

# MUSIC

*Emeriti: (Professors)* John M. Chowning, Albert Cohen, George Houle, William H. Ramsey, Leonard G. Ratner, Leland C. Smith; *(Professors, Performance)* Arthur P. Barnes, Marie Gibson; *(Professor, Research)* Max V. Mathews

*Chair:* Stephen M. Sano

*Professors:* Jonathan Berger, Karol Berger, Chris Chafe (on leave), Brian Ferneyhough (on leave), Thomas Grey, Stephen Hinton, Julius O. Smith (on leave Autumn)

*Associate Professors:* Mark Applebaum, Heather Hadlock, William P. Mahrt

*Assistant Professors:* Jaroslaw Kapuscinski, Jesse Rodin, Ge Wang  
*Professor (Teaching):* George Barth (Piano; on leave Winter, Spring)

*Associate Professor (Teaching):* Stephen M. Sano (Director of Choral Studies)

*Associate Professor (Performance):* Jindong Cai (Director of Orchestral Studies)

*Courtesy Professor:* Paul DeMarinis

*Senior Lecturers:* Giancarlo Aquilanti (Director of Theory; Wind Ensemble), Stephen Harrison (Violoncello), Thomas Schultz (Piano), Gregory A. Wait (Voice; Director of Vocal Studies), Frederick R. Weldy (Piano)

*Lecturers:* Kumaran Arul (Piano), Talya Berger (Theory), Fredrick Berry (Jazz Ensemble), Frances Blaisdell (Flute), Mark Brandenburg (Clarinet), Marjorie Chauvel (Harp), Tony Clements (Tuba), Laura Dahl (Resident Collaborative Pianist), Natasha Daniels (Viola), Anthony Doheny (Violin), John Dornenburg (Viola da Gamba), Charles A. Ferguson (Guitar), Debra Fong (Violin), Claire Giovannetti (Voice), Dawn Harms (Violin, Viola), Alexandra Hawley (Flute), David Henderson (Classical Saxophone), Melody Holmes-Schaeffe (Flute), Robert Hubbard (Oboe), Graeme Jennings (Violin), Joyce Johnson-Hamilton (Trumpet), Jay Kadis (Audio Recording), McDowell Kenley (Trombone), Mary Linduska (Voice), Fernando Lopez-Lezcano (CCRMA), Murray Low (Jazz Piano), Janet Maestre (Flute), Anthony Martin (Baroque Violin), James Matheson (Oboe), Charles McCarthy (Jazz Saxophone), Robert Huw Morgan (University Organist, Organ), Bruce Moyer (Contrabass), Herbert Myers (Early Winds), James Nadel (Jazz), Rufus Olivier (Bassoon), Larry S. Ragent (French Horn), Amy Schneider (Voice; on leave Autumn), Robin Sharp (Violin), Jerome Simas (Clarinet), Livia Sohn (Violin), Elaine Thornburgh (Harpsichord), Erik Ulman (Composition, Theory), Linda Uyechi (Taiko), Mark Veregge (Percussion), Sharon Wei (Viola), John Worley (Jazz Trumpet), Hui (Daisy) You (Guzheng), Timothy Zerlang (University Carillonneur, Piano)

*Consulting Professors:* Jonathan Abel (CCRMA), David Berners (CCRMA), Marina Bosi-Goldberg (CCRMA), Walter Hewlett (Computer-Assisted Research in the Humanities), Eleanor Selfridge-Field (Computer-Assisted Research in the Humanities), Malcolm Slaney (CCRMA)

*Visiting Professor:* Thomas Rossing (CCRMA)

*Acting Assistant Professor:* Charles Kronengold

*Artists-in-Residence (St. Lawrence String Quartet):* Geoff Nuttall (Violin), Scott St. John (Violin), Lesley Robertson (Viola), Christopher Costanza (Violoncello)

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Courses offered by the Department of Music have the subject code MUSIC, and are listed in the "Music (MUSIC) Courses" section of this bulletin.

## MISSION OF THE DEPARTMENT OF MUSIC

The Department of Music's aims are to provide specialized training for those who plan careers in music as composers, performers, teachers, and research scholars, and to promote the

understanding and enjoyment of music in the University at large through its courses and performance offerings.

## UNDERGRADUATE PROGRAMS IN MUSIC

### BACHELOR OF ARTS IN MUSIC

The undergraduate major in Music is built around a series of foundation courses in theory, musicianship, and music history, in addition to performance and the proficiency requirements outlined below. Majors must complete a minimum of 66 units within the department. All required courses for the B.A. in any concentration must be taken for a letter grade. Electives may be taken credit/no credit, but any courses taken towards concentration requirements must also carry a letter grade.

### SUGGESTED PREPARATION FOR THE MAJOR

Because of the sequence of courses, it takes more than two years to complete the requirements for the major. Students are required to meet with the undergraduate student services officer (USSO) in the department prior to declaring the major. It is highly recommended that prospective majors schedule this consultation with the USSO as early as possible in their careers in order to plan a program that allows sufficient time for major course work, practice, and University requirements outside the major. Early planning is especially important for students wishing to double-major, for those contemplating overseas study during their undergraduate years, for those wishing to do an in-depth concentration in the Music major, and for those with particular musical talents and interests.

*Suggested Preparatory Course*—MUSIC 19. Introduction to Music Theory

### FIELDS OF STUDY OR DEGREE OPTIONS

Concentrations are offered in: performance; conducting; composition; history and theory; or music, science, and technology. Each of these concentration areas is declarable in Axxess as a subplan. Specific guidelines and information on the concentration tracks are available from the Department of Music office and students are urged to select this option no later than the middle of their junior year in order to complete all of the requirements in a timely manner.

### DEGREE REQUIREMENTS

In conjunction with the undergraduate student services office, the student is assigned a departmental adviser with whom the student is required to meet at least one time each quarter. Total units and courses required to graduate for each concentration are specified in the relevant section following.

*Required Courses*—The following courses are required of all majors.

*Theory*—

MUSIC 21. Elements of Music I (4 units)

MUSIC 22. Elements of Music II (4 units)

MUSIC 23. Elements of Music III (4 units)

1. *History*—

MUSIC 40. Music History to 1600 (4 units)

MUSIC 41. Music History 1600-1830 (4 units)

MUSIC 42. Music History Since 1830 (4 units)

2. *Analysis*—

MUSIC 121. Analysis of Tonal Music (4 units)

and two at the 4-unit level, from:

MUSIC 122A. Eighteenth-Century Counterpoint

MUSIC 122B. Harmonic Materials of the 19th Century

MUSIC 122C. Introduction to 20th-Century Composition

3. *Writing in the Major (WIM)*—Three (at least two at the 4-unit level) from:

MUSIC 140. Studies in Medieval Music

MUSIC 141. Studies in Renaissance Music

MUSIC 142. Studies in Baroque Music

MUSIC 143. Studies in Classical Music

MUSIC 144. Studies in Romantic Music

MUSIC 145. Studies in Modern Music

MUSIC 148. Musical Shakespeare: Theater, Song, Opera, and Film

MUSIC 151. Psychophysics and Cognitive Psychology for Musicians

4. *Applied*—
- minimum five quarters totaling 15 units of private instruction in instrumental and/or vocal performance (MUSIC 172/272 – 177/277); students who do not qualify for private instruction at the intermediate or advanced level, but who wish to pursue the major may take introductory voice (MUSIC 65 and 73), piano (MUSIC 12 and 72A), or guitar (MUSIC 74C) to reach the minimum proficiency levels required to be accepted into a private studio and then complete their 5 quarters. Requirements for the minimum levels of proficiency in each instrument for private instruction are posted at: <http://music.stanford.edu/Academics/Auditions.html>.
  - minimum five quarters totaling at least 5 units of work in one or more of the department's organizations or chamber groups. To fulfill the ensemble requirement, Music majors need at least three quarters of participation in the department's traditional large ensembles (MUSIC 159–167), with the exception of students whose primary instrument is harp, keyboard, or guitar, who need to participate at least one quarter in the ensembles above, but who may fulfill the rest of the requirement with chamber music (MUSIC 171). MUSIC 181 may count for up to two of the ensemble-unit requirements for the Music major.
- Note—MUSIC 156, "sic": Improvisation Collective; MUSIC 157, Mariachi Band; and MUSIC 161C, Red Vest Band, do not satisfy this requirement.
5. *Additional requirements*—
- Majors are required to pass a Piano Proficiency examination as part of the music theory core (MUSIC 21, 22, 23). The examination is given in the first two weeks of MUSIC 21. Students who do not pass the Piano Proficiency examination are required to enroll in MUSIC 12 concurrently with the music theory core until they are able to pass the examination. The examination consists of scales and arpeggios, performance of a simple tune to be set by the examiner, sight-reading, and the performance of prepared pieces. Information regarding the proficiency examination may be downloaded at <http://music.stanford.edu/private/downloads/PIANO%20PROFICIENCY%20EXAM.doc>
  - Majors must also pass an ear-training proficiency examination, which is one of the requirements to complete MUSIC 23. It may be taken by arrangement and demonstrates a student's ability to hear music accurately and to perform it at sight.

*Electives*—

- I. *Concentration in Performance*—In addition to degree requirements required of majors listed above, students in the Performance concentration must: complete at least 6 additional, graded course units in performance. Acceptable courses are described under "Applied" in the section describing private instruction and ensemble course work above. Additional courses might include, but are not limited to:
- MUSIC 126. Introduction to Thoroughbass  
MUSIC 154. Composition and Performance of Instrumental Music with Electronics  
MUSIC 182. Diction for Singers  
MUSIC 183. Art Song Interpretation  
MUSIC 169A/269A. Seminar in Performance Practices  
MUSIC 269B. Research in Performance Practices  
register for an independent project (MUSIC 198, 4 units) in the senior year under faculty supervision, leading to a senior recital.
- II. *Concentration in Conducting*—In addition to degree requirements required of majors listed above, students in the Conducting concentration must: complete at least 6 additional, graded course units in conducting. Additional courses might include, but are not limited to:
- MUSIC 127. Instrumentation and Orchestration  
MUSIC 130. Elementary Conducting  
MUSIC 230. Advanced Orchestral Conducting

MUSIC 231. Advanced Choral Conducting  
register for an independent project (MUSIC 198, 4 units) in the senior year under faculty supervision, leading to a senior conducting project.

III. *Concentration in Composition*—In addition to degree requirements required of majors listed above, students in the Composition concentration must:

complete at least 6 additional, graded course units in composition. Additional courses might include, but are not limited to:

- MUSIC 123. Undergraduate Seminar in Composition  
MUSIC 125. Individual Undergraduate Projects in Composition  
MUSIC 127. Instrumentation and Orchestration  
MUSIC 150. Musical Acoustics  
MUSIC 154. Composition and Performance of Instrumental Music with Electronics  
MUSIC 220A, B, or C—any of the series in computer-generated sound, music, and composition  
register for an independent project (MUSIC 198, 4 units) in the senior year under faculty supervision, leading to a composition.

IV. *Concentration in History and Theory*—In addition to degree requirements required of majors listed above, students in the History and Theory concentration must: complete at least 6 additional, graded course units in history and theory. Additional courses might include, but are not limited to:

- MUSIC 122A, B, or C—any course not taken in fulfillment of the major requirement  
MUSIC 140–148/240–248, 151—any courses not taken in fulfillment of the major requirement  
MUSIC 221. Topics in the History of Theory  
MUSIC 220A, B, or C—any of the series in computer-generated sound, music, and composition  
MUSIC 169A/269A. Seminar in Performance Practices  
register for an independent project (MUSIC 198, 4 units) in the senior year under faculty supervision, leading to a senior research paper.

V. *Concentration in Music, Science, and Technology*—Requires completion of 66 units of course work that differs from that of the major and is delineated below. This field of study is designed for those students interested in the musical ramifications of rapidly evolving computer technology and digital audio, and in the acoustic and psychoacoustic foundations of music. This program can serve as a complementary major to students in the sciences and engineering. Students in the program are required to include the following courses in their studies:

*Theory and Analysis*—

- MUSIC 21. Elements of Music I (4 units)  
MUSIC 22. Elements of Music II (4 units)  
MUSIC 23. Elements of Music III (4 units; includes passing the piano and ear-training proficiency examinations, as described for the major)  
MUSIC 121. Analysis of Tonal Music (4 units)  
MUSIC 150. Musical Acoustics (3 units)  
MUSIC 151. Psychophysics and Cognitive Psychology for Musicians (WIM) (4 units)  
MUSIC 220A. Fundamentals of Computer-Generated Sound (4 units)  
MUSIC 220B. Compositional Algorithms, Psychoacoustics, and Spatial Processing (4 units)  
MUSIC 220C. Research Seminar in Computer-Generated Music (4 units)  
MUSIC 220D. Research in Computer-Generated Music (4 units)  
MUSIC 250A. Human-Computer Interface Theory and Practice (4 units)

*Applied*—

- Individual studies in performance, MUSIC 171/272–177/277, (6 units), or MUSIC 192A. Foundations of Sound Recording Technology and MUSIC 192B. Advanced Sound-Recording Technology, (3 units each).
- Ensemble as described above for the major (5 units) or MUSIC 192C. Session Recording (5 units)

*History*—Two at the 4-unit level from:

- MUSIC 40. Music History to 1600

MUSIC 41. Music History 1600–1830

MUSIC 42. Music History Since 1830

The program requires a senior research project (4 units) completed under faculty guidance. May be completed in conjunction with enrollment in any of the following:  
MUSIC 220D; MUSIC 199; MUSIC 198.

#### HONORS PROGRAM

Honors in Music are awarded by the faculty to concentrators who have produced an independent project of exceptional quality and meet certain departmental standards in musicianship, scholarship, and academic standing. The conferral of honors is done solely through faculty consultation. Students do not petition for honors.

#### OVERSEAS STUDY OR STUDY ABROAD

Courses in Music are often available at Stanford overseas programs, especially in Berlin, Paris, Florence, and Oxford. See the “Overseas Studies Program” section of this bulletin for this year’s listings. Music majors and minors should talk to the Department of Music undergraduate administrator prior to going overseas.

#### MINOR IN MUSIC

Minors in Music and in Music, Science, and Technology provide the student with a core of essential Music courses in the disciplines that establish both a foundation for informed appreciation of music and a basis for more advanced study, should the student wish to pursue it.

*Requirements*—Total of 36 units required course work as delineated below. Students in either minor must also pass the piano and ear-training proficiency examinations required of Music majors.

*Required Courses for the Minor in Music—*

##### *Theory—*

MUSIC 21. Elements of Music I (4 units)

MUSIC 22. Elements of Music II (4 units)

MUSIC 23. Elements of Music III (4 units)

##### 6. *History—*

MUSIC 40. Music History to 1600 (4 units)

MUSIC 41. Music History 1600–1830 (4 units)

MUSIC 42. Music History Since 1830 (4 units)

##### 7. *Applied (two quarters)—*

MUSIC 159-171. Ensemble (2 units, total)

MUSIC 172-177. Individual Instruction (6 units, total)

##### 8. *Choice of one (WIM)—*

MUSIC 140-148, 151 (4 units)

*Required Courses for the Minor in Music, Science, and Technology—*

##### *Theory—*

MUSIC 21. Elements of Music I (4 units)

MUSIC 22. Elements of Music II (4 units)

MUSIC 23. Elements of Music III (4 units)

MUSIC 150. Musical Acoustics (3 units)

MUSIC 151. Psychophysics and Cognitive Psychology for Musicians (WIM) (4 units)

MUSIC 220A. Fundamentals of Computer-Generated Sound (4 units)

MUSIC 220B. Compositional Algorithms, Psychoacoustics, and Spatial Processing (4 units)

##### 9. *Applied—*

MUSIC 192A. Foundations of Sound-Recording Technology (3 units)

MUSIC 192B. Advanced Sound-Recording Technology (3 units)

MUSIC 192C. Session Recording (two quarters; 3 units total)

## GRADUATE PROGRAMS IN MUSIC

### MASTER OF ARTS IN MUSIC

University requirements for the M.A. are described in the “Graduate Degrees” section of this bulletin.

None of Stanford’s required undergraduate courses may be credited toward an advanced degree unless specifically required for both degrees. Only work that receives a grade of ‘A,’ ‘B,’ or

‘Satisfactory’ (a passing grade in an instructor-mandated credit/no credit course) in Music courses numbered 100 or higher taken as a graduate student is recognized as fulfilling the advanced-degree requirements. Students may need to devote more than the minimum time in residence if preparation for graduate study is inadequate.

#### ADMISSION

Applicants are required to submit evidence of accomplishment (scores, recordings, and/or research papers) when they complete the application form. Applicants should arrange to take the Graduate Record Examination (GRE) well in advance of the December 16 application deadline. All components of the application are due by December 16. International students whose first language is not English are also required to take the TOEFL exam (with certain exceptions: see <http://gradadmissions.stanford.edu>).

#### FIELDS OF STUDY OR DEGREE OPTIONS

All of the above fields of study are declarable as subplans in Axxess:

Master of Arts degree (M.A.)—in Composition.

Master of Arts degree (M.A.)—in Music History.

Master of Arts degree (M.A.)—in Computer-Based Music Theory and Acoustics.

Master of Arts degree (M.A.)—in Music, Science, and Technology (M.A./M.S.T.) Note: The MA/MST program is the only terminal master’s degree; it is one year in duration and consists only of coursework.

#### DEGREE REQUIREMENTS

A minimum of 45 academic units is required for the master’s degree in Music. The Department of Music does not accept students for study only towards the M.A. degree except in the Music, Science, and Technology program, described below.

*Required Courses—*

I. *Composition*—Students are not admitted into the M.A. as a terminal degree for composition: rather, students in the D.M.A. program in composition who enter directly from the bachelor’s level may, upon completing 45 graduate-level units and advancing to candidacy by passing the qualifying examination, be recommended for the M.A. degree in composition.

II. *Music History*—Students are not admitted into the M.A. as a terminal degree for music history: rather, students in the Ph.D. program in musicology who enter directly from the bachelor’s level may, upon completing 45 graduate-level units and advancing to candidacy by passing the qualifying examination, be recommended for the M.A. degree in music history.

III. *Computer-Based Music Theory and Acoustics*—Students are not admitted into the M.A. as a terminal degree for computer-based music theory and acoustics: rather, students in the Ph.D. program in computer-based music theory and acoustics who enter directly from the bachelor’s level may, upon completing 45 graduate-level units and advancing to candidacy by passing the qualifying examination, be recommended for the M.A. degree in computer-based music theory and acoustics.

IV. *Music, Science, and Technology*—The M.A. in music, science, and technology is the department’s only terminal master’s degree. This is a one-year program of 45 units focusing on the integration of music perception, music-related signal processing and controllers, and synthesis. The program is designed for students having an undergraduate engineering or science degree or a degree that includes course work in engineering mathematics. In addition to degree requirements required of all students listed above, students must complete at least 39 units of approved course work. Modifications to the required course work listed below may be proposed on a student’s behalf by the student’s program adviser.

Required:

MUSIC 151. Psychophysics and Cognitive Psychology for Musicians (4 units)

MUSIC 154. Composition and Performance of Instrumental Music with Electronics (3 units)

MUSIC 192A. Foundations of Sound-Recording Technology (3 units)

MUSIC 192B. Advanced Sound-Recording Technology (3 units)

- MUSIC 220A. Fundamentals of Computer-Generated Sound (4 units)
- MUSIC 220B. Compositional Algorithms, Psychoacoustics, and Spatial Processing (4 units)
- MUSIC 220C. Research Seminar in Computer-Generated Music (4 units)
- MUSIC 250A. Human-Computer Interface Theory and Practice (4 units)
- MUSIC 320. Introduction to Digital Audio Signal Processing (4 units)
- MUSIC 420. Signal Processing Models in Musical Acoustics (3 units)
- MUSIC 421. Audio Applications of the Fast Fourier Transform (3 units)

10. Electives: students are required to complete an additional 6 units of graduate level work that may be taken outside the department.

### DOCTOR OF MUSICAL ARTS (D.M.A.) AND DOCTOR OF PHILOSOPHY (PH.D.) IN MUSIC

University requirements for the D.M.A. and Ph.D. are described in the “Graduate Degrees” section of this bulletin. The following statements apply to all the graduate degrees described below, unless otherwise indicated.

**Department Examinations**—All entering doctoral graduate students are required to take: (1) a diagnostic examination testing the student in theory (counterpoint, harmony, and analysis) and (for musicologists only) the history of Western art music; and, (2) a proficiency examination in sight-singing and piano sight-reading. These exams are given at the beginning of study in the department (usually the week before school begins). Teaching Assistant assignments and the funding associated with this portion of a graduate student’s financial aid package are determined based upon successful completion of these exams.

None of Stanford’s required undergraduate courses may be credited toward an advanced degree unless specifically required for both degrees. Only work that receives a grade of ‘A,’ ‘B,’ or ‘Satisfactory’ (a passing grade in an instructor-mandated credit/no credit course) in music courses numbered 100 or higher taken as a graduate student is recognized as fulfilling the advanced-degree requirements. Students may need to devote more than the minimum time in residence if preparation for graduate study is inadequate.

The following may be taken as electives for graduate credit:

- e. any course in another department numbered 100 or over (with adviser’s consent)
- f. any course in the Music department numbered 100 or over except those required for the B.A. degree. A letter grade of ‘A,’ ‘B,’ or ‘S’ (in an instructor-mandated pass/fail course) is required.
- g. Music department group instruction: MUSIC 72–77.

### ADMISSION

Applicants are required to submit evidence of accomplishment (scores, recordings, and/or research papers, according to the proposed field of concentration) when they complete the application form. Applicants should arrange to take the Graduate Record Examination (GRE) well in advance of the December 16 application deadline. All components of the application are due by December 16. International students whose first language is not English are also required to take the TOEFL exam (with certain exceptions: see <http://gradadmissions.stanford.edu>).

### FIELDS OF STUDY OR DEGREE OPTIONS

All of the following fields of study are declarable as subplans in Access:

**Doctor of Musical Arts degree (D.M.A.) in Composition**—The D.M.A. is offered to a limited number of students who demonstrate substantial training in the field and high promise of attainment as composers. Students may work in traditional and/or electronic forms. Breadth is given through studies in other branches of music and in relevant fields outside music, as desirable. The final project for this degree is a large-scale composition.

**Doctor of Philosophy degree (Ph.D.) in Musicology**

**Doctor of Philosophy degree (Ph.D.) in Computer-Based Music Theory and Acoustics**—The Ph.D. is offered in areas of the research of Stanford’s graduate faculty: Musicology, including specialties in musical aesthetics, history of music theory, and performance practice; and Computer-Based Music Theory and Acoustics (CBMTA), specializing in research in musical acoustics at the Center for Computer Research in Music and Acoustics (CCRMA). The department seeks students who demonstrate substantial scholarship, high promise of attainment, and the ability to do independent investigation and present the results of such research in a dissertation.

### DEGREE REQUIREMENTS

**Residence**—The candidate must complete a minimum of 135 academic units (see Residency under the “Graduate Degrees” section of this bulletin). Doctoral candidates working on Ph.D. dissertations or Doctor of Musical Arts (D.M.A.) final projects that require consultation with faculty members continue enrollment in the University under Terminal Graduate Registration (TGR), after they have reached the required 135 academic units and have completed their Special Area examinations.

**Qualifying Examination**—A written and oral examination for admission to candidacy is given just prior to the fourth quarter of residence for D.M.A. students and Ph.D. students in the Computer-Based Music Theory and Acoustics programs; for Ph.D. students in Musicology, the exams are given just prior to the eighth quarter of residence. This exam tests knowledge of history, theory, repertory, and analysis.

**Teaching**—All students in the Ph.D. or D.M.A. degree programs, regardless of sources of financial support, are required to complete six quarters of supervised teaching at half time. Music 280 (given in Spring Quarter and taken at the end of the first year) is a required course for Teaching Assistants. Additional quarters of teaching may be required by the department.

### Required Courses—

MUSIC 200. Graduate Proseminar (4 units)—required of all composition and computer-based music theory and acoustics students entering directly from the bachelor’s degree and of all students in musicology, regardless of entering degree level.

MUSIC 301A. Analysis of Music: Modal (4 units)

MUSIC 301B. Analysis of Music: Tonal (4 units)

MUSIC 301C. Analysis of Music: Post-Tonal (4 units)

**I. Composition**—The Doctor of Musical Arts (D.M.A.) degree in Composition is given breadth through collateral studies in other branches of music and in relevant studies outside music as seems desirable. In addition to degree requirements required of all doctoral graduate students and listed above, students must complete at least 16 units of:

MUSIC 323. Doctoral Seminar in Composition

11. Besides those requirements listed above, candidates are expected to produce a number of works demonstrating their ability to compose in a variety of forms and for the common media: vocal, instrumental, and electronic music. If possible, the works submitted are presented in public performance prepared by the composer. Annual progress is reviewed by the composition faculty.

12. **Foreign Language Requirement**—At the time of advancement to candidacy, all D.M.A. students are required to have demonstrated a reading knowledge of one language other than English and the ability to translate into idiomatic English.

13. **Special-Area Examination**—A written examination in the candidate’s field of concentration, including a final project proposal, is required to be completed during the fourth year of study, no later than the last day of classes in Autumn Quarter of that year.

14. **Final Project Defense**—Required during the last quarter of residence, the purpose of the defense is to demonstrate the ability of the candidate to organize and present the topic of the Final Project for public review. It should be one hour in length, treating aspects of the final project. Details regarding the D.M.A. defense may be found in the *Department of Music Graduate Handbook* available at: <http://music.stanford.edu/Academics/gradStudies.html>

15. *Final Project*—Candidate's work culminates in a required Final Project. The final project in composition must be a major work for full orchestra or chamber ensemble with chorus, instruments, voices, electronic media, or a combination of these. Typically, work on the final project encompasses several quarters. Usually, smaller works, for specific performances, are composed at the same time.

16. *Reading Committee*—The minimum membership of the reading committee is the principal dissertation adviser and a second member from the department. A third member from the department is optional. All members of the committee must belong to the Academic Council. The notice of appointment of a D.M.A. Final Project Reading Committee should be submitted to the department at the same time as the approved final project proposal and the completion of the special area exam. It is the responsibility of the student, with the advice of his or her adviser, to approach appropriate faculty members and obtain their consent to serve on the reading committee. Obtain the D.M.A. reading committee form from the department office; fill it out; obtain committee members' signatures; return to the department office.

II. *Musicology*—In addition to degree requirements required of all doctoral graduate students and listed above, students must complete at least 42 units of approved courses including:

*Required:*

MUSIC 221. Topics in the History of Theory (3–5 units)

MUSIC 300A. Medieval Notation (4 units)

MUSIC 300B. Renaissance Notation (4 units)

MUSIC 310. Research Seminar in Musicology (24–40 units); the requirement is for eight seminars of 3–5 units each. Students may petition to take up to two graduate seminars in other departments, in consultation with their adviser.

17. *Foreign Language Requirement*—At the time of advancement to candidacy, all Ph.D. students in Musicology must have passed a Ph.D. Language examination in German and in a second language, chosen from French, Italian, or Latin (or, on a case-by-case basis, another language, if it has significant bearing on the candidate's field of study). If one of these languages is the student's native language, the student may be exempted from an examination.

18. *Special-Area Examination*—A written and oral examination testing the student's knowledge of music and research in the student's field of concentration is completed during the fourth year of study, no later than the last day of classes in Autumn Quarter of that year. This includes an oral defense of the dissertation proposal. The examining committee comprises prospective readers of the dissertation.

19. *University Oral Examination*—Taken once the dissertation is substantially underway; an oral presentation and defense of dissertation research methods and results.

20. *Dissertation*—After the first two years of graduate study, the student concentrates on research and writing of the dissertation. The dissertation demonstrates the student's ability to work systematically and independently to produce an essay of competent scholarship.

21. *Reading Committee*—The minimum membership of the reading committee is 1) the principal dissertation adviser, 2) a second member from the department, and 3) a third member from the major department or another department. If a third member is from another institution, a fourth member must be appointed from the department. The principal dissertation adviser and all other members of the committee must belong to the Academic Council. The notice of appointment of a Reading Committee should be submitted to the department at the same time as the approved dissertation proposal and the completion of the Special-Area Exam. It is the responsibility of the student, with the advice of his or her adviser, to approach appropriate faculty members and obtain their consent to serve on the reading committee.

III. *Computer-Based Music Theory and Acoustics*—In addition to degree requirements required of all doctoral graduate students and listed above, students must complete at least 28 units of approved courses including:

*Required:*

MUSIC 220A. Fundamentals of Computer-Generated Sound (4 units)

MUSIC 220B. Compositional Algorithms, Psychoacoustics, and Spatial Processing (4 units)

MUSIC 220C. Research Seminar in Computer-Generated Music (4 units)

MUSIC 220D. Research in Computer-Generated Music (12 units total)

MUSIC 320. Introduction to Digital Audio Signal Processing (4 units)

22. *Foreign Language Requirement*—At the time of advancement to candidacy, all Ph.D. students in computer-based music theory and acoustics are required to have demonstrated a reading knowledge of one language other than English and the ability to translate into idiomatic English.

23. *Special-Area Examination*—A written and oral examination testing the student's knowledge of music and research in the student's field of concentration is completed during the fourth year of study, no later than the last day of classes in Autumn Quarter of that year. This includes an oral defense of the dissertation proposal. The examining committee comprises prospective readers of the dissertation.

24. *University Oral Examination*—Taken once the dissertation is substantially underway; an oral presentation and defense of dissertation research methods and results.

25. *Dissertation*—After the first two years of graduate study, the student concentrates on research and writing of the dissertation. The dissertation demonstrates the student's ability to work systematically and independently to produce an essay of competent scholarship.

26. *Reading Committee*—The minimum membership of the reading committee is 1) the principal dissertation adviser, 2) a second member from the department, and 3) a third member from the major department or another department. If a third member is from another institution, a fourth member must be appointed from the department. The principal dissertation adviser and all other members of the committee must belong to the Academic Council. The notice of appointment of a Reading Committee should be submitted to the department at the same time as the approved dissertation proposal and the completion of the Special-Area Exam. It is the responsibility of the student, with the advice of his or her adviser, to approach appropriate faculty members and obtain their consent to serve on the reading committee.

## PH.D. IN MUSIC AND HUMANITIES

The department participates in the Graduate Program in Humanities leading to a Ph.D. degree in Music and Humanities. For a description of the program, see the "Interdisciplinary Studies in Humanities" section of this Bulletin.

# MUSIC (MUSIC) COURSES

Many Music courses have web pages linked to the Music home page. Courses with web sites at press time are noted in their entries below. For information on undergraduate and graduate programs in the Department of Music, see the "Music" section of this bulletin.

## UNDERGRADUATE COURSES IN MUSIC

Students with training in theory should take the placement exam given at the beginning of each quarter for admission to more advanced courses. Students must not assume that they may begin study with MUSIC 21.

### MUSIC 5G. Introduction to Guzheng

Introduction to Chinese music through learning how to play guzheng, a 21-stringed traditional Chinese instrument. The cultural, social, and historical significance of guzheng. 15 guzheng techniques, how to read Chinese music and guzheng notation, and two simple classic guzheng pieces. May be repeated for credit a total of 14 times. (AU)

1 unit, Aut (You, H), Win (You, H), Spr (You, H)

### MUSIC 6A. Musical Treasures of Asia

Introduction to the music of Asian cultures emphasizing China, India, Indonesia, Japan, and Korea. Ethnic, social, cultural, and global perspectives. Instruments and ensembles in performance contexts such as sacred rituals and secular dance and theater. Traditional genres and their impact on contemporary composers. No musical background required. GER:DB-Hum, EC-GlobalCom

3 units, Win (Kapuscinski, J)

### MUSIC 7A. World Music and Globalized Culture

The circulation of musicians, audiences, instruments and other musical technologies, songs, recordings, and musical genres. What happens when music moves from rural to urban contexts, across national boundaries, into new mediascapes and technological regimes? Emphasis is on recent developments. Topics include: Arabic, Chinese, and Hindustani classical music; hip hop's global reach; carnival in the Americas; Bollywood film; music, Islam, and the state; attempts at creating pan-Asian pop; the spread of the guitar and the brass band; ringtones and mobile music; YouTube.

3 units, Aut (Kronengold, C)

### MUSIC 8A. Rock, Sex, and Rebellion

Development of critical listening skills and musical parameters through genres in the history of rock music. Focus is on competing aesthetic tendencies and subcultural forces that shaped the music. Rock's significance in American culture, and the minority communities that have enriched rock's legacy as an expressively diverse form. Lectures, readings, listening, and video screenings. GER:DB-Hum, EC-AmerCul

3 units, Spr (Applebaum, M), alternate years, not given next year

### MUSIC 12A. Introductory Piano Class

(A=level 1; B=level 2; C=level 3)

1 unit, Aut (Zerlang, T), Win (Zerlang, T), Spr (Zerlang, T), Sum (Zerlang, T)

### MUSIC 12B. Introductory Piano Class

(A=level 1; B=level 2; C=level 3)

1 unit, Aut (Zerlang, T), Win (Zerlang, T), Spr (Zerlang, T), Sum (Zerlang, T)

### MUSIC 12C. Introductory Piano Class

(A=level 1; B=level 2; C=level 3.) May be repeated for credit a total of 14 times.

1 unit, Aut (Zerlang, T), Win (Zerlang, T), Spr (Zerlang, T), Sum (Zerlang, T)

### MUSIC 13Q. Classical Music and Politics: Western Music in Modern China

Stanford Introductory Seminar. Preference to sophomores. Social history, cultural studies, China studies, international relations, and music. From the Italian Jesuit, Matteo Ricci who presented a clavichord to the Chinese emperor to the emergence of a modern generation of Chinese musicians. GER:DB-Hum, EC-GlobalCom

3 units, Spr (Cai, J)

### MUSIC 14N. Women Making Music

Stanford Introductory Seminar. Preference to freshmen. Women's musical activities across times and cultures; how ideas about gender influence the creation, performance, and perception of music. GER:DB-Hum, EC-Gender

3 units, Aut (Hadlock, H)

### MUSIC 16N. Music, Myth, and Modernity: Wagner's Ring Cycle and Tolkien's Lord of the Rings

(Same as GERLIT 16N.) Stanford Introductory Seminar. Preference to freshmen. Roots of Wagner's operatic cycle and Tolkien's epic trilogy in a common core of Norse, Germanic, and Anglo-Saxon mythology. The role of musical motive and characterization in Wagner's music dramas and the film version of Tolkien's trilogy. Music as a key element in the psychological, political, and cultural revision of ancient myth in modern opera and film. GER:DB-Hum, EC-GlobalCom

3 units, Spr (Grey, T)

### MUSIC 17N. The Operas of Mozart

Stanford Introductory Seminar. Preference to freshmen. Four of Mozart's mature operas, the earliest works in the operatic repertoire never to go out of fashion. What accounts for this extraordinary staying power? Focus on the history of their composition, performance, and reception, and their changing significance from Mozart's time to the present. GER:DB-Hum

3 units, Win (Berger, K)

### MUSIC 17Q. Perspectives in North American Taiko

Stanford Introductory Seminar. Preference to sophomores. Taiko, or Japanese drum, is a newcomer to the American music scene. Emergence of the first N. American taiko groups coincided with increased Japanese American activism, and to some it is symbolic of Japanese American identity. N. American taiko is associated with Japanese American Buddhism. Musical, cultural, historical, and political perspectives of taiko. Hands-on drumming. Japanese music and Japanese American history, and relations among performance, cultural expression, community, and identity. GER:DB-Hum, EC-AmerCul

4 units, Spr (Sano, S; Uyechi, L)

### MUSIC 18A. Jazz History: Ragtime to Bebop, 1900-1940

From the beginning of jazz to the war years. GER:DB-Hum, EC-AmerCul

3 units, Win (Berry, F)

### MUSIC 18B. Jazz History: Bebop to Present, 1940-Present

Modern jazz styles from Bebop to the current scene. Emphasis is on the significant artists of each style. GER:DB-Hum, EC-AmerCul

3 units, Spr (Berry, F)

### MUSIC 19. Introduction to Music Theory

For non-music majors and Music majors or minors unable to pass the proficiency test for entry to MUSIC 21. The fundamentals of music theory and notation, basic sight reading, sight singing, ear training, keyboard harmony; melodic, rhythmic, and harmonic dictation. Skill oriented, using piano and voice as basic tools to develop listening and reading skills. GER:DB-Hum

3 units, Aut (Berger, T), Spr (Berger, T)

### MUSIC 20A. Jazz Theory

Introduces the language and sounds of jazz through listening, analysis, and compositional exercises. Students apply the fundamentals of music theory to the study of jazz. Prerequisite: 19 or consent of instructor. GER:DB-Hum

3 units, Aut (Nadel, J)

### MUSIC 20B. Advanced Jazz Theory

Approaches to improvisation through listening and transcribing, and developing familiarity with important contributors to this music. Topics: scale theory, altered dominants, and substitute harmony. Prerequisite: 20A or consent of instructor. GER:DB-Hum

3 units, Win (Nadel, J), alternate years, not given next year

### MUSIC 20C. Jazz Arranging and Composition

Jazz arranging and composition for small ensembles. Foundation for writing for big band. Prerequisite: 20A or consent of instructor.

3 units, alternate years, not given this year

**MUSIC 21. Elements of Music I**

Preference to majors. Introduction to tonal theory. Practice and analysis. Diatonic harmony focusing on melodic and harmonic organization, functional relationships, voice-leading, and tonal structures. Ear-training and keyboard-harmony skills; analytical methods and listening strategies. Concurrent enrollment in MUSIC 12 (Piano) or demonstration of keyboard skills sufficient to pass the Piano Proficiency Exam within the first two weeks of the term is required. Enrollment limited to 40. Prerequisite: pass a basic musical skills proficiency examination on first day of class; students who do not pass may take MUSIC 19. GER:DB-Hum

4 units, Aut (Aquilanti, G), Win (Berger, T)

**MUSIC 22. Elements of Music II**

Preference to majors. Introduction to chromatic harmony focusing on secondary functions, modulations, harmonic sequences, mode mixture, and the Neapolitan, and augmented sixth chords. Analysis of musical forms and harmonizations complemented by harmonic and melodic dictation, sight singing, and other practical skills. Prerequisites: 21 or consent of instructor; demonstration of keyboard skills sufficient to pass the Piano Proficiency Exam within the first two weeks of the term is required, or concurrent enrollment in MUSIC 12. GER:DB-Hum

4 units, Win (Aquilanti, G), Spr (Berger, T)

**MUSIC 23. Elements of Music III**

Preference to majors. Continuation of chromatic harmony, complex forms, and introduction to early 20th-century techniques. Satisfactory passage of ear-training proficiency exam, part of the course's final, is a requirement for course completion and for continuation in the major sequence. Prerequisites: 22 or consent of instructor; demonstration of keyboard skills sufficient to pass the Piano Proficiency Exam within the first two weeks of the term is required, or concurrent enrollment in MUSIC 12. GER:DB-Hum

4 units, Aut (Berger, T), Spr (Ulman, E)

**MUSIC 37N. *Ki ho'alu*: The New Renaissance of a Hawaiian Musical Tradition**

Stanford Introductory Seminar. Preference to freshman. Developed in the Hawaiian Islands during the 1830s, *ki ho'alu*, or Hawaiian slack key guitar, is an art form experiencing newfound popularity coinciding with the growth of political activism in Hawaiian culture. The musical, cultural, historical, and political perspectives of Hawaiian music and *ki ho'alu*, through hands-on experience, readings, discussion, and workshops. Hawaiian music and history and relationships among performance, cultural expression, community, and identity. GER:DB-Hum, EC-AmerCul

3 units, Aut (Sano, S)

**MUSIC 38N. Singing Early Music**

Stanford Introductory Seminar. Preference to freshmen. 15th- and 16th-century musical repertoires and their contexts; performance practice. GER:DB-Hum

3 units, Spr (Rodin, J)

**MUSIC 40. Music History to 1600**

Pre- or corequisite: 23. GER:DB-Hum

4 units, Aut (Rodin, J)

**MUSIC 41. Music History 1600-1830**

Pre- or corequisite: 23. GER:DB-Hum

4 units, Win (Hadlock, H)

**MUSIC 42. Music History Since 1830**

Pre- or corequisite: 23. GER:DB-Hum

4 units, Spr (Grey, T)

**MUSIC 65A. Voice Class I**

Group (7 students to a section) beginning voice for the non-major (A = level 1; B = level 2). May be repeated for credit.

1 unit, Aut (Linduska, M), Win (Giovannetti, C), Spr (Giovannetti, C), Sum (Linduska, M)

**MUSIC 65B. Voice Class II**

Group (7 students to a section) beginning voice for the non-major (A = level 1; B = level 2). May be repeated for credit.

1 unit, Aut (Linduska, M), Win (Giovannetti, C), Spr (Giovannetti, C), Sum (Linduska, M)

**MUSIC 72A. Intermediate Piano Class**

For intermediate students. May be repeated for credit a total of 14 times. Prerequisites: 12C or equivalent. audition.

1 unit, Aut (Zerlang, T), Win (Zerlang, T), Spr (Zerlang, T), Sum (Zerlang, T)

**MUSIC 72B. Organ Class**

For beginning organ students who have keyboard skills. May be repeated for credit a total of 14 times.

1 unit, Aut (Morgan, R), Win (Morgan, R), Spr (Morgan, R)

**MUSIC 72C. Harpsichord Class**

For beginning harpsichord students who have keyboard skills. May be repeated for credit a total of 14 times.

1 unit, Aut (Thornburgh, E), Win (Thornburgh, E), Spr (Thornburgh, E)

**MUSIC 72D. Jazz Piano Class**

By invitation only; priority to majors and jazz-ensemble participants. May be repeated for credit a total of 14 times.

1 unit, Aut (Low, M), Win (Low, M), Spr (Low, M)

**MUSIC 73. Intermediate Voice Class**

For intermediate students. Admission by audition. May be repeated for credit a total of 14 times.

1 unit, Aut (Linduska, M), Win (Giovannetti, C), Spr (Giovannetti, C)

**MUSIC 74C. Classical Guitar Class**

May be repeated for credit a total of 14 times.

1 unit, Aut (Ferguson, C), Win (Ferguson, C), Spr (Ferguson, C)

**MUSIC 74D. Harp Class**

May be repeated for credit a total of 14 times.

1 unit, Aut (Chauvel, M), Win (Chauvel, M), Spr (Chauvel, M)

**MUSIC 75B. Renaissance Wind Instruments Class**

May be repeated for credit.

1 unit, Aut (Myers, H), Win (Myers, H), Spr (Myers, H)

**MUSIC 76. Brass Instruments Class**

May be repeated for credit a total of 14 times.

1 unit, Aut (Kenley, M), Win (Kenley, M), Spr (Kenley, M)

**MUSIC 77. Percussion Class**

May be repeated for credit a total of 14 times.

1 unit, Aut (Veregge, M), Win (Veregge, M), Spr (Veregge, M)

**MUSIC 120. Auditory Remapping of Bioinformatics**

Representation of data related to bioinformatics and medical imaging. Physiological and perceptual perspectives. Representations of complexity in sound and types of auditory display applied to representation of data sets. Term project involving developing tools for sonification and/or applying these tools to a representation problem. Recommended: basic knowledge and interest in music, computer programming, or one of the biological sciences. GER:DB-EngrAppSci

1-3 units, not given this year

**MUSIC 121. Analysis of Tonal Music**

Complete movements, or entire shorter works of the 18th and 19th centuries, are analyzed in a variety of theoretical approaches. Prerequisites: 23 or consent of instructor; and pass the ear-training and piano-proficiency examinations. GER:DB-Hum

4 units, Win (Ulman, E)

**MUSIC 122A. Eighteenth-Century Counterpoint**

Analysis and composition of two- and three-part inventions and three- and four-voice fugues. Use of keyboard, ear training, and sight singing. Prerequisites: 23 or consent of instructor; and pass the ear-training and piano-proficiency examinations. GER:DB-Hum

4 units, Spr (Rodin, J)

**MUSIC 122B. Harmonic Materials of 19th Century**

Analysis of 19th-century music, with compositional exercises based on 19th-century models. Prerequisites: 23 or consent of instructor; and pass the ear-training and piano-proficiency examinations. GER:DB-Hum

4 units, Win (Ulman, E)

**MUSIC 122C. Introduction to 20th-Century Composition**

Contemporary works, with emphasis on music since 1945. Projects in free composition based on 20th-century models. Prerequisites: 23 or consent of instructor; and pass the ear-training and piano-proficiency examinations. GER:DB-Hum

4 units, Aut (Ulman, E)

**MUSIC 123. Undergraduate Seminar in Composition**

Current trends in composition. May be repeated for credit a total of 7 times. Prerequisites: Music major; 23 or consent of instructor. GER:DB-Hum

3 units, Aut (Kapuscinski, J)

**MUSIC 125. Individual Undergraduate Projects in Composition**

May be repeated for credit a total of 14 times. Prerequisites: music major, and one quarter of 123.

1-3 units, Aut (Staff), Win (Staff), Spr (Staff)

**MUSIC 126. Introduction to Thoroughbass**

The development of continuo techniques and skills for figured-bass realization. Performance and analysis of selected repertoire, using thoroughbass principles and exercises based on historical theoretical treatises. Prerequisite: 21.

1-3 units, Win (Berger, T)

**MUSIC 127. Instrumentation and Orchestration**

Individual instruments, instrumental groups within the orchestra, and combinations of groups. Arrangements from piano to orchestral music. Score analysis with respect to orchestration. Practical exercises using chamber ensembles and school orchestra. Prerequisite: 23. GER:DB-Hum

3 units, Aut (Aquilanti, G)

**MUSIC 128. Composition, Coding, and Performance with SLOrk**

Classroom instantiation of the Stanford Laptop Orchestra (SLOrk) which includes public performances. An ensemble of more than 20 humans, laptops, controllers, and special speaker arrays designed to provide each computer-mediated instrument with its sonic identity and presence. Topics and activities include issues of composing for laptop orchestras, instrument design, sound synthesis, programming, and live performance. May be repeated four times for credit.

1-5 units, Spr (Wang, G)

**MUSIC 128X. Composing, Coding, and Performance for Laptop Orchestra (Extended)**

Composing, coding, and performing with the medium of the laptop orchestra. Prerequisite: MUSIC 128 and consent of instructor.

1 unit, Aut (Wang, G), Win (Wang, G)

**MUSIC 130A. Introduction to Conducting**

Baton techniques and rehearsal procedures. The development of coordination of the members of the body involved in conducting; fluency in beat patterns and meters; dynamics, tempi, cueing, and use of the left hand in conducting. Prerequisites: 121 and diagnostic musicianship exam given first day of class; preference to students who have completed 122B.

3 units, Aut (Morgan, R), alternate years, not given next year

**MUSIC 130B. Elementary Orchestral Conducting**

Prerequisites: 127 or previous orchestral performance experience, 130A.

3 units, Spr (Cai, J), alternate years, not given next year

**MUSIC 130C. Elementary Choral Conducting**

Techniques specific to the conducting of choral ensembles: warm-ups, breathing, balance, blend, choral tone, isolation principles, recitative conducting, preparation, and conducting of choral/orchestral works. Prerequisite: 130A.

3 units, Win (Wait, G), alternate years, not given next year

**MUSIC 140. Studies in Medieval Music**

(Same as MUSIC 240.) May be repeated for credit. Pre- or corequisite: 23 GER:DB-Hum

3-4 units, alternate years, not given this year

**MUSIC 141. Studies in Renaissance Music**

(Same as MUSIC 241.) May be repeated for credit. Pre- or corequisite: 23. GER:DB-Hum

3-4 units, not given this year

**MUSIC 142. Studies in Baroque Music**

(Same as MUSIC 242.) May be repeated for credit. Pre- or corequisite: 23. GER:DB-Hum

3-4 units, not given this year

**MUSIC 143. Studies in Classic Music**

(Same as MUSIC 243.) May be repeated for credit. Pre- or corequisite: 23. GER:DB-Hum

3-4 units, Spr (Hadlock, H)

**MUSIC 144. Studies in Romantic Music**

(Same as MUSIC 244.) May be repeated for credit. Pre- or corequisite: 23. GER:DB-Hum

3-4 units, not given this year

**MUSIC 145. Studies in Modern Music**

(Same as MUSIC 245.) May be repeated for credit. Pre- or corequisite: 23. GER:DB-Hum

3-4 units, not given this year

**MUSIC 149. Reactions to the Record: Early Recordings, Lost Styles, and Music's Future**

(Same as MUSIC 249.) Seminar. The transformation of musical style, audience expectations, the composer-performer relationship, and the musical score from the late 1800s to the present. Sources include: recordings from Stanford's Archive of Recorded Sound; recordings of (Brahms, Debussy, Rachmaninoff, Saint-Saëns, Prokofiev, Bartók; concert programs; interviews; and reviews. Readings include Hamilton's *After the Golden Age* and Philip's *Performing Music in the Age of Recording*. Emphasis is on voice, strings, piano, chamber music, and orchestra. Guest residencies in conjunction with January 2009 symposium; see <http://music.stanford.edu/Events/StanfordMusicSymposium/>. May be repeated for credit. Pre- or corequisite: 23 or consent of instructor. GER:DB-Hum

3-4 units, Aut (Barth, G; Arul, K)

**MUSIC 150. Musical Acoustics**

The physics of vibrating systems, waves, and wave motion. Time- and frequency-domain analysis of sound. Room acoustics, reverberation, and spatialization. The acoustics of musical instruments: voice, strings, and winds. Emphasis is on the practical aspects of acoustics in making music. Hands-on and computer-based lab. See <http://ccrma.stanford.edu/courses/150/>. Prerequisites: music performance/composition experience, basic algebra, calculus, and physics. GER:DB-EngrAppSci

3 units, Win (Rossing, T)

**MUSIC 151. Psychophysics and Cognitive Psychology for Musicians**

Concepts and experiments relevant to the use of sound, especially synthesized, in music. Listening to sound examples. Emphasis is on salience and the importance of various auditory phenomena in music. See <http://ccrma.stanford.edu/>. Prerequisite: basic knowledge of music. GER:DB-Hum, WIM

4 units, Win (Berger, J; Menon, V)

**MUSIC 152. Anthropology of Sound, Identity, and Place**

(Same as ANTHRO 127A.) The ethnography of sound; challenges and opportunities in representing and interpreting the music, noise, and silence of human cultures. Readings include work that avoids, engages with, distorts, and celebrates sound. Goal is for the students to develop critical theories and techniques. Guest lecturer is MacArthur Fellow Steven Feld. Fieldwork includes making recordings; final project.

5 units, Win (Diehl, K)

**MUSIC 154. Composition and Performance of Instrumental Music with Electronics**

Aesthetic and analytical issues of mixed instrumental and electronic works. Focus is on one or a few works leading to a public performance at the end of the quarter. Prerequisite: experience in analysis of contemporary music and in electronic music. May be repeated for credit once.

1-5 units, Spr (Ruviano, B)



**MUSIC 156. "sic": Improvisation Collective**

Small ensemble devoted to learning trans-idiomatic improvisation techniques and composing indeterminate pieces in a workshop setting. One major concert. Prerequisite: access to an instrument. Improvisational experience and conventional instrumental virtuosity not required. May be repeated for credit for a total of 3 times.

*1 unit, Aut (Applebaum, M)*

**MUSIC 157. Introduction to Mariachi Ensemble**

The practice of mariachi music, tradition, and history. Focus is on learning traditional sones, rancheras, huapangos, and boleros. Requirements: ability to play and access to instruments (violin, trumpet, guitar, vihuela, and guitarron). May be repeated for credit.

*1 unit, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 158. Soundwire Ensemble**

Stanford's Internet2-based Soundwire Ensemble rehearses with the East Coast Tintinnabulate Ensemble directed by Pauline Oliveros, Rensselaer Polytechnic Institute. Concerts, composition, and improvisation projects using resources available when connecting with remote musicians. State-of-the-art audio and video technology developed by ensemble participants. May be repeated for credit.

*2-3 units, Win (DiPietro, R)*

**MUSIC 159. Early Music Singers**

Small choir specializing in Medieval, Renaissance, and early Baroque vocal music. One major concert per quarter. May be repeated for credit for a total of 14 times.

*1 unit, Aut (Mahrt, W), Win (Mahrt, W), Spr (Mahrt, W)*

**MUSIC 160. Stanford Symphony Orchestra**

70- to 100-member ensemble performing major orchestral works; minimum one concert per quarter. May be repeated for credit a total of 14 times.

*1 unit, Aut (Cai, J), Win (Cai, J), Spr (Cai, J)*

**MUSIC 160A. Stanford Philharmonia Orchestra**

Prerequisite: audition, one year of 160, or consent of instructor. May be repeated for credit.

*1 unit, Aut (Cai, J), Win (Cai, J), Spr (Cai, J)*

**MUSIC 161A. Stanford Wind Ensemble**

40- to 50-member ensemble performing transcriptions of symphonic music, brass band music, and repertoire composed specifically for symphonic band. One concert per quarter. May be repeated for credit a total of 14 times.

*1 unit, Aut (Aquilanti, G), Win (Aquilanti, G), Spr (Aquilanti, G)*

**MUSIC 161B. Jazz Orchestra**

Big band format. Repertoire drawn primarily from the contemporary jazz-ensemble literature. One formal concert per quarter. May be repeated for credit a total of 14 times.

*1 unit, Aut (Berry, F), Win (Berry, F), Spr (Berry, F)*

**MUSIC 161C. Red Vest Band**

A small ensemble of the Leland Stanford Junior University Marching Band open to members of the LSJUMB by audition and consent of instructor. Members perform at all men's and women's home basketball games and travel to some away and post-season games. Twice-weekly rehearsals focus on introduction of new student arrangements and the LSJUMB's repertoire of rock, funk, and traditional styles. May be repeated for credit a total of 4 times.

*1 unit, Win (Aquilanti, G)*

**MUSIC 161D. Stanford Brass Ensemble**

Performance of works for full brass choir and for smaller ensembles of brass instruments. Once weekly rehearsals. May be repeated for credit. Prerequisite: audition and consent of instructor.

*1 unit, Aut (Kenley, M), Win (Kenley, M), Spr (Kenley, M)*

**MUSIC 162. Symphonic Chorus**

100- to 150-voice ensemble, performing major choral masterworks with orchestra. One concert per quarter. May be repeated for credit a total of 14 times.

*1 unit, Aut (Sano, S), Win (Sano, S), Spr (Sano, S)*

**MUSIC 163. Memorial Church Choir**

Official choir of Memorial Church, furnishing music for Sunday services and special occasions in the church calendar. May be repeated for credit a total of 14 times.

*2 units, Aut (Wait, G), Win (Wait, G), Spr (Wait, G)*

**MUSIC 165. Chamber Chorale**

Select 24-voice chamber ensemble, specializing in virtuoso choral repertoire from all periods of Western art music. May be repeated for credit a total of 14 times.

*1 unit, Aut (Sano, S), Win (Sano, S), Spr (Sano, S)*

**MUSIC 167. University Singers**

Mixed-repertoire chorus, performing choral repertoire from all periods of Western art music and other world cultures. May be repeated for credit a total of 14 times.

*1 unit, Aut (Morgan, R), Win (Morgan, R), Spr (Morgan, R)*

**MUSIC 167S. Summer Chorus**

80-100 voice ensemble, performing major choral masterworks.

*1 unit, Sum (Hunn, A)*

**MUSIC 169. Stanford Taiko**

Select North American taiko ensemble, performing traditional and contemporary repertoire for Japanese drums. Multiple performances in Winter and Spring quarters, also touring; instrument construction and maintenance. Admission by audition in Autumn Quarter only. May be repeated for credit a total of 14 times.

*1 unit, Aut (Sano, S; Uyechi, L), Win (Sano, S; Uyechi, L), Spr (Sano, S; Uyechi, L)*

**MUSIC 169A. Seminar in Performance Practices**

(Same as MUSIC 269A.) Performance techniques, theoretical principles, aesthetics, and musical resources of various historical periods. GER:DB-Hum

*1-4 units, alternate years, not given this year*

**MUSIC 170. Collaborative Piano**

Performance class in a workshop setting. Techniques of collaboration with vocalists and instrumentalists in repertoire ranging from songs and arias to sonatas and concertos. Prerequisite: private-lesson proficiency level in piano, or consent of instructor.

*1 unit, Aut (Dahl, L)*

**MUSIC 171. Chamber Music**

Audition required. Weekly coachings (1 hr) from Music Dept. Faculty. Classical string quartets and piano/ string groups are supervised by the St. Lawrence String Quartet, and require attendance at a weekly Wednesday 4:15pm masterclass. May be repeated for credit.

*1 unit, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 172A. Piano**

Private lessons and group master class weekly. May be repeated for credit a total of 14 times.

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 172B. Organ**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Morgan, R), Win (Morgan, R), Spr (Morgan, R)*

**MUSIC 172C. Harpsichord**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Thornburgh, E), Win (Thornburgh, E), Spr (Thornburgh, E)*

**MUSIC 172D. Jazz Piano**

By invitation only; priority to majors and jazz-ensemble participants. May be repeated for credit a total of 14 times.

*1-3 units, Aut (Low, M), Win (Low, M), Spr (Low, M)*

**MUSIC 172E. Fortepiano**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Barth, G), Win (Barth, G), Spr (Barth, G)*

**MUSIC 172F. Carillon**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Zerlang, T), Win (Zerlang, T), Spr (Zerlang, T)*

**MUSIC 173. Voice**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 174A. Violin**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 174B. Viola**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 174C. Violoncello**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 174D. Contrabass**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Moyer, B), Win (Moyer, B), Spr (Moyer, B)*

**MUSIC 174E. Viola Da Gamba**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Dornenburg, J), Win (Dornenburg, J), Spr (Dornenburg, J)*

**MUSIC 174F. Classical Guitar**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Ferguson, C), Win (Ferguson, C), Spr (Ferguson, C)*

**MUSIC 174G. Harp**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Chauvel, M), Win (Chauvel, M), Spr (Chauvel, M)*

**MUSIC 174H. Baroque Violin**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Martin, A), Win (Martin, A), Spr (Martin, A)*

**MUSIC 174I. Early Plucked Strings**

(Same as MUSIC 274I.)

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 175A. Flute**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 175B. Oboe**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Hubbard, R), Win (Matheson, J), Spr (Matheson, J)*

**MUSIC 175C. Clarinet**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 175D. Bassoon**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Olivier, R), Win (Olivier, R), Spr (Olivier, R)*

**MUSIC 175E. Recorder/Renaissance Wind Instruments**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Myers, H), Win (Myers, H), Spr (Myers, H)*

**MUSIC 175F. Saxophone**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 175G. Baroque Flute**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 176A. French Horn**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Ragent, L), Win (Ragent, L), Spr (Ragent, L)*

**MUSIC 176B. Trumpet**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 176C. Trombone**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Kenley, M), Win (Kenley, M), Spr (Kenley, M)*

**MUSIC 176D. Tuba**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Clements, A), Win (Clements, A), Spr (Clements, A)*

**MUSIC 177. Percussion**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Veregge, M), Win (Veregge, M), Spr (Veregge, M)*

**MUSIC 181. Advanced Voice Performance**

Performance class in a workshop setting. Skills including style, diction, interpretation, and expression in art song, oratorio, and opera literature. Repertoire varies and spans more than one quarter. May be repeated for credit a total of 14 times. Prerequisite: private-lesson proficiency in voice or consent of instructor.

*1 unit, Aut (Wait, G), Win (Schneider, A), Spr (Schneider, A)*

**MUSIC 182. Diction for Singers**

The international phonetic alphabet and its application to German, French, and Italian vocal literature. Open also to pianists interested in vocal coaching and choral conducting.

*1 unit, Win (Dahl, L)*

**MUSIC 183A. German Art Song Interpretation**

Including composers from Beethoven and Schubert to Wolf and Strauss. for advanced singers and pianists as partners. Performance class in a workshop setting. Prerequisite: consent of instructor. Recommended: 170 for pianists or 182 for singers. May be repeated for credit a total of 2 times.

*1 unit, alternate years, not given this year*

**MUSIC 183B. French Art Song Interpretation**

Composers include Fauré, Debussy, Ravel, and Poulenc. For advanced singers and pianists as partners. Performance class in a workshop setting. May be repeated for credit a total of 2 times. Prerequisite: consent of instructor. Recommended: 170 for pianists or 182 for singers.

*1 unit, Spr (Dahl, L), alternate years, not given next year*

**MUSIC 192A. Foundations of Sound-Recording Technology**

For upper division undergraduates and graduate students; preference given to Music majors with MST specialization. Topics: elementary electronics; the physics of sound transduction and microphone operation, selection, and placement; mixing consoles; connectors and device interconnection; grounding and shielding; principles of analog magnetic recording; operation maintenance of recording equipment; and principles of recording engineering. Enrollment limited. Prerequisites: 151; algebra, physics basics, and consent of instructor. GER:DB-EngrAppSci

*3 units, Aut (Kadis, J)*

**MUSIC 192B. Advanced Sound Recording Technology**

Topics: noise reduction techniques; dynamics and time-delay audio effects; the principles of digital audio; disk- and tape-based digital recorders; digital audio workstations and editing; advanced multitrack techniques; SMPTE and MIDI time code and device synchronization; MIDI sequencing and synchronization. See <http://ccrma.stanford.edu/courses/>. Prerequisite: 192A. GER:DB-EngrAppSci. DB-Hum

*3 units, Win (Kadis, J)*

**MUSIC 192C. Session Recording**

Independent engineering of recording sessions. May be repeated for credit a total of 14 times. Prerequisites: 192A.B.

*1-2 units, Aut (Kadis, J), Win (Kadis, J), Spr (Kadis, J)*

**MUSIC 197. Undergraduate Teaching Apprenticeship**

Work in an apprentice-like relationship with faculty teaching a student-initiated course. Prerequisite: consent of instructor.

*1-2 units, Aut (Staff), Win (Sano, S), Spr (Sano, S)*

**MUSIC 198. Concentrations Project**

For concentration program participants only. Must be taken in senior year.

*4 units, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 199. Independent Study**

For advanced undergraduates and graduate students who wish to do work outside the regular curriculum. Before registering, student must present specific project and enlist a faculty sponsor. May be repeated for credit a total of 14 times.

*1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

## GRADUATE COURSES IN MUSIC

Primarily for graduate students; undergraduates may enroll with consent of instructor.

### **MUSIC 200. Graduate Proseminar**

Required of first-year graduate students in music. Introduction to research in music, bibliographical materials, major issues in the field, philosophy, and methods in music history. Guest lecturers and individual research topics.

*4 units, Aut (Berger, K; McBride, J)*

### **MUSIC 220A. Fundamentals of Computer-Generated Sound**

Techniques for digital sound synthesis, effects, and reverberation. Topics: summary of digital synthesis techniques (additive, subtractive, nonlinear, wavetable, spectral-modeling, and physical-modeling); digital effects algorithms (phasing, flanging, chorus, pitch-shifting, and vocoding); and techniques for digital reverberation. Majors (undergraduate or graduate) must take for 4 units. See <http://ccrma.stanford.edu/>.

*2-4 units, Aut (Wang, G)*

### **MUSIC 220B. Compositional Algorithms, Psychoacoustics, and Spatial Processing**

The use of high-level programming language as a compositional aid in creating musical structures. Advanced study of sound synthesis techniques. Simulation of a reverberant space and control of the position of sound within the space. Majors (undergraduate or graduate) must take for 4 units. See <http://ccrma.stanford.edu/>. Prerequisite: 220A.

*2-4 units, Win (Wang, G)*

### **MUSIC 220C. Research Seminar in Computer-Generated Music**

Individual projects in composition, psychoacoustics, or signal processing. Majors (undergraduate or graduate) must take for 4 units. See <http://ccrma.stanford.edu/>. May be repeated for credit. Prerequisite: 220B.

*2-4 units, Spr (Caceres, J)*

### **MUSIC 220D. Research in Computer-Generated Music**

Independent research projects in composition, psychoacoustics, or signal processing. See <http://ccrma.stanford.edu/>. May be repeated for credit. Prerequisite: 220C.

*1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

### **MUSIC 221. Topics in the History of Theory**

The intersection of music theory and compositional practice in different eras of Western music history. Primary sources in music theory and issues such as notation, rhythm, mode, dissonance treatment, counterpoint, tonality, form, rhetoric, affect and imitation, expression, linear analysis, 12-tone and set theory, in light of relevant repertoire and modern scholarship. May be repeated for credit a total of 5 times.

*3-5 units, alternate years, not given this year*

### **MUSIC 230. Advanced Orchestral Conducting**

May be repeated for credit a total of 8 times. Prerequisite: 130B.

*2-4 units, Aut (Cai, J), Win (Cai, J), Spr (Cai, J)*

### **MUSIC 231. Advanced Choral Conducting**

May be repeated for credit a total of 8 times. Prerequisite: 130C.

*2-4 units, Aut (Sano, S), Win (Sano, S), Spr (Sano, S)*

### **MUSIC 240. Studies in Medieval Music**

(Same as MUSIC 140.) May be repeated for credit. Pre- or corequisite: 23

*3-4 units, alternate years, not given this year*

### **MUSIC 241. Studies in Renaissance Music**

(Same as MUSIC 141.) May be repeated for credit. Pre- or corequisite: 23.

*3-4 units, not given this year*

### **MUSIC 242. Studies in Baroque Music**

(Same as MUSIC 142.) May be repeated for credit. Pre- or corequisite: 23.

*3-4 units, not given this year*

### **MUSIC 243. Studies in Classic Music**

(Same as MUSIC 143.) May be repeated for credit. Pre- or corequisite: 23.

*3-4 units, Spr (Hadlock, H)*

### **MUSIC 244. Studies in Romantic Music**

(Same as MUSIC 144.) May be repeated for credit. Pre or corequisite: 23.

*3-4 units, not given this year*

### **MUSIC 245. Studies in Modern Music**

(Same as MUSIC 145.) May be repeated for credit. Pre- or corequisite: 23.

*3-4 units, not given this year*

### **MUSIC 249. Reactions to the Record: Early Recordings, Lost Styles, and Music's Future**

(Same as MUSIC 149.) Seminar. The transformation of musical style, audience expectations, the composer-performer relationship, and the musical score from the late 1800s to the present. Sources include: recordings from Stanford's Archive of Recorded Sound; recordings of (Brahms, Debussy, Rachmaninoff, Saint-Saëns, Prokofiev, Bartók; concert programs; interviews; and reviews. Readings include Hamilton's *After the Golden Age* and Philip's *Performing Music in the Age of Recording*. Emphasis is on voice, strings, piano, chamber music, and orchestra. Guest residencies in conjunction with January 2009 symposium; see <http://music.stanford.edu/Events/StanfordMusicSymposium/>. May be repeated for credit. Pre- or corequisite: 23 or consent of instructor.

*3-4 units, Aut (Barth, G; Arul, K)*

### **MUSIC 250A. HCI Theory and Practice**

HCI issues as they relate to music applications in composition and performance. Project-oriented, examining issues from the technical and theoretical perspectives of computer science, haptics, and music theory. See <http://ccrma.stanford.edu/>.

*3-4 units, Aut (Ju, W)*

### **MUSIC 250B. HCI Performance Systems**

Continuation of 250A, concentrating on interactive computer-music performance systems. See <http://ccrma.stanford.edu/courses/250b/>. Prerequisite: 250A.

*1-4 units, Win (Ju, W)*

### **MUSIC 251. Music, the Brain, and Human Behavior**

The perception, cognition, and neuroscience of music. Prerequisite: MUSIC 151 or consent of instructors.

*1-5 units, Win (Berger, J; Menon, V)*

### **MUSIC 253. Musical Information: An Introduction**

The kinds of musical information used in sound, graphical, and analytical applications. Emphasis is on independent concepts and principles in music representation and research objectives (repertory analysis, performance analysis, theoretical models, similarity, and stylistic simulation). Examples from Western art music. Prerequisites: one year of music theory or equivalent; methods courses in fields such as musical analysis, symbolic systems, information processing, sound engineering, or intellectual property issues.

*1-4 units, Win (Selfridge-Field, E)*

### **MUSIC 254. Applications of Musical Information: Query, Analysis, and Style Simulation**

Participants explore the issues introduced in 253 in greater depth and take initiative for research projects related to a theoretical or methodological issue, a software project, or a significant analytical result. Prerequisite: 253 or consent of instructor.

*1-4 units, Spr (Selfridge-Field, E)*

### **MUSIC 256. Music, Computing, and Design**

Topics include interactive software system design for computer music, implementation strategies and best practices, software interface design and visualization, and real-time audio systems. Open-source, software re-use, and the intersection of audio and graphics. Crafting software systems for computer music and multimedia. Programming projects in C++ and the Chuck programming language. Prerequisite: a programming course in C++/Java or equivalent experience. May be repeated once for credit.

*1-4 units, Aut (Wang, G)*

### **MUSIC 269A. Seminar in Performance Practices**

(Same as MUSIC 169A.) Performance techniques, theoretical principles, aesthetics, and musical resources of historical periods.

*1-4 units, alternate years, not given this year*

**MUSIC 269B. Research in Performance Practices**  
Directed reading and research. May be repeated for credit a total of 5 times.

*1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**MUSIC 272A. Advanced Piano**

Private lessons and group masterclass weekly. May be repeated for credit a total of 14 times.

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 272B. Advanced Organ**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Morgan, R), Win (Morgan, R), Spr (Morgan, R)*

**MUSIC 272C. Advanced Harpsichord**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Thornburgh, E), Win (Thornburgh, E), Spr (Thornburgh, E)*

**MUSIC 272D. Advanced Jazz Piano**

By invitation only; priority to majors and jazz-ensemble participants. May be repeated for credit a total of 14 times.

*1-3 units, Aut (Low, M), Win (Low, M), Spr (Low, M)*

**MUSIC 272E. Advanced Fortepiano**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Barth, G), Win (Barth, G), Spr (Barth, G)*

**MUSIC 272F. Advanced Carillon**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Zerlang, T), Win (Zerlang, T), Spr (Zerlang, T)*

**MUSIC 273. Advanced Voice**

May be repeated for credit.

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 274A. Advanced Violin**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 274B. Advanced Viola**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 274C. Advanced Violoncello**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 274D. Advanced Contrabass**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Moyer, B), Win (Moyer, B), Spr (Moyer, B)*

**MUSIC 274E. Advanced Viola da Gamba**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Dornenburg, J), Win (Dornenburg, J), Spr (Dornenburg, J)*

**MUSIC 274F. Advanced Classical Guitar**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Ferguson, C), Win (Ferguson, C), Spr (Ferguson, C)*

**MUSIC 274G. Advanced Harp**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Chauvel, M), Win (Chauvel, M), Spr (Chauvel, M)*

**MUSIC 274H. Advanced Baroque Violin**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Martin, A), Win (Martin, A), Spr (Martin, A)*

**MUSIC 274I. Early Plucked Strings**

(Same as MUSIC 174I.)

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 275A. Advanced Flute**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 275B. Advanced Oboe**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Hubbard, R), Win (Matheson, J), Spr (Matheson, J)*

**MUSIC 275C. Advanced Clarinet**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 275D. Advanced Bassoon**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Olivier, R), Win (Olivier, R), Spr (Olivier, R)*

**MUSIC 275E. Advanced Recorder/Renaissance Wind Instruments**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Myers, H), Win (Myers, H), Spr (Myers, H)*

**MUSIC 275F. Advanced Saxophone**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 275G. Advanced Baroque Flute**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 276A. Advanced French Horn**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Ragent, L), Win (Ragent, L), Spr (Ragent, L)*

**MUSIC 276B. Advanced Trumpet**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Staff), Win (Staff), Spr (Staff)*

**MUSIC 276C. Advanced Trombone**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Kenley, M), Win (Kenley, M), Spr (Kenley, M)*

**MUSIC 276D. Advanced Tuba**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Clements, A), Win (Clements, A), Spr (Clements, A)*

**MUSIC 277. Advanced Percussion**

May be repeated for credit a total of 14 times.

*1-3 units, Aut (Veregge, M), Win (Veregge, M), Spr (Veregge, M)*

**MUSIC 280. TA Training Course**

Required for doctoral students serving as teaching assistants. Orientation to resources at Stanford, guest presentations on the principles of common teaching activities, supervised teaching experience. Students who entered in the Autumn should take 280 in the Spring prior to the Autumn they begin teaching.

*1 unit, Spr (Ruviaro, B; Heel, K)*

**MUSIC 300A. Medieval Notation**

Western notation of the Middle Ages and Renaissance: principles, purposes, and transcription.

*4 units, alternate years, not given this year*

**MUSIC 300B. Renaissance Notation**

Western notation of the Middle Ages and Renaissance: principles, purposes, and transcription.

*4 units, Aut (Mahrt, W), alternate years, not given next year*

**MUSIC 301A. Analysis of Music: Modal**

*4 units, Win (Mahrt, W)*

**MUSIC 301B. Analysis of Music: Tonal**

*4 units, Aut (Grey, T)*

**MUSIC 301C. Analysis of Music: Post-Tonal**

Current analytical trends, issues, and methods.

*4 units, Spr (Ulman, E)*

**MUSIC 302. Research in Musicology**

Directed reading and research. May be repeated for credit a total of 7 times.

*1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**MUSIC 310. Research Seminar in Musicology**

For graduate students. Topics vary each quarter. May be repeated for credit a total of 8 times.

*3-5 units, Aut (Kronengold, C), Win (Rodin, J), Spr (Mahrt, W)*

**MUSIC 312A. Aesthetics and Criticism of Music, Ancients and Moderns: Plato to Nietzsche**

For graduate students. Primary texts focusing on the nature, purposes, and uses of music and other arts.

*4 units, Win (Berger, K), alternate years, not given next year*

**MUSIC 312B. Aesthetics and Criticism of Music, Contemporaries: Heidegger to Today**

For graduate students. Primary texts focusing on the nature, purposes, and uses of music and other arts.

*4 units, Spr (Berger, K), alternate years, not given next year*

**MUSIC 318. Advanced Acoustics**

Current topics. May be repeated for credit.

*1-5 units, Win (Rossing, T)*

**MUSIC 319. Research Seminar on Computational Models of Sound Perception**

All aspects of auditory perception, often with emphasis on computational models. Topics: music perception, signal processing, auditory models, pitch perception, speech, binaural hearing, auditory scene analysis, basic psychoacoustics, and neurophysiology. See <http://ccrma.stanford.edu/courses/>. May be repeated for credit a total of 14 times.

*1-3 units, Aut (Slaney, M), Win (Slaney, M), Spr (Slaney, M)*

**MUSIC 320. Introduction to Digital Audio Signal Processing**

Digital signal processing for music and audio research. Topics: complex numbers, sinusoids, spectrum representation, sampling and aliasing, digital filters, frequency response, z transforms, transfer-function analysis, and associated Matlab software. See <http://ccrma.stanford.edu/courses/320/>.

*3-4 units, Aut (Abel, J; Berners, D)*

**MUSIC 321. Readings in Music Theory**

Directed reading and research. May be repeated for credit a total of 5 times.

*1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**MUSIC 323. Doctoral Seminar in Composition**

Illustrated discussions of compositional issues and techniques. Students present their own work to the class, and individually to the instructor. May be repeated for credit a total of 14 times.

*4 units, Aut (Applebaum, M), Win (Berger, J), Spr (Kapusinski, J)*

**MUSIC 325. Individual Graduate Projects in Composition**

May be repeated for credit.

*1-5 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**MUSIC 341. Ph.D Dissertation**

May be repeated for credit a total of 5 times.

*1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**MUSIC 390. Practicum Internship**

On-the-job training under the guidance of experienced, on-site supervisors. Meets the requirements for curricular practical training for students on F-1 visas. Students submit a concise report detailing work activities, problems worked on, and key results. May be repeated for credit. Prerequisite: qualified offer of employment and consent of adviser.

*1 unit, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**MUSIC 399. D.M.A. Final Project**

May be repeated for credit a total of 5 times.

*1-10 units, Aut (Staff), Win (Staff), Spr (Staff), Sum (Staff)*

**MUSIC 420. Signal Processing Models in Musical Acoustics**

Computational methods in musical sound synthesis and digital audio effects based on acoustic physical models. Topics: acoustic simulation with delay lines, digital filters, and nonlinear elements; comb filters; allpass filters; artificial reverberation; delay-line interpolation and sampling-rate conversion; phasing, flanging, and chorus effects; efficient computational models of strings, woodwinds, brasses, and other musical instruments. See <http://ccrma.stanford.edu/courses/420/>. Prerequisites: 320 or equivalent; PHYSICS 21 or equivalent course applying Newton's laws of motion; and CS 106B or equivalent programming in C and C++.

*3-4 units, Win (Smith, J)*

**MUSIC 421. Audio Applications of the Fast Fourier Transform (FFT)**

Spectrum analysis and signal processing using the FFT with emphasis on audio applications. Topics: Fourier theorems; FFT windows; spectrum analysis; spectrograms; sinusoidal modeling; spectral modeling synthesis; FFT convolution; FIR filter design and system identification; overlap-add and filter-bank-summation methods for short-time Fourier analysis, modification, and resynthesis. See <http://ccrma.stanford.edu/courses/421/>. Prerequisites: 420 or consent of instructor.

*3-4 units, Spr (Smith, J)*

**MUSIC 422. Perceptual Audio Coding**

History and basic principles: development of psychoacoustics-based data-compression techniques; perceptual-audio-coder applications (radio, television, film, multimedia/internet audio, DVD, EMD). In-class demonstrations: state-of-the-art audio coder implementations (such as AC-3, MPEG) at varying data rates; programming simple coders. Topics: audio signals representation; quantization; time to frequency mapping; introduction to psychoacoustics; bit allocation and basic building blocks of an audio codec; perceptual audio codecs evaluation; overview of MPEG-1, 2, 4 audio coding and other coding standards (such as AC-3). Prerequisites: knowledge of digital audio principles, familiarity with C programming. Recommended: 320, EE 261. See <http://ccrma.stanford.edu/>.

*3 units, Win (Bosi-Goldberg, M)*

**MUSIC 423. Signal Processing Research**

Graduate research seminar. Problems in music and/or audio signal processing. Presentation of research-in-progress by graduate students, visiting scholars, and CCRMA faculty. See <http://ccrma.stanford.edu/courses/423/>. May be repeated for credit a total of 11 times.

*1-4 units, Aut (Abel, J; Berners, D), Win (Smith, J), Spr (Smith, J)*

**MUSIC 424. Signal Processing Techniques for Digital Audio Effects**

Techniques for dynamic range compression, reverberation, equalization and filtering, panning and spatialization, digital emulation of analog processors, and implementation of time-varying effects. Single-band and multiband compressors, limiters, noise gates, de-essers, convolutional reverberators, parametric and linear-phase equalizers, wah-wah and envelope-following filters, and the Leslie. Students develop effects algorithms of their own design in labs. Prerequisites: digital signal processing, sampling theorem, digital filtering, and the Fourier transform at the level of 320 or EE 261; Matlab and modest C programming experience. Recommended: 420 or EE 264; audio effects in mixing and mastering at the level of 192.

*3-4 units, Spr (Berners, D; Abel, J)*