 104. Each lab project is weighed equally and applies material from the reading and class discussions to actual musical practice.

### **Extra Credit Project**

An extra credit project can be done as a fourth lab. Extra credit projects are due at the end of the Final Exam period. It is encouraged that the student pick materials they would like to work with at the beginning of the semester and that the extra credit project is a culmination and extension of procedures used during the semester. A student may present their extra credit project to the class before the final exam review to receive class participation credit. A student will only be able to use equipment available in room AR 194 for extra credit projects. No special equipment arrangements will be made.

### **Extra Credit Concert**

On a date TBA the Professor may give a concert of recent computer based compositions or speak publicly about current trends in music technology. You will have the opportunity to receive 2% extra credit for your attendance.

## Final Grade

The total points you accumulate will be divided by the total number of points possible on tests, labs and class attendance/participation. Labs and tests are weighted equally at 15% each. These are worth the following:

3 Tests	45%
3 Lab Projects	45%
Participation	10%

Perfect attendance, no missed classes for any reason, receives a 3% bonus to overall semester grade.

An extra credit project will be credited from 2-10%, added to overall semester grade, at the professors discretion.

The resulting percent will determine your final grade as follows:

90 - 100% = A
80 - 89% = B
70 - 79% = C
60 - 69% = D
59 - 0% = F

Any percent ending with .5 or above will be rounded up, while those ending with .4 and below will be rounded down. (Example: 89.5 = A-, 89.4 = B+) Rollins' Catalog Grade Definitions:

Grade '**A**' is reserved for work that is exceptional in quality and shows keen insight, understanding, and initiative.

Grade '**B**' is given for work that is consistently superior and shows interest, effort, or originality.

Grade '**C**' is a respectable grade. A '**C**' average (2.00) is required for graduation. It reflects consistent daily preparation and satisfactory completion of all work required.

Grade '**D-**' is the lowest passing grade. It is below the average necessary to meet graduation requirements and ordinarily is not accepted for transfer by other institutions.

Grade '**F**' is failing.

## Outline

<u>DATE</u>	<u>TOPIC</u>	<u>EMT READING</u>
Jan. 13	Course Introduction and Software Overview	
15	Digital Audio	Modules 8 - 10
20, 22	Digital Performer Introduction	
25, 27, 29	Lab 1 Demonstration	
Feb. 1	Digital Audio Data Structures	Module 11
3	Data Structures of Optical Disc	Module 12
5	Hardware for Digital Audio Workstations	Module 13
8	Digital Audio Workstations Continued	
10	Test Review	
12	Test 1	
15, 17	Sequencing Software and MIDI	Modules 14 - 16

	19	Digital Performer	
	22, 24 & 26	Software Synthesizers	
Mar.	1	Lab 2 Demonstration	
	3	MIDI Data Structures	Module 17
	5, 15	MIDI Hardware	Module 18
	17, 19	MIDI Hardware Continued / Review	
	22	Test 2	
	24	MIDI Projects	
	26, 29 & 31	Software Synthesizers Continued	
Apr.	2	Music Notation Software	Module 19
	5, 7	Sibelius Introduction	
	9, 12	Lab 3 Demonstration	
	14, 16	Data Structures for Music Notation	Module 20
	19, 21	Input Methods for Music Notation	Module 21
	23	Notation Projects	
	26	Notation Projects / Review	
	TBA	Test 3 / FINAL EXAM	

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### **Return of Student Work**

Papers, projects and tests grades will be returned directly to the students either during class time or in office hours.

### **Final Examinations**

The 15<sup>th</sup> week of classes in the fall and spring terms is reserved for final examinations. All courses include a final examination, with possible exceptions for performance, writing, independent study, or seminar courses where other means of evaluation are more appropriate.

The final examination must be offered in the time period scheduled in the examination matrix prepared by the Office of Student Records, unless the Dean of the Faculty has approved a change. An alternative period for unusual examination procedures, such as an oral examination, may be used provided the students involved do not thereby encounter conflicts with other scheduled examinations.

Tests or examinations may be offered through the 13<sup>th</sup> week (penultimate) of classes but must not be employed in lieu of a final examination.

Final papers, research reports and other similar assignments, except those in lieu of a final examination, should be due before examinations begin to help students avoid conflicts.

If a student has more than two final examinations scheduled in one day, s/he has the right to reschedule one examination to an open date within the final examination period. Arrangements will be made through the Dean of Students or program Dean in consultation with the faculty members involved.

Department chairs are responsible for overseeing the implementation of the final examination policy. (Faculty Handbook)

**Rollins College**  
**Department of Music**  
Introduction to Music Technology - MUS 190  
Sigmund Rothschild, Ph.D.

**Lab Project #1**  
**Digital Audio: Sound Effects and Music Sync to Quicktime Movie**

You will add music and sound effects to the To LIVE\_ and Die\_in\_LA-no sound.mov file. Your project needs at least twenty (20) sound effects (sfx) placed in proper sync. Use sound effects from sfx disks in the lab. Use a needle drop music library and import at least four (4) different segments of music. These segments should be edited and mixed together so they fit well with each other, the sfx and the video.

- A. Create an Edit Decision List (EDL) using QuickTime showing the time and placement of each sound file within your project.
- B. Create a folder with your twenty sfx and four music clips on your computer's hard drive. Make a copy of this folder on your USB flash drive.
- C. Import the movie and create your sound track using Digital Performer.
- C. Bounce your finished audio track to a .wav file.
- D. Turn in copies of your EDL and .wav file.

Your project will be assessed using the following criteria:

1. Effectiveness of Overall Sound Design. Does the audio and music support the video's content?
2. Creativity: Was the sound design conceived from an auditory perspective using the sounds as a primary component?
3. Technical Merit: Cleanliness of tracks, presence of audible edits, distortion, signal to noise ratio, pops and clicks...
4. Balance: Are the relative volumes of the sfx and musical components appropriate for the visual context?
5. Panning, Spatial Imaging, Localization: Does your project have appropriate width and depth in the stereo field? Do all the sounds have their own sonic space or is space used creatively?
6. Signal Processing and Sound Selection: Used Creatively? Are the sounds used in this project interesting and captivating?
7. Completion of all parameters listed in the project description.

No late projects will be accepted.

**Rollins College**  
**Department of Music**

**Advanced Sound Recording - MUS 225 M**  
Fall 2009, MWF 1:00-1:50 AM, in Keene Hall, Room 104

Professor: Sigmund Rothschild, Ph.D.  
Office: Keene Hall, 209. Voice: 407-691-1148  
Email: srothschild@rollins.edu  
Office Hours: TBA and by appointment

**Course Syllabus**

**Course Description**

Advanced Sound Recording investigates intermediate and advanced concepts related to recording music. This course explores the field's methodologies and applies these concepts with hands-on recording studio projects. Topics will include microphone techniques, stereo and multi-track recording, digital signal processing, mixing, music editing and CD mastering. The course is divided into three units, and students will do a recording project during each unit.

**Prerequisites**

MUS 225H, Introduction to Sound Recording, or permission of the instructor.  
Knowledge of audio, computers and music.

**Required Textbooks**

Handbook of Recording Engineering  
John Eargle  
Publisher: Springer; 4th edition (September 16, 2005)  
ISBN-10: 0387284702

The New Stereo Soundbook  
Ron Streicher & F. Alton Everest  
Third Edition (Released August 2006)  
ISBN: 978-0-9665162-1-0  
<http://www.stereosoundbook.com/>

**Required Materials**

USB Flash Memory Drive

**Attendance Requirements**

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### **Test Formats**

During the course, a total of three tests will be given, one after each unit. Each test is weighed equally and covers concepts from the reading, lab work and in class discussions. These tests will include multiple choice, true or false, short answer and fill in the diagram. The final exam is the last test of the three and is not cumulative.

### **Lab Formats**

Three lab projects are included in this class. All equipment, software and materials to complete the Labs are provided in Keene Hall room 104, 241 or 209. Each lab project is weighed equally and applies material from the reading and class discussions to actual musical practice.

### **Extra Credit Project**

An extra credit project can be done as a fourth lab. Extra credit projects are due at the end of the Final Exam period. It is encouraged that the student pick materials they would like to work with at the beginning of the semester and that the extra credit project is a culmination and extension of procedures used during the semester. A student may present their extra credit project to the class before the final exam review to receive class participation credit. No special equipment arrangements will be made for extra credit projects.

### Extra Credit Concert

On a date TBA the Professor may give a concert of recent computer based compositions or speak publicly about current trends in music technology. You will have the opportunity to receive 2% extra credit for your attendance.

### Final Grade

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3 Tests                      45%

3 Lab Projects              45%

Participation                10%

Perfect attendance, no missed classes for any reason, receives a 3% bonus to overall semester grade.

An extra credit project will be credited from 2-10%, added to overall semester grade, at the professors discretion.

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### Outline

<u>DATE</u>	<u>TOPIC</u>	<u>READING</u>
Aug. 24	Course Introduction and Acoustics Review	Eargle 1 & 2
26	Stereo Recording Techniques	Eargle 18, Streicher
28	Stereo Recording Techniques Continued	Streicher

	31	Lab Project 1 Demonstration: Stereo record one music ensemble using at least three different standard microphone techniques.	
Sept.	2, 4, 9	Lab Project 1 Demonstration Continued	
	11	Two-track Analog Tape Recorders	Eargle 11
	14	Two-track Digital Hardware Recorders	Eargle 12
	16	Decca Tree Recording	Eargle 18, 20, Streicher
	18	M/S Recording	Eargle 18, 20, Streicher
	21	Test Review	
	23	Test 1	
	25, 28, 30	Multi-Track Recording Techniques	Eargle 19
Oct.	2 & 5	Lab Project 2 Demonstration: Multi-track record a music ensemble. Include at least one overdub track.	
	7 & 9	DAW as Multi-Track Recorder	
	14, 16	Multi-Track Mic Placements: Wind and Brass	Eargle 19
	19, 21	Multi-Track Mic Placements: Strings, Percussion, Piano and Drum-set	Eargle 19
	23	Test Review	
	26	Test 2	
	28, 30	Mixing	Eargle 22
Nov.	2	DAW Based Music Editing	Eargle 23
	4, 6, 9	Lab Project 3 Demonstration: Edit, Mix and Master a Music CD.	
	11, 13	Lab Project 3 Demonstration Continued	
	16, 18	CD Mastering General Considerations	Eargle 25
	23, 30	CD Mastering Tools, Programs and Plug-ins	Handouts
Dec.	2	Project Presentations	
	4	Final Review	
	TBA	Test 3 / FINAL EXAM	

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Tests or examinations may be offered through the 13<sup>th</sup> week (penultimate) of classes but must not be employed in lieu of a final examination.

Final papers, research reports and other similar assignments, except those in lieu of a final examination, should be due before examinations begin to help students avoid conflicts.

If a student has more than two final examinations scheduled in one day, s/he has the right to reschedule one examination to an open date within the final examination period. Arrangements will be made through the Dean of Students or program Dean in consultation with the faculty members involved.

Department chairs are responsible for overseeing the implementation of the final examination policy. (Faculty Handbook)

# Syllabus CMS 167 – Intro to Programming

Fall, 2009

**Instructor:**

**Office:** Bush 366D, ext 2682

**Email:**

**Home telephone:**

**Office hours:** Tentatively, 8:00 a.m. – 11:00 a.m. MWF, 8:00 – 9:30 a.m. TTh  
Please feel free to stop in at other times; if my door is open, I'm happy to talk to you.

**Text:**

Introduction to Computing & Programming with Java, A Multimedia Approach, Guzdial & Ericson, Pearson Prentice Hall, 2007.

## Why learn to program and, in particular, to write programs to manipulate media?

- You may decide to be a computing professional. In that case, it is useful to know how to program and learning to program in Java in the media domain carries over easily to other languages and other domains.
- Even if you are only a user of digital media applications, it's helpful to know something about how they work. Furthermore, most such applications are programmable.
- There might be times when your applications can't give you exactly the effect you want and you need to take complete control and do it yourself.
- More comfort and facility with computers in general.
- Programming is an outlet for creativity. As your book says, "The computer is the most amazingly creative device that humans have ever conceived of. It is literally completely made up of mind-stuff."
- Programming has the potential to change the world! How else can we map the spread of AIDS among populations, send robots into space or under the oceans, predict the results or maybe even the cures for global warming, map genomes, etc.

## Learning goals:

You will learn

- The fundamentals of programming such as what a program is, how a variable relates to memory, selection and looping constructs, simple data types, objects and methods, message and parameter passing, array, scope and lifetime, testing and debugging;
- to design, implement and test simple methods
- the fundamentals of digital media such as how pictures and sounds are stored and manipulated;
- that programming is a social activity and a program is meant for people to use;
- to recognize well-designed algorithms.

## Syllabus

### COURSE INFORMATION

Course:	<b>CMS 170</b> (CS Principles I)	Term:	Spring 2010
Instructor:		Office:	Bush 366E
Class hours:	2:00 – 2:50pm MWF	Location:	Bush 362
Lab hours:	2 – 3:30pm Tuesday	Location:	Bush 222 (Mac Lab)
Office hours:	11:00am - 1:00pm MTWF 4:00 – 5:00pm MW	<b>**Available other times by appointment**</b>	
Telephone:	Office Ext 2681	E-mail:	
Web Site:	blackboard.rollins.edu (login page)		

### LEARNING TOOLS:

#### Course Description:

Develops discipline in program design, problem solving, debugging, and testing, with an introduction to data structures. Topics include: abstract data types, complexity analysis, and recursion. Basic data structures (queues, stacks, trees, and graphs) and transformations (sorting and searching) are introduced as representative of the fundamental tools that are used to aid in software development. An object-oriented language is used to construct programs of moderate size. Includes a laboratory experience. Pre-requisite: CMS 167A/B.

#### Course Rationale:

CMS 170 continues building a foundation for the study of computer science using the Java programming language. In addition to improving your Java skills, the course emphasizes the use of data structures to improve a program's efficiency as well as the use of test cases to improve understanding of a program's design.

#### Course Goals:

At the completion of this course, you should be able to:

1. design and develop *complete* object-oriented programs using the Java programming language.
2. successfully use the major data structures to improve program efficiency.
3. utilize the Java reference material to identify pre-built components to incorporate into applications.
4. understand the use of Java test programs to increase program reliability as well as insight into its design.

**Course Syllabus**  
**PHY 115**  
**The Physics of Musical Instruments**  
Spring 2010

**Course Information**

The class meets MWF 11:00 – 11:50 a.m. in Bush 129.

**Professor**

Room 111, Bush Science Center

Phone:

Email:

**Text**

The text for the course is *The Science of Sound, 3<sup>rd</sup> ed.*, Rossing, Moore and Wheeler, Addison Wesley: San Francisco, 2002.

**Course description**

This is a course in Natural Philosophy. The course goals are philosophical in nature, and students will be required to demonstrate their ability to think critically about scientific issues: the simple recall of knowledge will be necessary, but not sufficient, to succeed in this course. During the course, we will investigate methods of studying natural phenomena using the field of musical acoustics as a vehicle. Within the context of learning about acoustics we will investigate the methods of inquiry necessary to gain an understanding of natural phenomena.

**Course Objectives:**

The objectives of this course are to assist students in gaining an appreciation of the natural sciences, help them to develop an inquisitive mind, and to foster a desire for life-long learning about the natural world. Additionally, this course will help students prepare for active citizenship in a global society by developing the critical thinking skills necessary to evaluate and participate in discussions of scientific and technical issues.

**Course goals**

The **P** general education requirement is satisfied by taking this course. The requirements specify that after taking the course the student will be able to:

- Demonstrate knowledge of scientific principles, and paradigms or models at the appropriate level of analysis
- Evaluate hypotheses using empirical evidence.
- Find, analyze and evaluate scientific material, which may include quantitative and qualitative data, to make an informed decision.