

Board of Regents, State of Iowa**REQUEST TO IMPLEMENT A NEW BACCALAUREATE, MASTERS,
DOCTORAL OR FIRST PROFESSIONAL DEGREE PROGRAM**

THE PURPOSE OF ACADEMIC PROGRAM PLANNING: Planning a new academic degree program provides an opportunity for a Regent University to demonstrate need and demand as well as the university's ability to offer a quality program that is not unnecessarily duplicative of other similar programs offered by colleges and universities in Iowa.

Institution: **Iowa State University**

Departments involved: **Music**

CIP Discipline Specialty Title: **Music Theory and Composition.**

A program that focuses on the study of the principles of sound manipulation as applied to the creation of music, and the techniques of creating and arranging music. Includes instruction in aural theory, melody, counterpoint, complex harmony, modulation, chromatics, improvisation, progressions, musical writing, instrumentation, orchestration, **electronic and computer applications**, studies of specific musical styles, and development of original creative ability.

CIP Discipline Specialty Number (six digits): **50.0904**

Level: **B**

Title of Proposed Program: **Minor in Music Technology**

Degree Abbreviation (e.g., Minor, B.S., B.A., M.A.): **Minor**

Approximate date to establish degree: Month **May** Year **2008**

Contact person(s): **Dr. Christopher Hopkins, 294-0396, hopkinsc@iastate.edu**

Program Description

Brief Description and Objectives

The Minor in Music Technology is a program of study in the creative application of computer technologies to the following: sound editing, processing, and synthesis techniques, programming designs for computer-based musical instruments, development of human-computer interfaces for musical performance, and electronic music composition. The minor establishes a foundation in these areas through a core of three courses, with electives to provide additional study in four tracks:¹

- (1) broadening of musical study through courses in music theory, history, literature, performance
- (2) advanced study in music technology
- (3) coordination with foundation studies in computer programming and software engineering
- (4) augmentation of study in computer programming and engineering to strengthen interdisciplinary learning outcomes with these majors

The minor is fulfilled by earning 15 credits as follows.²

1. 8 credits: Music Technology Core

Music 246 Introduction to Music Technology, Cr. 2
 Music 346 MIDI and Digital Audio Techniques, Cr. 3
 Music 446 Electronic Music Synthesis, Cr. 3.

2. 7 credits: Technology and *Music electives:

Com S 107. Applied Computer Programming	** Music 101. Fundamentals of Music
Com S 207. Programming I	Music 102. Introduction to Music Listening
Com S 208. Programming II	** Music 105. Basic Musicianship
Com S 227. Intro. to Object-oriented Programming	Music 118. Applied Music: Non-majors
Com S 228. Introduction to Data Structures	Music 221. Introduction to Music Theory
Com S 229. Advanced Programming Techniques	Music 222. Introduction to Aural Theory
Com S 309. Software Development Practices	Music 231. Materials of Music I
Cpr E 329. Software Project Management	Music 232. Aural Theory I
E E 201. Electric Circuits	Music 302. Advanced Music Listening
E E 224. Signals and Systems I	Music 304. History of Rock 'n' Roll
E E 324. Signals and Systems II	Music 318. Applied Music: Non-majors
E E 424. Introduction to Digital Signal Processing	Music 337. Materials of Music III
M E 451. Engineering Acoustics	Music 338. Aural Theory III
Phys 198. Physics of Music	Music 383. History of Music I
S E 319. Software Construction and User Interfaces	Music 384. History of Music II
	Music 472. History of American Music
	Music 490I. Independent Study (Electronic Music)
	Music 593I. Workshops (Music and Technology)

* Music majors seeking this minor may not count in the fifteen credits music courses comprising the minor other than 246, 346, 446, 490I, and 593I, and may not count Phys 198.

** only one of Music 101 and 105 may be counted in the minor

3. At least six of the fifteen credits must be taken at Iowa State University in courses numbered 300 or above with a grade of C or higher. The minor must include at least nine credits that are not used to meet any other department, college, or university requirement.

Interdisciplinary Objectives of Advanced Elective Courses

Music technology is an interdisciplinary field that changes rapidly with new technological developments. This minor includes advanced elective courses in computer programming, engineering, and music to provide an interdisciplinary track for advanced students who have the prerequisites and will use electives to establish a bridge to their major, particularly between technical sub-disciplines. For example, mechanical engineering majors may wish to develop technologies for

¹ Sample programs of study are given for each of these tracks in Appendix II.

² Catalog citations for courses in this minor are provided in Appendix I.

music that require more programming experience than provided by their major. Computer engineering majors may support their goals for music technologies with a more advanced understanding of engineering acoustics. Computer programming majors may have goals to create musical applications closely tied with digital signal processing.

Advanced electives in music theory, history, literature, and performance are included for non-music majors who are qualified for study at higher levels. These provide contact with more advanced musical concepts and skills that would be incorporated in software and interface design for music.

This minor may also be used as an autonomous program of study to complement a major without being configured to meet specific interdisciplinary goals. In such a case, it is expected that electives would be satisfied through non-majors courses in computer programming, software engineering, and music.

Music Majors

A special case of a major in music (Bachelor of Arts or Bachelor of Music) earning this minor is treated as follows: No music courses other than those in music technology core may be counted in the minor. A major in music therefore will obtain a minor that has a minimal overlap with the major, the supporting courses being taken from non-majors courses in computer science and software engineering, or as qualified from related courses in computer science and engineering.

Relation to Institutional Mission and Strategic Plan

The Minor in Music Technology will support the following goal identified as a priority in the Strategic Plan for 2005-2010: “Enhance areas of excellence in the arts, humanities, and social sciences that build on and complement the university’s unique strengths.” This minor promotes collaboration and interdisciplinary perspectives between an artistic discipline and the areas of engineering, science, and technology.

Relation to Existing Programs

Iowa State has established strengths in Engineering, Computer Science, Electrical Engineering, Journalism and Mass Communication, and Art & Design (including new programs in digital art). Three of the core courses already have established ties to programs in these fields: Music 246 (Introduction to Music Technology), Music 346 (MIDI and Digital Audio Techniques, taught as 348x) and 446 (Electronic Music Synthesis) have established records of drawing from these majors (between 75-90% of enrollment has been from these programs). Music 346 and 446 serve engineering undergraduates as technical electives outside their major, and are available for graduate credit, especially for human-computer interaction. This proposed minor complements these programs.

For majors in science and technology fields, the addition of a minor in music technology will provide experience with technological solutions for design and structural challenges posed by aesthetics and human performance (interactive). For majors in the arts and humanities, this minor will provide both an interdisciplinary arts perspective and experience with a technological discipline.

Relation to Programs in Other Iowa Universities

There are no other minors (or majors) in music technology within the Regents universities nor in the major four-year private colleges (see paragraphs following concerning Other Institutions of Higher Education in Iowa operating Similar Programs).

Appropriateness of Initiating this program at Iowa State University

Iowa State has an established commitment to research and academic programs in science and technology. A minor in music technology extends this commitment to incorporate applications of technology to the arts. Experience with the design challenges posed by the arts enhances work in technological fields such as software design and programming, interface design, integral new media, and virtual reality applications

Personnel, Facilities, and Equipment at ISU to Support this Program

Dr. Christopher Hopkins (Assistant Professor) will coordinate further development of the program and teach core music technology courses. A reallocation of position/teaching load from music theory-composition to music technology was established with this hire (August 2004). One to two courses from the required core in music technology may be taught by other qualified faculty. The department is committed to include music technology as a supporting teaching area in future hires.

In Fall 2006 a remodeled and expanded computer lab (056 Music Hall) opened to support the increased demand for courses in music technology. This facility supports a class size of 20 for four courses per year in the program, fulfilling the needs of the proposed new program. Excellent instructional media/network technologies are in place for this facility. Advanced projects and 490 courses will use the Electronic Media Studio Suite (242/246 Music Hall), which was remodeled and upgraded in Fall 2005 and Spring 2006, and the Recording Control Room (252 Music Hall).

Student Demand

Student demand for a minor in music technology is represented in the high percentage of non-majors that have been enrolled in the music technology courses. Music 246 (Introduction to Music Technology – numbered 248 prior to 2007-2009 catalog) and 446 (Electronic Music Synthesis, formerly 448) have consistently enrolled with 80-90% non-majors, primarily from Engineering departments with other significant representation from Journalism and Mass Communication and Art & Design. This is a regular situation for these type of courses in music curricula nationally, although the percentage here at ISU is higher than average. Music is an avocation of many working toward degrees in the science and engineering disciplines as well as in degrees emphasizing technical applications in communications and art.

State and National Demand for Graduates of the Proposed Program

This minor is interdisciplinary in nature. The knowledge and practical skills provided by this curriculum extend therefore to any fields that design for or use digital media, which are ubiquitous. The demand for a music technology minor may be indexed therefore to that for graduates in majors that demand interdisciplinary applications of technology. Further, one may consider the value of the minor as a general augmentation of learning outcomes from experience with interdisciplinary applications themselves.

Other Institutions of Higher Education in Iowa operating Similar Programs

Curricula at the other Iowa universities include courses related to music technology, but there are no existing degree programs that offer a minor (or a major) music technology.

The University of Iowa School of Music has two courses in Composition for Electronic Media, serving a graduate program in music composition. There are two audio recording techniques courses. There are no courses in music technologies directed toward non-majors. The UI department of Teaching and Learning has a 2 cr. course in Technology in the Classroom that includes examination of instructional software in addition to audio-visual operations.

The University of Northern Iowa has a single 2 cr. Music and Technology course which is an “overview of current applications in the music industry” required of undergraduate majors in composition-theory.

Drake University has two 3 cr. elective courses in MIDI techniques.

Grinnell College has a 4 cr. elective course in Electronic Music for a BA in Music and for a technology studies concentration.

Luther College has a 2 cr. introductory Music Technology course and a 2 cr. Electronic Music course. A “study plan” is offered in Music Technology that includes these courses.

Simpson College lists no courses in music technology.

Projected Enrollment of Majors and Non-majors Years 1-7

Undergraduate

Undergraduate	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7
Majors							
Non-Majors	10	20	30	30	30	30	30

This projection is based on 25% of full enrollment in the introductory course being students intending to complete the minor.³ A simple projection follows into a recurring three-year term, the maximum period of continuous enrollment required to earn the minor.

Sources

Majors in Art and Design, Engineering, Computer Sciences, Journalism and Mass Communications, Music, and Performing Arts are expected to be the primary sources for this minor, based on the majors of students enrolled in music technology courses over the past three years.

Off-Campus Sites

No off-campus sites are required for the minor in its initial configuration. Our longer-range plan does include exploration of partnerships with research institutions that have an arts focus. These would be partnerships in summer programs. There is no plan for distance education because lab-based hands-on supervision is required for troubleshooting of technologies.

Review and Approval List

 X Department of Music
 X Curriculum Committee
 X Faculty
 X DEO

 College of Liberal Arts and Sciences
 Curriculum Committee
 College Dean

 Faculty Senate Curriculum Committee

 Provost

List date the program proposal was submitted to the Iowa Coordinating Council for Post High School Education (ICCPHSE) and the results of listserv review.

(THIS FILLED IN BY THE PROVOST OFFICE):

Accreditation

The National Association of Schools of Music (NASM) is the accrediting agency for the department of music. Appendix II.B of the NASM Handbook 2007-2008 is an Advisory Statement on Undergraduate Minors in Music (pp. 171-172). It advises the following:

NASM does not accredit or list minor programs in its Directory since minors are considered part of an institution's program of music in general education.

Articulation Agreements

none

³ This result, ten students, corresponds to the number of students who at the time of writing have expressed a direct interest in the minor, six of whom are in their second music technology course and have otherwise completed 3-6 credits in other courses proposed to qualify for the minor.

Required Facilities, Equipment, and Faculty

One 20-workstation computer lab/classroom with music input/output devices, music software, and instructional technologies. One limited-access lab for advanced courses.

1½ FTE to cover core courses in music technology (Mus 246 [2cr], 346 [3cr], 446 [3cr], 490I [2-3cr]). One faculty member oversees curriculum and facilities development. (see letter from DEO).

These facilities, courses, and faculty lines are currently available.

Financial Resources

Establishment of this minor requires no new financial resources. The amounts below are for funds already spent to establish curriculum and facilities to support the departmental major. The totals are a sum of resource allocations for FY2005 and FY2006, the period over which the facilities required to support a curriculum in music technologies was established.

SOURCES	TOTAL AMOUNT
Faculty Line Reallocated to Music Technology (Hopkins) Partial load drawn from other current faculty (25-50% FTE)	Variable (1.25 – 1.5 FTE)
LASCAC Grants FY2005, FY2006 (computing equipment)	\$81,937
LASCAC Grants FY2005, FY2006 (computer lab operations)	\$29,835
Departmental and LAS Year-end Funds FY2005 (computer lab renovations and furnishings)	\$36,890
Departmental Funds (partial 50% matching funds with LASCAC for limited access labs)	\$4,390
Donor Funds (equipment and renovations for limited access lab)	\$12,000

New Costs over Seven Years

The total costs below are calculated for operations and equipment projected from data supplied by LASCAC funding FY2005-FY2008. To these are added a variable for 1.5 FTE for faculty. Two cycles of increased costs are shown in the table below, one for server upgrades, the other for lab workstation computers. Each are four-year cycles, offset by two years. Years 3 and 7 are projected starts of four-year cycle of computer replacements, the most recent replacement being in FY2006. Years 1 (current FY) and 5 show server/prINTER replacements. Annual increases are calculated from 2% for operations and 3% for equipment. The totals do not include maintenance and energy costs for the facilities allocated to this program.

All costs for this new program are shared with those of the current departmental programs, which will neither increase nor decrease with or without the new program. Therefore, no new costs are projected to result directly from the new program.

	TOTAL COSTS	TOTAL NEW COSTS
Year 1 (FY 2008)	\$31,837 + 1.5 FTE	0
Year 2	\$22,334 + 1.5 FTE	0
Year 3	\$58,704 + 1.5 FTE	0
Year 4	\$23,694 + 1.5 FTE	0
Year 5	\$34,405 + 1.5 FTE	0
Year 6	\$25,137 + 1.5 FTE	0
Year 7	\$61,591 + 1.5 FTE	0

**Supplemental materials
(to be used at Iowa State University in the review of the proposal):**

Program Requirements

Prerequisites for prospective students

Music: a knowledge of the fundamental vocabulary and structural concepts as provided by fluency in reading musical notation and/or a beginning course in music theory (Music 101 or equivalent). Students whose musical experience is advanced in performance skills without the above prerequisite may begin the music technology sequence with concurrent registration in Music 101 and 246.

Technology: a fundamental operational familiarity with hardware interfaces, directory/file structures, and window/menu-based software interfaces, as provided by experience using a standard personal computer. Students without this prerequisite must complete Com S 103 prior to registering for courses in the program.

Language requirements

English

Courses and seminars presently available for credit toward the program

All courses listed in the proposed program are presently available.

Proposed new courses or modifications of existing courses

none

Thesis and non-thesis options in master's programs

not applicable

Implications for related areas within the university

By providing a technical minor within an artistic discipline, this program will expand the interdisciplinary breadth for both arts and scientific/technical programs.

Admissions standards for graduate programs

not applicable

Appendix I

Catalog Listings for Courses Proposed for the Music Technology Minor

1. eight credits in the music technology core

Music 246. Introduction to Music Technology. (2-0) Cr. 2. F.S. Prereq: 101, 105, or 221, or permission of instructor. Introduction to audio and MIDI in music and media applications, fundamentals of digital audio editing and mixing, software-based musical arrangements and composition.

Music 346. MIDI and Digital Audio Techniques. (3-0) Cr. 3. S. Prereq: 246 or permission of instructor. MIDI theory and programming applications, sampling/synthesis control, digital signal processing techniques. Composition projects using integrated audio/MIDI sequencing applications. Nonmajor graduate credit.

Music 446. Electronic Music Synthesis. (3-0) Cr. 3. F. Prereq: 246 or permission of instructor. Techniques of digital sound synthesis, software synthesizer design, and electronic music composition. Nonmajor graduate credit.

2. seven credits in computer programming, signal processing, engineering acoustics, advanced music technology, software engineering, or *music electives

*Music majors seeking this minor may not count in the fifteen credits music courses other than 246, 346, 446, 490I, and 593I, and may not count Phys 198.

Com S 107. Applied Computer Programming. (3-0) Cr. 3. F.S. Introduction to computer programming for non-majors using a language such as the Visual Basic language. Basics of good programming and algorithm development. Graphical user interfaces.

Com S 207. Programming I. (3-1) Cr. 3. F.S. Prereq: Math 150 or placement into Math 140/141/142 or higher. An introduction to computer programming using an object-oriented programming language. Emphasis on the basics of good programming techniques and style. Extensive practice in designing, implementing, and debugging small programs. Use of abstract data types. Interactive and file I/O. Exceptions/error-handling. This course is designed for nonmajors. Credit may not be applied toward graduation for both Com S 207 and 227.

Com S 208. Programming II. (3-1) Cr. 3. S. Prereq: 207, credit or enrollment in Math 151, 160, or 165. Intermediate-level programming techniques. Emphasis on designing, writing, testing, debugging, and documenting medium-sized programs. Data structures and their uses. Dynamic memory usage. Inheritance and polymorphism. Algorithm design and efficiency: recursion, searching, and sorting. Event-driven and GUI programming. The software development process. This course is designed for nonmajors. Credit may not be applied toward the major.

Com S 227. Introduction to Object-oriented Programming. (3-2) Cr. 4. F.S. An introduction to object-oriented design and programming techniques. Symbolic and numerical computation. Recursion and iteration. Modularity procedural and data abstraction, specifications and subtyping. Object-oriented techniques. Imperative programming. Emphasis on principles of programming and object-oriented design through extensive practice in design, writing, running, debugging, and reasoning about programs. This course is designed for majors. Credit may not be applied toward graduation for both Com S 207 and 227.

Com S 228. Introduction to Data Structures. (3-1) Cr. 3. F.S. Prereq: C- or better in 227, credit or enrollment in Math 165. An object-oriented approach to data structures and algorithms. Object-oriented analysis, design, and programming, with emphasis on data abstraction, inheritance and subtype polymorphism. Abstract data type specification and correctness. Collections and associated algorithms, such as stacks, queues, lists, trees. Searching and sorting algorithms. Graphs. Data on secondary storage. Analysis of algorithms. Emphasis on object-oriented design, writing and documenting medium-sized programs. This course is designed for majors.

Com S 229. Advanced Programming Techniques. (3-0) Cr. 3. F.S. Prereq: 228, credit or enrollment in Math 166. Object-oriented programming experience using a language suitable for exploring advanced topics in programming. Topics include memory management, parameter passing, inheritance, compiling, debugging, and maintaining programs. Significant programming projects.

Com S 309. Software Development Practices. (3-1) Cr. 3. F.S. Prereq: Com S 228 with C- or better, Com S 229 or Cpr E 211, Engl 250. A practical introduction to methods for managing software development. Process models, requirements analysis, structured and object-oriented design, coding, testing, maintenance, cost and schedule estimation, metrics. Programming projects. Nonmajor graduate credit. credit.

Cpr E 329. Software Project Management. (Crosslisted with S E). (3-0) Cr. 3. Prereq: Com S 309. Process-based software development. Capability Maturity Model (CMM), Project planning, cost estimation, and scheduling. Project management tools. Factors influencing productivity and success. Productivity metrics. Analysis of options and risks. Planning for change. Management of expectations. Release and configuration management. Software process standards and process implementation. Software contracts and intellectual property. Inspections and reviews. Managing the testing process. Software quality metrics. Case studies of real industrial projects. Nonmajor graduate credit.

E E 201. Electric Circuits. (3-2) Cr. 4. F.S. Prereq: Credit or registration in Math 267 and Phys 222. Emphasis on mathematical tools. Circuit elements and analysis methods including power and energy relationships. Network theorems. DC,

sinusoidal steady-state, and transient analysis. Operational amplifiers. AC power. PSPICE. Laboratory instrumentation and experimentation.

E E 224. Signals and Systems I. (3-3) Cr. 4. F.S. Prereq: 201, Math 267, Phys 222. Mathematical preliminaries. Introduction to signals and systems. Signal manipulations. System properties. LTI systems, impulse response and convolution. Fourier Series representation and properties. Continuous and discrete time Fourier Transforms and properties. Sampling and reconstruction. Modulation and demodulation. Applications and demonstrations using Matlab.

E E 324. Signals and Systems II. (3-3) Cr. 4. F.S. Prereq: 224. Laplace and z-Transforms, properties and inverses. Applications to LTI systems and analog/digital filters. Feedback systems and stability. State-space representation and analysis. Nonmajor graduate credit.

E E 424. Introduction to Digital Signal Processing. (3-3) Cr. 4. Prereq: 324. Discrete Fourier Transform (DFT). Signal processing using the DFT. Fast Fourier algorithms. Design of IIR and FIR filters. Multi-rate signal processing. Spectral Analysis. Simulation and real-time laboratory experiments illustrating practical DSP implementations and applications. Nonmajor graduate credit.

M E 451. Engineering Acoustics. (Cross-listed with E M). (2-2) Cr. 3. S. Prereq: Phys 221 and Math 266 or 267. Sound sources and propagation. Noise standards and effects of noise on people. Principles of noise and vibration control used in architectural and engineering design. Characteristics of basic noise measurement equipment. Experience in use of noise measuring equipment, sound power measurements, techniques for performing noise surveys, evaluation of various noise abatement techniques applied to common noise sources. Selected laboratory experiments. Nonmajor graduate credit.

Music 490. Independent Study. Cr. arr. *Repeatable*. F.S.SS. Prereq: Permission of instructor; 12 credits in music, approval of department head.
I. Electronic Music

Music 593. Workshops. Cr. arr. *Repeatable*.
I. Music and Technology

S E 319. Software Construction and User Interfaces. (Cross-listed with Com S). (3-0) Cr. 3. F. Prereq: Com S 228. Basic theory of grammars, parsing. Language paradigms. State-transition and table-based software design. Rapid system prototyping. Review of principles of object orientation, object oriented analysis using UML. Event-driven and clock-driven simulation. Software construction methods. Frameworks and APIs. User interface architecture, evaluation of user interface. Design of windows, menus, and commands. Introduction to format specification and model-based software design. Introduction to domain-specific software engineering. Nonmajor graduate credit.

(courses below count only for majors other than music)

Music 101. Fundamentals of Music. (1-2) Cr. 2. F.S. Prereq: Ability to read elementary musical notation. Notation, recognition, execution and analysis of scales, intervals, triads, and rhythm; key signatures; time signatures; transposition. Open to non-majors only.

Music 102. Introduction to Music Listening I. (3-0) Cr. 3. F.S.SS. Expansion of the music listening experiences of the general student through greater awareness of differences in techniques of listening, performance media, and materials of the art. The course focuses on the elements of music: rhythm, melody, harmony, form, and style, and how these elements are used in musics of different cultures and time periods. Student need not be able to perform or read music. Open to non-majors only.

Music 105. Basic Musicianship. (1-4) Cr. 3. S. Beginning keyboard techniques, sight-reading and sight-singing skills. Basic materials of music: notation, scales, intervals, key signatures, time signatures, rhythm, and harmony. Music 102. Introduction to Music Listening I. Music 105. Basic Musicianship. Prereq: Performing arts major classification.

Music 118. Applied Music: Non-majors. Cr. 1-2. Repeatable. F.S.SS. Prereq: Audition, permission of instructor. (.5-0) for 1 cr. (1-0) for 2 cr. Applied music for the general student. Open only to non-majors. Will not satisfy applied music requirements for music majors.

Music 221. Introduction to Music Theory. (3-0) Cr. 3. F. Prereq: Music major status or permission of instructor; concurrent enrollment in 222 recommended. Fluent identification and application of the elements of music and music notation. The study of two-voice species counterpoint as an introduction to voice-leading principles in common practice period music.

Music 222. Introduction to Aural Theory and Music Technology. (0-4) Cr. 2. F. Prereq: Music major status or permission of instructor; concurrent enrollment in 221 recommended. Aural discrimination of musical elements and patterns as demonstrated by proficiency in ear training, sight singing, and related musicianship skills. Introduction to technological equipment and software used in the study of music.

Music 231. Materials of Music I. (3-0) Cr. 3. S. Prereq: 221. Harmonic, melodic, and rhythmic materials of the common practice period. Application of these materials in analysis and writing. Techniques of melodic construction, formal design, and harmonization.

Music 232. Aural Theory I. (0-3) Cr. 1. S. Prereq: 222. Development of sight singing, ear training, and related musical skills with emphasis on melodic, harmonic and rhythmic materials from the common practice period.

Music 302. Advanced Music Listening. (3-0) Cr. 3. S. Prereq: 102. Study of the evolution of music styles through history with emphasis on listening. Primarily European music with some non-Western music providing a global perspective. Individual composer's unique approaches to timbre, texture, rhythm and melody. General trends in the progress of style and form. Concert reports and papers in addition to examinations. Ability to read music recommended, but not required. Open to non-majors only. Only one of Music 120 and 302 can count toward graduation.

Music 304. History of Rock 'n' Roll. (3-0) Cr. 3. S. Prereq: 101, 102, 221, or 222. Rock 'n' Roll from the mid 1950s through the 1990s, focusing on the development of rock styles from its roots in blues, folk, country, and pop. Expansion of listening experience through study of song forms, musical instruments of rock, and the socio-political significance of song lyrics. Examinations, research paper or in class presentation required. Ability to read or perform music not required

Music 318. Applied Music: Non-majors. Cr. 1-2. Repeatable. F.S.SS. Prereq: Audition, permission of instructor. (.5-0) for 1 cr. (1-0) for 2 cr. Applied music for the general student. Open only to non-majors. Will not satisfy applied music requirements for music majors.

Music 337. Materials of Music III. (3-0) Cr. 3. S. Prereq: 331. Writing and analysis based on musical styles since 1900.

Music 338. Aural Theory III. (0-2) Cr. 1. S. Prereq: 332. Development of sight singing, ear training, and related musical skills with emphasis on melodic, harmonic and rhythmic materials from the nineteenth and twentieth centuries.

Music 383. History of Music I. (3-0) Cr. 3. F. Prereq: 120. History of the stylistic and cultural development of music: Middle Ages through Baroque.

Music 384. History of Music II. (3-0) Cr. 3. S. Prereq: 383. History of the stylistic and cultural development of music: Classical through contemporary music.

Music 472. History of American Music. (3-0) Cr. 3. Prereq: Ability to read music; 9 credits from music, American literature, American history, art history. Offered F. 2007. History and development of the sacred and secular music in North America from approximately 1600 to the present, exploring the diverse cultural backgrounds that have contributed to the variety of contemporary musical styles. Nonmajor graduate credit.

Phys 198. Physics of Music. (2-2) Cr. 3. F. Introductory level course on sound for nonphysics majors. Properties of pure tones and harmonics; human perception of sound; room acoustics; scales; production, and analysis of musical by voice, string, woodwind, brass, and percussion instruments.

Appendix II Sample Course Plans

These sample course plans illustrate options for different tracks in elective courses as listed in the Program Description.

Samples for electives track: “broadening of musical study through courses in music theory, history, literature, and performance”

Sample 1. This student is required to take Music 101 as a prerequisite to the music technology core. One elective in music history is combined with independent study. Note: either Music 346 or 446 may be taken ahead of the other. Total credits: 15

First Year (5 credits) 3 cr Music 101. Fundamentals of Music (<i>elective required as prerequisite</i>)	2 cr Music 246. Introduction to Music Technology.
Second Year (6 credits) 3 cr Music 446. Electronic Music Synthesis.	3 cr Music 346. MIDI and Digital Audio Techniques.
Third Year (4 credits) 1 cr Music 490I. Independent Study (Electronic Music).	3 cr Music 304. History of Rock ‘n’ Roll. (<i>music history/literature elective</i>)

Sample 2. This student has keyboard skills and emphasizes performance studies in coordination with music technology. Physics of Music is taken as an additional music elective. Total credits: 15

First Year (7 credits) 2 cr Music 246. Introduction to Music Technology. 1 cr Music 118. Applied Music: Non-majors (Piano) (<i>music elective</i>)	3 cr Music 346. MIDI and Digital Audio Techniques. 1 cr Music 118. Applied Music: Non-majors (Piano) (<i>music elective</i>)
Second Year (5 credits) 3 cr Phys 198. Physics of Music. (<i>music elective</i>) 1 cr Music 318. Applied Music: Non-majors (Piano) (<i>music elective</i>)	1 cr Music 318. Applied Music: Non-majors (Piano) (<i>music elective</i>)
Third Year (3 credits) 3 cr Music 446. Electronic Music Synthesis.	

Sample for electives track “advanced study in music technology”

Sample 4.

This student is a computer science or computer engineering major proficient in programming. This program of study prepares for graduate work in human-computer interaction. The independent study projects are in programming and interface development. Total credits: 16

First Year (5 credits) 2 cr Music 246. Introduction to Music Technology.	3 cr Music 346. MIDI and Digital Audio Techniques.
Second Year (5 credits) 3 cr Phys 198. Physics of Music.	2 cr Music 490I. Independent Study (Electronic Music).
Third Year (5 credits) 3 cr Music 446. Electronic Music Synthesis.	2 cr Music 490I. Independent Study (Electronic Music).

Samples for electives track “coordination with foundation studies in computer programming and software engineering”

Sample 5. This student is not a computer science major, but uses electives to expand the computer programming techniques used in the music technology core. A final project emphasizes this direction. Total credits: 15

First Year (5 credits) 2 cr Music 246. Introduction to Music Technology.	3 cr Com S 107. Applied Computer Programming.
Second Year (6 credits) 3 cr Com S 207. Programming I.	3 cr Music 346. MIDI and Digital Audio Techniques.
Third Year (4 credits) 3 cr Music 446. Electronic Music Synthesis.	1 cr Music 490I. Independent Study (Electronic Music).

Sample 6. This student is a music major who enters with elementary programming skills and math prerequisites. The goal of the minor in music technology is to develop software for music education. Total credits: 15

First Year (5 credits) 2 cr Music 246. Introduction to Music Technology.	3 cr S E 185. Problem Solving in Software Engineering.
Second Year (6 credits) 3 cr Com S 207. Programming I.	3 cr Music 346. MIDI and Digital Audio Techniques.
Third Year (4 credits) 3 cr Music 446. Electronic Music Synthesis.	1 cr Music 490I. Independent Study (Electronic Music).

Sample for electives track “augmentation of study in computer programming and engineering to strengthen interdisciplinary learning outcomes with these majors”

Sample 7. A student in mechanical engineering interested in a minor related to sound synthesis and acoustics as related to music. Total credits: 15

First Year (2 credits)	2 cr Music 246. Introduction to Music Technology.
Second Year (6 credits) 3 cr Phys 198 Physics of Music	3 cr Music 346. MIDI and Digital Audio Techniques.
Third Year (7 credits) 3 cr Music 446. Electronic Music Synthesis.	3 cr M E 451 Engineering Acoustics 1 cr Music 490I Independent Study (Electronic Music).

Sample 8. A student in software engineering interested in a minor related to programming for music software. . A final project emphasizes this direction. Total credits: 15

First Year (5 credits) 3 cr Com S 227 Introduction to Object-oriented Programming.	2 cr Music 246. Introduction to Music Technology.
Second Year (6 credits) 3 cr Com S 228 Introduction to Data Structures.	3 cr Music 346. MIDI and Digital Audio Techniques.
Third Year (7 credits) 3 cr Music 446. Electronic Music Synthesis.	1 cr Music 490I Independent Study (Electronic Music).

Appendix III
Letter of Support from Department Head

IOWA STATE UNIVERSITY
of Science and Technology

Interoffice Memorandum

DATE: September 11, 2007

TO: LAS Curriculum Committee
Faculty Senate Curriculum Committee

FROM: Mike Golemo, Music Dept. Chair

RE: Departmental Support for Minor in Music Technology

This letter is in support of our proposed minor in music technology. Our department is committed to providing faculty to maintain regular offering of the courses required by this minor, in particular Music 246, 346, and 446. These courses require at minimum one faculty member with advanced expertise in computer music applications, supported by other faculty for whom music technology is a secondary teaching area. Our department has options to diversify current faculty responsibilities to accommodate the addition of this minor to our curriculum.

Christopher Hopkins is our faculty member with primary responsibility for teaching music technology courses. Up to the present he has taught Music 246 and 446 in addition to courses in composition, theory, and 248, a required course in technology specialized for the music education curriculum. With the 2007-2009 catalog, our curriculum has added an advanced course, Music 346, which requires a faculty member with his expertise. In order to accommodate this change we can take advantage of other faculty members qualified to teach Music 246 and 248. This also avoids bundling the required course sequence into in a single faculty line.

Maintenance of a faculty line with primary responsibilities in music technology will remain a priority for the department. Should Dr. Hopkins leave our department suddenly, we would re-hire someone as soon as possible to maintain continuity of the program.


Please let me know if you have any questions, comments or concerns.

Appendix IV
Letters of support from other ISU Programs and Departments

Interoffice Communication

DATE: 20 September 2007

TO: Curriculum Committee, College of Liberal Arts and Sciences
Curriculum Committee, Faculty Senate

FROM: Mark J. Kushner 
Dean, College of Engineering

SUBJECT: College of Engineering Support for a Minor in Music Technology

A minor in Music Technology will add an important interdisciplinary option to our undergraduate curriculum. This new program will challenge students to balance structural and creative thinking in response to the design problems posed by an aesthetic discipline. In turn, this will enhance students' creativity in their engineering major. I strongly endorse the minor.

This new minor also complements the engineering curriculum through specific intersections related to technology and research methods. Both curricula develop skills in the use of computer applications, and progress to solving discipline-specific problems through specialized programming. Both require analysis and manipulation of data. Both develop applications for digital signal processing, and employ interactive human-computer interfaces. Both experiment through abstractions, yet ultimately respond to real-world constraints (e.g. acoustics). Such inherent ties identify this minor as one particularly well-suited to our majors.

It is gratifying to learn that the proposed courses, faculty, and facilities for this program are already in place. Upon final approval our majors may therefore anticipate availability of this minor with minimal delay.

From: bugeja@iastate.edu
Subject: **Re: Music Technology Minor**
Date: September 25, 2007 1:05:58 PM CDT
To: hopkinsc@iastate.edu
Cc: rwallace@iastate.edu, faculty@jlmc.iastate.edu,
lecturers@jlmc.iastate.edu, staff@jlmc.iastate.edu, jefe@iastate.edu

Dear Christopher,

Last Friday, as you know, I sent an email to the faculty asking them to weigh in with "Affirm," "Reject," or "Abstain" concerning your proposal for a Minor in Music Technology. A bit fewer than half of our voting faculty members sent me votes concerning your proposal, with two not voting officially but expressing views (non critical) about the substance and curriculum for the proposal. All those who voted "affirmed."

Thus, you have the Greenlee School's support in your efforts to establish what looks to many of us as an alluring program of study.

I'll copy in Rob Wallace so that he has this email chain on file and so that you can incorporate it in your narrative.

Best Wishes,
Michael

Michael Bugeja, director
Greenlee School of Journalism and Communication
Hamilton Hall 101A
Iowa State University of Science and Technology
Ames, Iowa 50011

Appendix V
Memos from Programs at other Regents Universities

From: Michael Golemo <mgolemo@iastate.edu>
Subject: **Minor in Music Tech**
Date: May 10, 2006 3:06:45 PM CDT
To: hopkinsc@iastate.edu

>From popserve Wed May 10 14:10:47 2006
Subject: RE: Minor in Music Technology
Date: Wed, 10 May 2006 13:58:39 -0500
Thread-Topic: Minor in Music Technology
Thread-Index: AcZzdDgKu5nIRG9JR2aCspTPDMeowwA7oZfQ
From: "Thelander, Kristin" <kristin-thelander@uiowa.edu>
To: "Michael Golemo" <mgolemo@iastate.edu>

Michael,
The University of Iowa offers no programs or minor areas in music technology *per se*, so there is no duplication of programs with the proposed minor at Iowa State University. The UI School of Music offers courses in music technology, including recording techniques and composition using electronic and computer technologies.

Kristin Thelander
Director, Division of Performing Arts
Director, School of Music
University of Iowa
319/335-1601

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Dr. Michael Golemo
Director of Bands
Chair, Department of Music
Iowa State University
Music Hall Room 103
Ames, IA 50011
Phone (515) 294-0394
Fax (515) 294-6409
<http://www.music.iastate.edu/>

Chair, Board of Trustees
Past National President ('99-'01)
Kappa Kappa Psi National Honorary Band Fraternity
<http://www.kkpsi.org/>

November 3, 2006

The University of Northern Iowa (UNI) School of Music does not object to a minor being offered by ISU in Music Technology. It is not uncommon for multiple universities, even in the same state to offer such minors. Technology is a basic component of today's society and can be extremely helpful to all music majors. However, the UNI School of Music does not offer a recording minor at this time and does not see a conflict, nor duplication of efforts in regard to this minor degree program.

Sincerely,

John F. Vallentine
Director & Professor