

**892. Seminar**  
*Fall, Spring. 1(1-0) A student may earn a maximum of 6 credits in all enrollments for this course.*  
*R: Open only to graduate students in College of Agriculture and Natural Resources, College of Engineering, College of Human Medicine, College of Natural Science, College of Osteopathic Medicine, or College of Veterinary Medicine.*  
 Student review and presentation of selected topics in microbiology and public health.  
 QA: MPH 800

**899. Master's Thesis Research**  
*Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 24 credits in all enrollments for this course.*  
*R: Open only to graduate students in Microbiology and Public Health.*

QA: MPH 899

**991. Topics in Microbiology**  
*Fall, Spring. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course.*  
 Topics are selected from traditional subdisciplines such as bacteriology, virology, cell biology, and immunology or from transecting subdisciplines such as microbial genetics, physiology, molecular biology and ecology.  
 QA: MPH 900

**999. Doctoral Dissertation Research**  
*Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 99 credits in all enrollments for this course.*  
*R: Open only to graduate students in Microbiology and Public Health.*

QA: MPH 999

**MILITARY SCIENCE MS**

**Department of Military Science  
Office of the Provost**

**101. Leadership: The Military Profession**  
*Fall, Spring, Summer. 1(1-1)*  
 Analysis of military profession from several academic perspectives. Technical, ethical, and personal ramifications of officership. Introduction to military leadership. Lab introduces military skills.  
 QA: MS 101, MS 102

**102. Leadership: Land Navigation**  
*Fall, Spring. 1(1-1)*  
 Military topographic and special maps: intersection, resection, modified resection, and polar coordinates. Tactical operation overlays. Preview of small unit leader's role in the Army. Lab: use of lensatic compass.  
 QA: MS 102, MS 203

**201. Leadership Assessment Program, the Military Leader**  
*Fall, Spring, Summer. 1(1-1)*  
 Individual leadership development using standardized assessment technology. Administration, personal relations, and decision making. Military writing and professional obligations. Lab includes rappelling and marksmanship.  
 QP: MS 103 QA: MS 201, MS 202

**202. Leadership: First Aid/Fitness Training**  
*Fall, Spring, Summer. 1(1-1)*  
 Emergency first aid including casualty evaluation, lifesaving measures, CPR, and environmental injury prevention. Leader's role in implementing Army Physical Fitness Program. Individual and group fitness programs. Lab: hands on leadership training.  
 QP: MS 201 QA: MS 103, MS 201

**301. Leadership: Command and Control Communication**  
*Fall, Spring, Summer. 3(3-2)*  
 P: MS 202.  
 Wire and radio communications for tactical operations. Encryption/decryption, use of codes, and electronic warfare. Theories and models of behavioral sciences for leadership. Lab emphasizes communication skills.  
 QP: MS 202 QA: MS 301, MS 302

**302. Leadership: Small Unit Tactics**  
*Fall, Spring, Summer. 3(3-2)*  
 P: MS 301.  
 Military topographic and special maps: intersection, resection, modified resection, and polar coordinates. Tactical operation overlays. Preview of small unit leader's role in the Army. Lab: use of lensatic compass.  
 QP: MS 301 QA: MS 302, MS 303

**401. Leadership: Management**  
*Fall, Spring, Summer. 3(2-3)*  
 P: MS 302.  
 Army training personnel administration and logistics systems, and the leader's role as a trainer and effective manager. Oral and written communication. Leadership assessment and development. Lab: practical experience in unit administration.  
 QP: MS 302 QA: MS 401, MS 402

**402. Military Law, Ethics and Professionalism**  
*Spring, Summer. 3(2-3)*  
 P: MS 401.  
 Military legal system. Application of military justice. Fundamental values and principles of conduct in the profession of arms. Development of subordinates and the role of noncommissioned officers. Lab includes leadership development assessment.  
 QP: MS 401 QA: MS 402, MS 403

**490. Independent Study in Military Science**  
*Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 4 credits in all enrollments for this course.*  
*R: Open only to juniors and seniors. Approval of department.*  
 Individual research in areas related to military science.  
 QA: MS 499

**MUSIC MUS**

**School of Music  
College of Arts and Letters**

**112. Chamber Music**  
*Fall, Spring. 1(0-2) A student may earn a maximum of 10 credits in all enrollments for this course.*  
*R: Audition required.*  
 Rehearsal and performance of broad range of chamber music literature.  
 QA: MUS 112

**114. Marching Band**  
*Fall. 1(0-9) A student may earn a maximum of 6 credits in all enrollments for this course.*  
*R: Audition required.*  
 Rehearsal and performance of broad range of marching band literature at football games.  
 QA: MUS 118A

**115. Spartan Brass**  
*Spring. 1(0-2) A student may earn a maximum of 6 credits in all enrollments for this course.*  
*R: Audition required.*  
 Rehearsal and performance of broad range of brass literature at basketball and hockey games.  
 QA: MUS 118B

**116. Campus Band**  
*Fall, Spring. 1(0-3) A student may earn a maximum of 10 credits in all enrollments for this course.*  
 Rehearsal and performance of broad range of band literature chosen from baroque period to the present.  
 QA: MUS 118F

**117. Concert Band**  
*Fall, Spring. 1(0-3) A student may earn a maximum of 10 credits in all enrollments for this course.*  
*R: Audition required.*  
 Rehearsal and performance of broad range of wind literature from various historical periods and styles.  
 QA: MUS 118C

**118. Wind Symphony**  
*Fall, Spring. 1(0-5) A student may earn a maximum of 10 credits in all enrollments for this course.*  
*R: Audition required.*  
 Rehearsal and performance of broad range of wind literature from various periods and styles.  
 QA: MUS 118E

**120. Symphony Orchestra**  
*Fall, Spring. 1(0-5) A student may earn a maximum of 10 credits in all enrollments for this course.*  
*R: Audition required.*  
 Rehearsal and performance of symphonic and operatic repertoire.  
 QA: MUS 133A

**121. Chamber Orchestra**  
*Fall, Spring. 1(0-4) A student may earn a maximum of 10 credits in all enrollments for this course.*  
*R: Audition required.*  
 Rehearsal and performance of representative chamber works of baroque, classic and contemporary composers.  
 QA: MUS 133B

**123. Collegiate Choir**  
*Fall, Spring. 1(0-3) A student may earn a maximum of 10 credits in all enrollments for this course.*  
*R: Audition required.*  
 Rehearsal and performance of representative literature for mixed choir with emphasis on renaissance, baroque, classical, romantic, and contemporary composers.  
 QA: MUS 189

**124. Choral Union**  
*Fall, Spring. 1(0-2) A student may earn a maximum of 10 credits in all enrollments for this course.*  
*R: Audition required.*  
 University and community chorus. One evening rehearsal per week, culminating in performance of a major work with orchestra.  
 QA: MUS 191

**125. Glee Club, Men and Women**  
*Fall, Spring. 1(0-3) A student may earn a maximum of 10 credits in all enrollments for this course.*  
 Rehearsal and performance of broad range of choral literature chosen from medieval period to the present.  
 QA: MUS 192

**126. State Singers**  
*Fall, Spring. 1(0-4) A student may earn a maximum of 10 credits in all enrollments for this course.*  
*R: Audition required.*  
 Mixed choir performing music from all periods.  
 QA: MUS 190

**127. University Chorale**  
*Fall, Spring. 1(0-4) A student may earn a maximum of 10 credits in all enrollments for this course.*  
*R: Audition required.*  
 Mixed chamber choir for experienced singers performing representative literature from all periods.  
 QA: MUS 193

**129. Percussion Ensemble**  
*Fall, Spring. 1(0-3) A student may earn a maximum of 10 credits in all enrollments for this course.*  
*R: Audition required.*  
 Rehearsal and performance of representative works for percussion and mallet ensembles.  
 QA: MUS 112

**Descriptions—Music  
of  
Courses**

- 130. Jazz Band**  
Fall, Spring. 1(0-4) A student may earn a maximum of 10 credits in all enrollments for this course.  
R: Audition required.  
Rehearsal and performance in large jazz ensemble. Literature from classic bands of Ellington and Basie to contemporary composers.  
QA: MUS 195
- 131. Jazz Combo**  
Fall, Spring. 1(1-2) A student may earn a maximum of 10 credits in all enrollments for this course.  
R: Audition required.  
Rehearsal and performance in small jazz ensembles. Literature from all historical periods of jazz.  
QA: MUS 196
- 135. Music in Elementary Education**  
Fall, Spring. 3(2-2)  
Aural elements of music. How elementary pupils and classroom teachers perceive, sort, and classify musical sounds as encountered in selected genres and styles of musical art.  
QP: MUS 135
- 141. Class Instruction in Piano I**  
Fall, Spring. 1(1-1)  
R: Open only to students in School of Music.  
Use of the piano as a teaching tool.  
QP: NOTATION QA: MUS 142G
- 142. Class Instruction in Piano II**  
Spring. 1(1-1)  
P: MUS 141. R: Open only to students in School of Music.  
Use of the piano as a teaching tool.  
QP: MUS 141G QA: MUS 142G, MUS 143G
- 143. Class Instruction in Voice I: Music Majors**  
Fall. 1(1-1)  
C: MUS 151 R: Open only to students in School of Music with an emphasis in voice.  
English lyric diction. Rules of pronunciation. Performance of English language songs in class.  
QA: MUS 141F
- 144. Class Instruction in Voice II: Music Majors**  
Spring. 1(1-1)  
P: MUS 143. C: MUS 151 R: Open only to students in School of Music with an emphasis in voice.  
Italian lyric diction. Rules of pronunciation. Performance of Italian language songs in class.  
QP: MUS 141F QA: MUS 142F, MUS 143F
- 145. Class Instruction in Voice I**  
Fall. 1(1-1)  
R: Not open to students in School of Music with an emphasis in voice.  
Rules of pronunciation. Vocal techniques.  
QA: MUS 141F
- 146. Class Instruction in Voice II**  
Spring. 1(1-1)  
P: MUS 145. R: Not open to students in School of Music with an emphasis in voice.  
Vocal techniques and exploration of vocal literature.  
QP: MUS 141F QA: MUS 142F, MUS 143F
- 147. Class Instruction in Elementary Piano I**  
Fall, Spring. 2(2-1)  
R: Not open to students in School of Music.  
Basic notation, performance, improvisation, and transposition. Repertoire includes folksongs, simple classics, and blues.  
QA: MUS 147
- 148. Class Instruction in Elementary Piano II**  
Fall, Spring. 2(2-1)  
P: MUS 147. R: Not open to students in School of Music.  
Note reading and performance, folksongs, easy ragtime, jazz, and shorter classics.  
QP: MUS 147 QA: MUS 148
- 149. Keyboard Skills**  
Fall, Spring. 1(0-2) A student may earn a maximum of 4 credits in all enrollments for this course.  
R: Open only to students in School of Music.  
Sight-reading, transposing, figured bass, keyboard harmony, and accompanying instrumentalists and vocalists.  
QA: MUS 356
- 150A. Piano**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 18 credits in all enrollments for this course.  
R: Open only to students in School of Music. Audition required.  
Private instruction in piano.  
QA: MUS 150A
- 150B. Pipe Organ**  
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 16 credits in all enrollments for this course.  
R: Open only to students in School of Music. Audition required.  
Private instruction in pipe organ.  
QA: MUS 150B
- 150C. Harp**  
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 16 credits in all enrollments for this course.  
R: Open only to students in School of Music. Audition required.  
Private instruction in harp.  
QA: MUS 150C
- 151. Voice**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 12 credits in all enrollments for this course.  
R: Open only to students in School of Music and students in Music secondary teaching minor. Audition required.  
Private instruction in voice.  
QA: MUS 151
- 152A. Violin**  
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 16 credits in all enrollments for this course.  
R: Audition required.  
Private instruction in violin.  
QA: MUS 152A
- 152B. Viola**  
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 16 credits in all enrollments for this course.  
R: Audition required.  
Private instruction in viola.  
QA: MUS 152B
- 152C. Cello**  
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 16 credits in all enrollments for this course.  
R: Audition required.  
Private instruction in cello.  
QA: MUS 152C
- 152D. Double Bass**  
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 16 credits in all enrollments for this course.  
R: Audition required.  
Private instruction in double bass.  
QA: MUS 152D
- 153A. Flute**  
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 16 credits in all enrollments for this course.  
R: Audition required.  
Private instruction in flute.  
QA: MUS 153A
- 153B. Oboe**  
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 16 credits in all enrollments for this course.  
R: Audition required.  
Private instruction in oboe.  
QA: MUS 153B
- 153C. Clarinet**  
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 16 credits in all enrollments for this course.  
R: Audition required.  
Private instruction in clarinet.  
QA: MUS 153C
- 153D. Saxophone**  
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 16 credits in all enrollments for this course.  
R: Audition required.  
Private instruction in saxophone.  
QA: MUS 153D
- 153E. Bassoon**  
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 16 credits in all enrollments for this course.  
R: Audition required.  
Private instruction in bassoon.  
QA: MUS 153E
- 154A. Trumpet**  
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 16 credits in all enrollments for this course.  
R: Audition required.  
Private instruction in trumpet.  
QA: MUS 154A
- 154B. Horn**  
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 16 credits in all enrollments for this course.  
R: Audition required.  
Private instruction in horn.  
QA: MUS 154B
- 154C. Trombone**  
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 16 credits in all enrollments for this course.  
R: Audition required.  
Private instruction in trombone.  
QA: MUS 154C
- 154D. Euphonium**  
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 16 credits in all enrollments for this course.  
R: Audition required.  
Private instruction in euphonium.  
QA: MUS 154D
- 154E. Tuba**  
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 16 credits in all enrollments for this course.  
R: Audition required.  
Private instruction in tuba.  
QA: MUS 154E
- 155. Percussion Instruments**  
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 16 credits in all enrollments for this course.  
R: Audition required.  
Private instruction in percussion instruments.  
QA: MUS 155
- 160. Class Instruction in Guitar**  
Fall. 1(1-0)  
R: Open only to students in Music Therapy and to other students in School of Music with a teacher certification option.  
Chording, strumming and finger picking techniques. Accompanying and song leading with guitar. Reading of notation and tablature. Classical and popular styles.  
QA: MUS 141J
- 161. Class Instruction in Stringed Instruments**  
Fall. 2(2-2)  
R: Open only to students in Music Therapy and to other students in School of Music with a teacher certification option.  
Techniques for playing and teaching stringed instruments.  
QA: MUS 141A, MUS 142A

- 162. Class Instruction in Flute and Saxophone**  
Spring, 1(0-2)  
R: Open only to students in School of Music with a teacher certification option.  
Techniques for playing and teaching flute and saxophone.  
QA: MUS 143D, MUS 141D
- 163. Class Instruction in Clarinet**  
Fall, 1(0-2)  
R: Open only to students in School of Music with a teacher certification option.  
Techniques for playing and teaching clarinet.  
QA: MUS 143A
- 164. Class Instruction in Double Reed Instruments**  
Spring, 1(0-2)  
R: Open only to students in School of Music with a teacher certification option.  
Techniques for playing and teaching oboe and bassoon.  
QA: MUS 142D, MUS 141E
- 165. Class Instruction in High Brass Instruments**  
Fall, 1(0-2)  
R: Open only to students in School of Music with a teacher certification option.  
Techniques for playing and teaching trumpet and horn.  
QA: MUS 141C, MUS 142B
- 166. Class Instruction in Low Brass Instruments**  
Spring, 1(0-2)  
R: Open only to students in School of Music with a teacher certification option.  
Techniques for playing and teaching trombone, euphonium, and tuba.  
QA: MUS 142C, MUS 143B
- 167. Class Instruction in Percussion Instruments**  
Fall, 2(1-2)  
R: Open only to students in Music Therapy and to other students in School of Music with a teacher certification option.  
Techniques for playing and teaching percussion instruments.  
QA: MUS 141B, MUS 143C
- 180. Fundamentals of Music**  
Fall, 2(2-1)  
Conceptual and notational presentation of the basic components of musical structure. No previous familiarity with music is assumed.  
QA: MUS 180
- 181. Musicianship I**  
Spring, 3(3-1)  
P: MUS 180.  
Hierarchical musical structure through species counterpoint and figured bass. Linear and vertical aspects of tonality.  
QP: MUS 180 QA: MUS 181, MUS 182
- 182. Ear Training and Sight Singing I**  
Fall, 1(1-1)  
Dictation, melody singing using solfege (movable do) syllables, intervals to octave, error detection, quarter note values in rhythm, part singing.  
QA: MUS 183
- 183. Ear Training and Sight Singing II**  
Spring, 1(1-1)  
P: MUS 182.  
Dictation, singing melodies in major and minor keys. Simple modulation, chromatic alteration, error detection, rhythms, triads and components, part singing.  
QP: MUS 183 QA: MUS 184, MUS 185
- 208. Basic Keyboard Tuning: Theory and Practice I**  
Fall, 2(2-2)  
P: MUS 181, MUS 182 or concurrently. R: Not open to freshmen.  
Acoustics of intervals. Historical development of music scales and tuning systems. Classical and modern methods of keyboard tuning.  
QP: MUS 185 QA: MUS 208
- 209. Basic Keyboard Tuning: Theory and Practice II**  
Spring, 2(2-2)  
P: MUS 208. R: Not open to freshmen.  
Acoustics of intervals. Historical development of music scales and tuning systems. Classical and modern methods of keyboard tuning.  
QP: MUS 208 QA: MUS 209, MUS 210
- 211. History of Western Music to 1750**  
Fall, 3(3-0)  
P: MUS 181. R: Not open to freshmen. Open only to students in School of Music.  
Music from ancient Greece through the Baroque. Literature and theory of plainsong, instrumental and vocal traditions, and vocal polyphony before 1750 in sociopolitical context.  
QP: MUS 182 QA: MUS 224
- 212. History of Western Music Since 1750**  
Spring, 3(3-0)  
P: MUS 211. R: Not open to freshmen. Open only to students in School of Music.  
Literature of the cultivated tradition and its theory in sociopolitical context.  
QP: MUS 224 QA: MUS 225, MUS 226
- 230. Beginning Jazz Improvisation I**  
Fall, 2(2-0)  
P: MUS 181. R: Not open to freshmen.  
Keys, modes, chord progressions as improvisational tools. Blues form in basic keys. Aural transcription of recorded solos.  
QP: MUS 182 QA: MUS 231
- 231. Beginning Jazz Improvisation II**  
Spring, 2(2-0)  
P: MUS 230. R: Not open to freshmen.  
Performance of complete tunes using II,-V-I progressions in all major and minor keys. Transcriptions of recorded jazz solos.  
QP: MUS 231 QA: MUS 232
- 241. Advanced Class Instruction in Piano I**  
Fall, 1(1-1)  
P: MUS 142. R: Not open to freshmen. Open only to students in School of Music with an emphasis in voice.  
Use of the piano as a teaching tool in school music.  
QP: MUS 143G QA: MUS 241
- 242. Advanced Class Instruction in Piano II**  
Spring, 1(1-1)  
P: MUS 241. R: Not open to freshmen. Open only to students in School of Music with an emphasis in voice.  
Use of the piano as a teaching tool in school music.  
QP: MUS 241 QA: MUS 242
- 245. Music in Special Education**  
Fall, 2(2-0)  
P: CEP 240. R: Not open to students in the School of Music. Open only to sophomores, juniors, and seniors with a teacher certification option.  
Methods of using music experiences in the educational, social, emotional and physical development of students with special needs.  
QP: MUS 135 QA: MUS 245
- 248. German Diction for Singers**  
Fall, 1(1-1)  
P: MUS 151. R: Open only to students in School of Music.  
German lyric diction. Rules of pronunciation. Performance of German art songs in class.  
QP: MUS 151 QA: MUS 251
- 249. French Diction for Singers**  
Spring, 1(1-1)  
P: MUS 151. R: Open only to students in School of Music.  
French lyric diction. Rules of pronunciation. Performance of French art songs in class.  
QP: MUS 151 QA: MUS 252
- 260. Introduction to School Music**  
Fall, Spring, 2(2-1)  
R: Not open to freshmen. Open only to students in the School of Music with a teacher certification option and to students with a Music teaching minor.  
Historical foundations, current trends, and teaching responsibilities in school music at all curricular levels.  
QA: MUS 250
- 270. Music Therapy: Foundations and Principles**  
Fall, 3(3-0)  
R: Not open to freshmen.  
History, philosophy and scope of the practice of music therapy. Use of music in treating people with special needs. Field trips required.
- 271. Music Therapy: Instrumental, Vocal and Movement Techniques**  
Spring, 3(3-0)  
P: MUS 270. R: Not open to freshmen.  
Creative and expressive techniques involving percussion instruments, autoharp, handchimes, song leading, creative movement, folk dance.  
QA: MUS 450
- 280. Musicianship II**  
Fall, 3(3-1)  
P: MUS 181.  
Techniques of diatonic modulation and soprano harmonization. Chromatic techniques.  
QP: MUS 182 QA: MUS 280
- 281. Musicianship III**  
Spring, 3(3-1)  
P: MUS 280.  
Research base for formal categorization. Large-scale principles of musical organization. Chromatic substitution and chords derived from voice-leading.  
QP: MUS 280 QA: MUS 281, MUS 282
- 282. Advanced Ear Training and Sight Singing I**  
Fall, 1(1-1)  
P: MUS 183.  
Dictation including recognition of triads, functions, cadences, seventh-chord harmonies, chord components. Two- and four-part dictation and singing.  
QP: MUS 185 QA: MUS 283
- 283. Advanced Ear Training and Sight Singing II**  
Spring, 1(1-1)  
P: MUS 282.  
Recognition of harmonic functions in major keys, minor keys, and modulations. Dictation in two- and four-part textures including augmented-sixth chords and nonharmonic tones.  
QP: MUS 283 QA: MUS 284, MUS 285
- 290. Independent Study**  
Fall, Spring, 1 to 3 credits. A student may earn a maximum of 9 credits in all enrollments for this course.  
R: Approval of school.  
Special projects arranged by an individual student and a faculty member in areas supplementing regular course offerings.
- 308. Advanced Keyboard Tuning: Theory and Practice I**  
Fall, 3(2-2)  
P: MUS 209. R: Not open to freshmen and sophomores.  
History of piano construction including physics of action and string measurements. Action regulation and minor repairs. Concert tuning and tone regulation.  
QP: MUS 210 QA: MUS 308
- 309. Advanced Keyboard Tuning: Theory and Practice II**  
Spring, 3(2-2)  
P: MUS 308. R: Not open to freshmen and sophomores.  
History of piano construction including physics of action and string measurements. Action regulation and minor repairs. Concert tuning and tone regulation.  
QP: MUS 308 QA: MUS 309, MUS 310
- 330. Advanced Jazz Improvisation I**  
Fall, 2(2-0)  
P: MUS 231. R: Not open to freshmen and sophomores.  
Secondary dominants, borrowed chords, and tritone substitutions. Transcription of recorded jazz solos.  
QP: MUS 233 QA: MUS 331
- 331. Advanced Jazz Improvisation II**  
Spring, 2(2-0)  
P: MUS 330. R: Not open to freshmen and sophomores.  
Pentatonic scale relationships within II-V-I progressions. Aleatoric approaches to improvisation. Non-traditional chord progressions. Transcription of recorded jazz solos.  
QP: MUS 331 QA: MUS 332, MUS 333

**Descriptions—Music  
of  
Courses**

**335. Ensemble Conducting I**  
Fall, 2(2-2)

P: MUS 181. R: Open only to students in the School of Music with a teacher certification option and to students with a Music teaching minor.  
Introduction to conducting and rehearsal techniques.  
QA: MUS 335

**336. Ensemble Conducting II**  
Spring, 2(2-2)

P: MUS 335. R: Open only to students in the School of Music with a teacher certification option and to students with a Music teaching minor.  
Advanced conducting and rehearsal techniques as applied to music literature from each of the stylistic periods.  
QP: MUS 335 QA: MUS 336

**337. Conducting for Music Performance Majors**  
Fall, Spring, 1(1-1)

R: Open only to Music Performance majors.  
Beat patterns, clefs, and transpositions of string, wind, and percussion instruments. Score reading and analysis. Rehearsal techniques.  
QA: MUS 436

**339. Teaching School Music**  
Spring, 3(2-2)

P: MUS 260. R: Open only to students in the School of Music with a teacher certification option and to students with a Music teaching minor.  
Techniques for developing instructional and management skills for teaching school music. On- and off-campus clinical experiences required.

**340. Methods and Literature for Voice**  
Fall, 3(3-0)

P: Four semesters of MUS 151. R: Open only to majors in School of Music.  
Methods of teaching voice. Literature for both private lessons and classrooms.  
QP: MUS 151 QA: MUS 347, MUS 348

**341. String Pedagogy**  
Spring, 2(2-1)

R: Open only to majors in School of Music.  
Principles, techniques, and materials for teaching stringed instruments.  
QA: MUS 349

**346. Keyboard Methods and Literature I**  
Fall, 2(2-0)

P: Four semesters of MUS 150A. R: Open only to majors in School of Music.  
Beginning and intermediate methods and literature for teaching piano. Observation and teaching of beginning piano students.  
QA: MUS 347

**347. Keyboard Methods and Literature II**  
Spring, 2(2-0)

P: MUS 346. R: Open only to majors in School of Music.  
Intermediate and advanced methods and literature for teaching piano. Observation and teaching of piano students.  
QA: MUS 348, MUS 349

**348. Piano Accompanying**  
Fall, Spring, 1(0-3)

A student may earn a maximum of 8 credits in all enrollments for this course.  
P: MUS 149. R: Not open to freshmen. Open only to students in School of Music.  
Accompaniment of instrumental and vocal soloists.  
QA: MUS 357

**349. Piano Performance**  
Fall, Spring, 1(0-2)

A student may earn a maximum of 10 credits in all enrollments for this course.  
C: MUS 150A or MUS 350A R: Open only to students in School of Music.  
Critique and analysis of individual performances in a group setting.

**350A. Piano**

Fall, Spring, 2 to 3 credits. A student may earn a maximum of 18 credits in all enrollments for this course.  
P: MUS 150A. R: Open only to majors in School of Music, approval of school.  
Private instruction in piano.  
QP: MUS 150A QA: MUS 350A

**350B. Pipe Organ**

Fall, Spring, 1 to 3 credits. A student may earn a maximum of 18 credits in all enrollments for this course.  
P: MUS 150B. R: Open only to majors in School of Music, approval of school.  
Private instruction in pipe organ.  
QP: MUS 150B QA: MUS 350B

**350C. Harp**

Fall, Spring, 1 to 3 credits. A student may earn a maximum of 18 credits in all enrollments for this course.  
P: MUS 150C. R: Open only to majors in School of Music, approval of school.  
Private instruction in harp.  
QP: MUS 150C QA: MUS 350C

**351. Voice**

Fall, Spring, 1 to 3 credits. A student may earn a maximum of 18 credits in all enrollments for this course.  
P: MUS 151. R: Open only to majors in School of Music and to students in Music secondary teaching minor, approval of school.  
Private instruction in voice.  
QP: MUS 151 QA: MUS 351

**352A. Violin**

Fall, Spring, 1 to 4 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
P: MUS 152A. R: Open only to majors in School of Music, approval of school.  
Private instruction in violin.  
QP: MUS 152A QA: MUS 352A

**352B. Viola**

Fall, Spring, 1 to 4 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
P: MUS 152B. R: Open only to majors in School of Music, approval of school.  
Private instruction in viola.  
QP: MUS 152B QA: MUS 352B

**352C. Cello**

Fall, Spring, 1 to 4 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
P: MUS 152C. R: Open only to majors in School of Music, approval of school.  
Private instruction in cello.  
QP: MUS 152C QA: MUS 352C

**352D. Double Bass**

Fall, Spring, 1 to 4 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
P: MUS 152D. R: Open only to majors in School of Music, approval of school.  
Private instruction in double bass.  
QP: MUS 152D QA: MUS 352D

**353A. Flute**

Fall, Spring, 1 to 4 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
P: MUS 153A. R: Open only to majors in School of Music, approval of school.  
Private instruction in flute.  
QP: MUS 153A QA: MUS 353A

**353B. Oboe**

Fall, Spring, 1 to 4 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
P: MUS 153B. R: Open only to majors in School of Music, approval of school.  
Private instruction in oboe.  
QP: MUS 153B QA: MUS 353B

**353C. Clarinet**

Fall, Spring, 1 to 4 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
P: MUS 153C. R: Open only to majors in School of Music, approval of school.  
Private instruction in clarinet.  
QP: MUS 153C QA: MUS 353C

**353D. Saxophone**

Fall, Spring, 1 to 4 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
P: MUS 153D. R: Open only to majors in School of Music, approval of school.  
Private instruction in saxophone.  
QP: MUS 153D QA: MUS 353D

**353E. Bassoon**

Fall, Spring, 1 to 4 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
P: MUS 153E. R: Open only to majors in School of Music, approval of school.  
Private instruction in bassoon.  
QP: MUS 153E QA: MUS 353E

**354A. Trumpet**

Fall, Spring, 1 to 4 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
P: MUS 154A. R: Open only to majors in School of Music, approval of school.  
Private instruction in trumpet.  
QP: MUS 154A QA: MUS 354A

**354B. Horn**

Fall, Spring, 1 to 4 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
P: MUS 154B. R: Open only to majors in School of Music, approval of school.  
Private instruction in horn.  
QP: MUS 154B QA: MUS 354B

**354C. Trombone**

Fall, Spring, 1 to 4 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
P: MUS 154C. R: Open only to majors in School of Music, approval of school.  
Private instruction in trombone.  
QP: MUS 154C QA: MUS 354C

**354D. Euphonium**

Fall, Spring, 1 to 4 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
P: MUS 154D. R: Open only to majors in School of Music, approval of school.  
Private instruction in euphonium.  
QP: MUS 154D QA: MUS 354D

**354E. Tuba**

Fall, Spring, 1 to 4 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
P: MUS 154E. R: Open only to majors in School of Music, approval of school.  
Private instruction in tuba.  
QP: MUS 154E QA: MUS 354E

**355. Percussion**

Fall, Spring, 1 to 4 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
P: MUS 155. R: Open only to majors in School of Music, approval of school.  
Private instruction in percussion.  
QP: MUS 155 QA: MUS 355

**363. Methods and Materials of Elementary Music I**  
Fall, Spring, 2(2-0)

R: Not open to freshmen and sophomores. Not open to students in the School of Music.  
How children learn music from early childhood to grade three.  
QP: MUS 135

- 364. Methods and Materials of Elementary Music II**  
Spring, 2(2-0)  
P: MUS 363. R: Not open to freshmen and sophomores. Not open to students in the School of Music.  
How children learn music in grades 4-6.  
QP: MUS 135 QA: MUS 345
- 370. Music Therapy: Behavior Measurement and Assessment**  
Fall, 3(3-1)  
P: MUS 270. R: Open only to Music Therapy majors. Observation and assessment of behavior. Principles of behavioral change. Design of treatment. Ethics and standards of clinical practice. Field trips required.  
QA: MUS 400
- 371. Music Therapy: Treatment Planning and Case Management**  
Spring, 3(3-1)  
P: MUS 370. R: Open only to Music Therapy majors. Supervised clinical practice in music therapy. Goals and objectives of treatment. Design and evaluation of treatment programs. Field trips required.
- 380. Musical Styles and Forms**  
Fall, 3(3-1)  
P: MUS 281. R: Open only to majors in School of Music.  
Form in pre-20th century Western music. Stylistic analysis of representative medieval, renaissance, baroque, and 18th and 19th century compositions.  
QP: MUS 282 QA: MUS 380
- 381. 20th Century Music Theory**  
Spring, 3(3-1)  
P: MUS 380.  
Western art music and jazz. Stylistic and formal analysis of representative compositions and jazz improvisations. Post-tonal theory. Jazz nomenclature and harmonic practice.  
QP: MUS 381
- 408. Piano Technology I**  
Fall, 3(2-2)  
P: MUS 309. R: Open only to majors in School of Music.  
Restoring the original tune of old pianos. Repairing or replacing all worn parts. Advanced concert tuning and tone regulation.  
QP: MUS 310 QA: MUS 408
- 409. Piano Technology II**  
Spring, 3(2-2)  
P: MUS 408. R: Open only to majors in School of Music.  
Restoring the original tune of old pianos. Repairing or replacing all worn parts. Advanced concert tuning and tone regulation.  
QP: MUS 408 QA: MUS 409, MUS 410
- 412. History of Oratorio**  
Spring of odd-numbered years. 2(2-0)  
P: MUS 211. R: Open only to majors in School of Music.  
History and literature of oratorio since 1600.  
QP: MUS 226 QA: MUS 412
- 413. Keyboard Literature to Mid-19th Century**  
Fall of even-numbered years. 2(2-1)  
P: MUS 281. R: Open only to majors in School of Music.  
Keyboard styles and works of representative composers such as Bach, Couperin, Mozart, Haydn and Beethoven.  
QP: MUS 182 QA: MUS 415C
- 414. Keyboard Literature since the Mid-19th Century**  
Spring of even-numbered years. 2(2-1)  
P: MUS 413. R: Open only to majors in School of Music.  
Keyboard styles and works of representative composers such as Schumann, Chopin, Ives and Prokofiev.  
QP: MUS 282 QA: MUS 416C, MUS 417C
- 415. Art Song Literature: German**  
Fall of even-numbered years. 2(2-1)  
P: MUS 181. R: Open only to majors in School of Music.  
Standard art song repertoire with emphasis on German Lieder. Performance of art songs in class.  
QP: MUS 182 QA: MUS 415E
- 416. Art Song Literature: European and American**  
Spring of even-numbered years. 2(2-1)  
P: MUS 181. R: Open only to majors in School of Music.  
Standard art song repertoire with emphasis on Italian, French, and twentieth century art songs. Performance of art songs in class.  
QP: MUS 182 QA: MUS 416E
- 420. Music of the 18th Century**  
Fall of even-numbered years. 2(2-0)  
P: MUS 212. R: Not open to freshmen and sophomores. Open only to Music majors.  
Late baroque and early classical traditions: styles, genres, forms, theories, aesthetics, performance practices, instruments and masterworks in sociopolitical context. Aural and score analysis of representative works.  
QP: MUS 182 QA: MUS 417A
- 421. 19th Century European-American Music Literature**  
Spring of even-numbered years. 2(2-0)  
P: MUS 212. R: Not open to freshmen and sophomores. Late classical and romantic period traditions: styles, genres, forms, theories, aesthetics, performance practice, instruments and masterworks in sociopolitical context. Aural and score analysis of representative works.  
QP: MUS 182 QA: MUS 415B
- 422. 20th Century European and American Music Literature**  
Spring of odd-numbered years. 2(2-0)  
P: MUS 212. R: Not open to freshmen and sophomores. Twentieth-century styles, genres, forms, theories, aesthetics, performance practices, instruments and masterworks in sociopolitical context. Aural and score analysis of representative works.  
QP: MUS 182 QA: MUS 416B
- 423. History of Opera**  
Fall of odd-numbered years. 2(2-0)  
P: MUS 212. R: Open only to majors in School of Music.  
Musical, cultural, and social significance of opera since 1600.  
QP: MUS 226 QA: MUS 411
- 427. Music of Asia, the Pacific, and the Near East**  
Fall, 2(2-0)  
P: MUS 212. R: Open only to majors in School of Music.  
Music in the cultures of the Asian continent and Pacific islands. Techniques of ethnomusicology, listening and analysis.  
QP: MUS 226
- 428. Music of Africa, Europe, and the Americas**  
Spring, 2(2-0)  
P: MUS 212. R: Open only to majors in School of Music.  
Music in the cultures of Africa, Europe, and the Americas with emphasis on folk and vernacular traditions. Techniques of ethnomusicology, listening and analysis.  
QP: MUS 226
- 435. Opera Theatre**  
Fall, Spring, 1 to 2 credits. A student may earn a maximum of 8 credits in all enrollments for this course.  
R: Audition required.  
Rehearsal and performance of complete operas and operatic excerpts.  
QA: MUS 495
- 440. Electronic and Computer Music Literature**  
Fall, 3(3-0)  
P: MUS 281. R: Not open to freshmen and sophomores. Music literature composed with tape recorders, synthesizers and computers.  
QP: MUS 282 QA: MUS 439
- 441. Introduction to Computer Music**  
Fall, 3(3-0)  
P: MUS 281. R: Not open to freshmen. Digital synthesizers, samplers, and Musical Instrument Digital Interface. Computer sequencing and timbre editing software. Compositional techniques of computer music.  
QP: MUS 282 QA: MUS 440
- 442. Independent Projects in Computer Music**  
Fall, Spring, 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course.  
P: MUS 441.  
Independent composition or research in computer music. Assigned use of computer music studios.  
QP: MUS 441 QA: MUS 442
- 448. Advanced Keyboard Methods and Literature I**  
Fall, 2(2-0)  
P: MUS 347. R: Open only to majors in School of Music.  
Advanced piano literature for private lessons and classrooms.  
QA: MUS 462
- 449. Advanced Keyboard Methods and Literature II**  
Spring, 2(2-0)  
P: MUS 448. R: Open only to majors in School of Music.  
Advanced piano literature for private lessons and classrooms.  
QA: MUS 463, MUS 464
- 457. Teaching Instrumental Music in the Elementary School**  
Fall, 3(2-2)  
P: MUS 339. R: Open only to seniors and graduate students in the School of Music and to seniors and graduate students with a Music teaching minor.  
Techniques for developing instrumental music programs in grades 4-6. Topics include curriculum, pedagogy, materials, and program administration. Clinical experiences in schools required.  
QP: MUS 250 QA: TE 320
- 458. Teaching Instrumental Music in the Secondary School**  
Spring, 3(2-2)  
P: MUS 339. R: Open only to seniors and graduate students in the School of Music and to seniors and graduate students with a Music teaching minor.  
Techniques for developing instrumental music programs in grades 7-12. Topics include curriculum, pedagogy, materials, and program administration. Clinical experiences in schools required.  
QP: MUS 250 QA: TE 335
- 460. Computers in School Music**  
Fall, 2(2-1)  
R: Not open to freshmen and sophomores. Open only to students in the School of Music with a teacher certification option and to students with a Music teaching minor.  
Techniques and principles of computer-assisted music instruction in school programs. Emphasis on appropriate software and hardware for teaching and management.  
QA: MUS 431
- 461. Marching Band Methods**  
Spring, 2(2-0)  
R: Not open to freshman and sophomores. Open only to students in the School of Music with a teacher certification option and to students with a Music teaching minor.  
Administration of school marching bands. Technical and philosophical aspects.  
QA: MUS 430
- 462. Suzuki Methods and Materials**  
Spring, 2(1-2)  
R: Open only to majors in School of Music.  
Beginning levels of Suzuki violin pedagogy.

**Descriptions—Music  
of  
Courses**

**465. Music in Early Childhood**  
Fall, Spring, 2(2-0)

P: MUS 260. R: Not open to freshmen and sophomores. Open only to students in the School of Music with a teacher certification option and to students with a Music teaching minor. Music learning activities and teaching strategies for children ages three to six.  
QP: MUS 250

**466. Literature for Teaching General Music, K-6**  
Spring, 2(2-1)

P: TE 401. R: Open only to seniors in the School of Music with a teacher certification option and to seniors with a Music teaching minor. Musical materials for listening and performance in general music classes, K-6. Composed music from classic styles, folk music, and music of diverse cultures.  
QP: TE 321, TE 335, TE 336, MUS 345 QA: MUS 404

**467. Teaching General Music in the Elementary School**  
Fall, 3(2-2)

P: MUS 339. R: Open only to seniors and graduate students in the School of Music with a teacher certification option and to seniors and graduate students with a Music teaching minor. Techniques for teaching general music to students in grades K-6. Topics include curriculum, pedagogy, materials, and program administration. Clinical experience in schools required.  
QP: MUS 250 QA: TE 321

**468. Teaching Choral Music in the Secondary School**  
Spring, 3(2-2)

P: MUS 339. R: Open only to seniors and graduate students in the School of Music with a teacher certification option and to seniors and graduate students with a Music teaching minor. Techniques for developing choral music programs in grades 7-12. Topics include curriculum, pedagogy, materials, and program administration. Clinical experience in schools required.  
QP: MUS 250 QA: TE 336

**470. Music Therapy: Mental and Behavioral Disorders**  
Fall, 3(3-1)

P: MUS 371. R: Open only to Music Therapy majors. Use of music therapy to treat clients with mental and behavioral disabilities. Clinical practicum required.  
QA: MUS 470

**471. Music Therapy: Physical and Developmental Disabilities**  
Spring, 3(3-1)

P: MUS 470. R: Open only to Music Therapy majors. Use of music therapy to treat clients with physical and developmental disabilities. Clinical practicum required.  
QA: MUS 471, MUS 472

**476. Psychology of Music: Foundations**  
Fall, 3(3-0)

R: Not open to freshmen and sophomores. Psychoacoustics and neurophysiological processing of music. Affective response to music and musical preference. Function of music in society. Nature of musical talent.  
QA: PSY 486

**477. Psychology of Music: Research Methodology and Application**  
Spring, 2(2-0)

P: MUS 476. Research projects and proposal writing. Application of elementary statistical concepts in evaluating responses to music.  
QP: PSY 486 QA: PSY 487

**480. Counterpoint**  
Fall, Spring, 2(2-0)

P: MUS 381. R: Open only to majors in School of Music. Creative and analytical work with two- and three-part counterpoint in the style of J.S. Bach.  
QA: MUS 386, MUS 387, MUS 388

**483. Composition**  
Fall, Spring, 2 credits. A student may

earn a maximum of 12 credits in all enrollments for this course.  
P: MUS 281. R: Open only to majors in School of Music. Private instruction in music composition.  
QP: MUS 282 QA: MUS 483

**484. Instrumentation and Basic Orchestration**  
Fall, 2(2-1)

P: MUS 381. R: Open only to majors in School of Music. Four families of orchestral instruments: strings, woodwinds, brass, and percussion. Acoustics, notation, range, articulation, dynamics, technique, and timbre for individual instruments and orchestral sections.  
QP: MUS 282 QA: MUS 383

**485. Advanced Orchestration**  
Spring, 2(2-0)

P: MUS 484. R: Open only to majors in School of Music. Transcription techniques. Orchestral devices and styles. Additional percussion material, harp, and auxiliary instruments.  
QP: MUS 383 QA: MUS 384, MUS 385

**490. Independent Study**

Fall, Spring, 1 to 3 credits. A student may earn a maximum of 9 credits in all enrollments for this course.  
R: Approval of school. Special projects arranged by an individual student and a faculty member in areas supplementing regular course offerings.  
QA: MUS 490

**491. Special Topics in Music**

Fall, Spring, 1 to 4 credits. A student may earn a maximum of 10 credits in all enrollments for this course.  
R: Approval of school. Special topics supplementing regular course offerings proposed by faculty for group study.  
QA: MUS 499

**493. Music Therapy: Clinical Practicum**  
Fall, Spring, Summer, 1 credit.

P: MUS 471. R: Open only to Music Therapy majors. Six months of internship in an approved music therapy clinical program at an accredited treatment center.  
QP: MUS 472 QA: MUS 400

**800. Introduction to Music Theory**  
Fall, 1(1-1)

R: Open only to graduate students in School of Music. Elements of music theory, with emphasis on voice-leading and harmonic analysis in diatonic and chromatic music.

**801. Aural Skills**  
Spring, 1(1-1)

R: Open only to graduate students in School of Music. Ear training in the areas of melody, harmony, and rhythm. Sight singing using the solfege system. Computer-aided drill programs.

**830. Research Methods and Materials in Music**

Fall, 1 to 3 credits. A student may earn a maximum of 3 credits in all enrollments for this course.  
R: Approval of school. Organization, presentation, and documentation of research. Encyclopedias, indices, databases, and other aids.  
QA: MUS 824

**835. Medieval Music**  
Fall, 3(3-0)

P: MUS 830 recommended. R: Open only to graduate students in School of Music. European music to 1400. Emphasis on polyphonic music, with some attention to Gregorian chant and secular monophony.  
QP: MUS 824, MUS 226, MUS 824 QA: MUS 915

**836. Renaissance Music**  
Spring, 3(3-0)

R: Open only to graduate students in School of Music. European music, sacred and secular, from 1400 to 1600.  
QP: MUS 824, MUS 226 QA: MUS 916, MUS 415A

**837. 17th-Century Music**  
Fall, 3(3-0)

P: MUS 830 recommended. R: Open only to graduate students in School of Music. Instrumental and vocal music in Europe from 1600 to 1700. Development of genres and of national styles.  
QP: MUS 824, MUS 226, MUS 824 QA: MUS 917, MUS 416A

**844. Secondary or Specialist Emphasis: Piano**

Fall, Spring, 1(1-0) A student may earn a maximum of 8 credits in all enrollments for this course.  
R: Open only to graduate students in School of Music. Approval of school. Audition required. Not open to students with an emphasis in piano. Instruction in piano for students whose principal instrument is not piano.  
QA: MUS 849

**845. Secondary or Specialist Emphasis: Voice**

Fall, Spring, 1(1-0) A student may earn a maximum of 8 credits in all enrollments for this course.  
R: Open only to graduate students in School of Music. Not open to students with an emphasis in voice. Approval of school. Audition required. Instruction in vocal techniques for students whose principal emphasis is not voice.  
QA: MUS 851

**846. Secondary or Specialist Emphasis: String**

Fall, Spring, 1(1-0) A student may earn a maximum of 8 credits in all enrollments for this course.  
R: Open only to graduate students in School of Music. Approval of school. Audition required. Instruction in violin, viola, cello, or double bass.  
QA: MUS 846

**847. Secondary or Specialist Emphasis: Brass**

Fall, Spring, 1(1-0) A student may earn a maximum of 8 credits in all enrollments for this course.  
R: Open only to graduate students in School of Music. Approval of school. Audition required. Instruction in trumpet, trombone, euphonium, or tuba.  
QA: MUS 847

**848. Secondary or Specialist Emphasis: Woodwind**

Fall, Spring, 1(1-0) A student may earn a maximum of 8 credits in all enrollments for this course.  
R: Open only to graduate students in School of Music. Approval of school. Audition required. Instruction in flute, clarinet, oboe, bassoon, or saxophone.  
QA: MUS 848

**850A. Piano**

Fall, Spring, 1 to 3 credits. A student may earn a maximum of 18 credits in all enrollments for this course.  
R: Open only to master's students in Music Performance with an emphasis in piano and to master's students in Music Education. Approval of school. Audition required. Private instruction in piano.  
QA: MUS 850A

**850B. Organ**

Fall, Spring, 1 to 3 credits. A student may earn a maximum of 18 credits in all enrollments for this course.  
R: Open only to master's students in Music Performance with an emphasis in organ. Approval of school. Audition required. Private instruction in pipe organ.  
QA: MUS 850B

- 850C. Harp**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 18 credits in all enrollments for this course.  
R: Open only to master's students in Music Performance with an emphasis in harp. Approval of school. Audition required.  
Private instruction in harp.  
QA: MUS 850C
- 851. Voice**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 18 credits in all enrollments for this course.  
R: Open only to master's students in Music Performance with an emphasis in voice. Approval of school. Audition required.  
Private instruction in voice.  
QA: MUS 850D
- 852A. Violin**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 18 credits in all enrollments for this course.  
R: Open only to master's students in Music Performance with an emphasis in violin. Approval of school. Audition required.  
Private instruction in violin.  
QA: MUS 850E
- 852B. Viola**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 18 credits in all enrollments for this course.  
R: Open only to master's students in Music Performance with an emphasis in viola. Approval of school. Audition required.  
Private instruction in viola.  
QA: MUS 850F
- 852C. Cello**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 18 credits in all enrollments for this course.  
R: Open only to master's students in Music Performance with an emphasis in cello. Approval of school. Audition required.  
Private instruction in cello.  
QA: MUS 850G
- 852D. Double Bass**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 18 credits in all enrollments for this course.  
R: Open only to master's students in Music Performance with an emphasis in double bass. Approval of school. Audition required.  
Private instruction in double bass.  
QA: MUS 850H
- 853A. Flute**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 18 credits in all enrollments for this course.  
R: Open only to master's students in Music Performance with an emphasis in flute. Approval of school. Audition required.  
Private instruction in flute.  
QA: MUS 850I
- 853B. Oboe**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 18 credits in all enrollments for this course.  
R: Open only to master's students in Music Performance with an emphasis in oboe. Approval of school. Audition required.  
Private instruction in oboe.  
QA: MUS 850J
- 853C. Clarinet**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 18 credits in all enrollments for this course.  
R: Open only to master's students in Music Performance with an emphasis in clarinet. Approval of school. Audition required.  
Private instruction in clarinet.  
QA: MUS 850K
- 853D. Saxophone**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 18 credits in all enrollments for this course.  
R: Open only to master's students in Music Performance with an emphasis in saxophone. Approval of school. Audition required.  
Private instruction in saxophone.  
QA: MUS 850L
- 853E. Bassoon**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 18 credits in all enrollments for this course.  
R: Open only to master's students in Music Performance with an emphasis in bassoon. Approval of school. Audition required.  
Private instruction in bassoon.  
QA: MUS 850M
- 854A. Trumpet**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 18 credits in all enrollments for this course.  
R: Open only to master's students in Music Performance with an emphasis in trumpet. Approval of school. Audition required.  
Private instruction in trumpet.  
QA: MUS 850N
- 854B. Horn**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 18 credits in all enrollments for this course.  
R: Open only to master's students in Music Performance with an emphasis in horn. Approval of school. Audition required.  
Private instruction in horn.  
QA: MUS 850O
- 854C. Trombone**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 18 credits in all enrollments for this course.  
R: Open only to master's students in Music Performance with an emphasis in trombone. Approval of school. Audition required.  
Private instruction in trombone.  
QA: MUS 850P
- 854D. Euphonium**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 18 credits in all enrollments for this course.  
R: Open only to master's students in Music Performance with an emphasis in euphonium. Approval of school. Audition required.  
Private instruction in euphonium.  
QA: MUS 850Q
- 854E. Tuba**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 18 credits in all enrollments for this course.  
R: Open only to master's students in Music Performance with an emphasis in tuba. Approval of school. Audition required.  
Private instruction in tuba.  
QA: MUS 850R
- 855. Percussion**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 18 credits in all enrollments for this course.  
R: Open only to master's students in Music Performance with an emphasis in percussion. Approval of school. Audition required.  
Private instruction in percussion.  
QA: MUS 850S
- 856. Chamber Music**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Open only to graduate students in School of Music. Approval of school. Audition required.  
Performance of pre-20th century chamber music under faculty direction.  
QA: MUS 813
- 857. 20th-Century Chamber Music**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 12 credits in all enrollments for this course.  
R: Open only to graduate students in School of Music. Approval of school. Audition required.  
Performance of 20th century chamber music under faculty direction.  
QA: MUS 857
- 858A. Seminar in Band Conducting**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 36 credits in all enrollments for this course.  
R: Open only to graduate students in School of Music. Approval of school. Audition required.  
Advanced band conducting, including core repertoire examination and execution with emphasis on score analysis and preparation.  
QA: MUS 836A
- 858B. Seminar in Orchestral Conducting**  
Fall, Spring. 3(3-0) A student may earn a maximum of 36 credits in all enrollments for this course.  
R: Open only to graduate students in School of Music. Approval of school. Audition required.  
Advanced conducting techniques for orchestral literature of all periods and styles (string orchestra, chamber orchestra, symphony orchestra).  
QA: MUS 836B
- 858C. Seminar in Choral Conducting**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 36 credits in all enrollments for this course.  
R: Open only to graduate students in School of Music. Approval of school. Audition required.  
Advanced conducting techniques for choral and instrumental music of all periods.  
QA: MUS 836C
- 859. Choral Techniques and Materials**  
Spring of odd-numbered years. 3(3-0) A student may earn a maximum of 15 credits in all enrollments for this course.  
R: Open only to graduate students in School of Music. Advanced development of choral proficiency. Demonstrations of choral techniques. Conducting by students. Examination and evaluation of new materials. Variable content.  
QA: MUS 852
- 860. Seminar in History and Philosophy of Music Education**  
Spring of odd-numbered years. 2(2-0)  
R: Open only to graduate students in College of Arts and Letters and in College of Education.  
Major philosophies influencing American music education. Rise of music curricula and studies from Ancient Greece to the present.  
QA: MUS 803
- 861. Seminar in Psychology of Music Education**  
Fall. 2(2-0)  
R: Open only to graduate students in College of Arts and Letters and College of Education.  
Psychological foundations of music teaching and learning. Psychological research on problems of music teaching.  
QA: MUS 804
- 862. Seminar in Music Curriculum Development**  
Fall. 2(2-0)  
R: Open only to graduate students in College of Arts and Letters and in College of Education.  
History of and trends in music education curricula. Curriculum development and curricular models.  
QA: MUS 805
- 863. Seminar in Music Education Methodology**  
Spring of even-numbered years. 2(2-0)  
R: Open only to graduate students in College of Arts and Letters and College of Education.  
Psychological, philosophical, and aesthetic theories of methods and pedagogy that undergird music education.  
QA: MUS 806

**Descriptions—Music  
of  
Courses**

- 864. Research in Music Education**  
Fall. 3(3-0)  
R: Open only to graduate students in College of Arts and Letters and in College of Education.  
Methods of research in music education. Conceptualizing and implementing a study. Systematic information retrieval. Proposal writing.  
QA: MUS 811
- 865. Advanced Methods and Materials in Secondary Music Education**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course.  
Current methods and materials for teaching music in secondary schools. Topics vary.  
QA: MUS 820
- 866. Advanced Methods and Materials in Elementary Music Education**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course.  
Current methods and materials for teaching music in elementary schools. Topics vary.  
QA: MUS 821
- 868. Current Studies in Music Therapy**  
Fall. 2(2-0)  
R: Open only to graduate students in Music Therapy and in Music Education.  
Evaluation of current research in such areas of music therapy as stress and pain reduction, and music psychotherapy.  
QA: MUS 812
- 869. Education, and Administration in Music Therapy**  
Spring. 2(2-0)  
R: Open only to graduate students in Music Therapy.  
Administration of clinical and educational programs in music therapy. Curriculum development. Clinical preparation. Ethical, fiscal, and regulatory issues.  
QA: MUS 812
- 870. Contrapuntal Techniques I**  
Fall of odd-numbered years. 3(3-0)  
R: Open only to graduate students in School of Music.  
Techniques of voice-leading through imitative counterpoint. Compositional exercises modeled after sacred vocal polyphony of the sixteenth century, principally Palestrina and Victoria.  
QA: MUS 970
- 871. Contrapuntal Techniques II**  
Spring of odd-numbered years. 3(3-0)  
P: MUS 870 R: Open only to graduate students in School of Music.  
Compositional exercises modeled after instrumental polyphony of the eighteenth century, principally J.S. Bach. Influence of fugal technique in the nineteenth and twentieth centuries.  
QA: MUS 971
- 872. Tonal Forms**  
Fall. 2(2-0)  
R: Open only to graduate students in School of Music.  
Music from the period of common practice and its relationship to music composition. Interplay of melody, harmony, rhythm, and timbre in various structural units.  
QA: MUS 880
- 873. Early 20th Century Techniques**  
Spring. 2(2-0)  
R: Open only to graduate students in School of Music.  
Melodic, harmonic, rhythmic, and textural devices employed in early twentieth century music.  
QA: MUS 880
- 874. Schenkerian Analysis**  
Fall. 2(2-0)  
R: Open only to graduate students in School of Music.  
Thought, works, and influences of Heinrich Schenker. Techniques of linear analysis emphasizing the role of long-range voice-leading musical structure.  
QA: MUS 963
- 875. Analysis of Musical Scores**  
Summer. 3(3-0) A student may earn a maximum of 6 credits in all enrollments for this course.  
R: Open only to graduate students in School of Music.  
Analysis of choral, orchestral, and band music as a means of enhancing interpretation and performance.  
QA: MUS 860
- 876. History of Music Theory**  
Fall of odd-numbered years. 3(3-0)  
P: MUS 830 recommended R: Open only to graduate students in School of Music.  
Principal western theories of music from Pythagoras to the present. Ideas contributing to the development of modern musical thought and their place in western intellectual history.  
QA: MUS 943
- 880. Composition**  
Fall, Spring. 2(2-0) A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Open only to graduate students in School of Music.  
Advanced guided projects in creative writing of music.  
QA: MUS 835
- 881. Seminar in Composition**  
Fall, Spring. 2(2-0) A student may earn a maximum of 20 credits in all enrollments for this course.  
R: Open only to graduate students in School of Music.  
Study of contemporary music, with emphasis on compositional procedures.  
QA: MUS 834
- 882. Composition with Computers**  
Fall. 2(2-1)  
R: Open only to graduate students in School of Music.  
Current applications of microcomputers in musical composition.  
QA: MUS 870
- 883. Advanced Computer Music Projects**  
Spring. 1 to 4 credits. A student may earn a maximum of 12 credits in all enrollments for this course.  
P: MUS 882 or MUS 441. R: Open only to graduate students in School of Music and in Computer Science.  
Techniques and principles of composition and research with computers. Use of computer hardware and software.  
QA: MUS 871
- 890. Independent Study**  
Fall, Spring, Summer. 1 to 10 credits. A student may earn a maximum of 20 credits in all enrollments for this course.  
R: Approval of school.  
Special projects, directed reading, and research arranged by an individual graduate student and a faculty member in areas supplementing regular course offerings.
- 891. Special Topics**  
Fall, Spring, Summer. 1 to 10 credits. A student may earn a maximum of 25 credits in all enrollments for this course.  
R: Approval of school.  
Special topics supplementing regular course offerings proposed by faculty on a group study basis for graduate students.
- 892A. Seminar in Music History**  
Fall, Spring. 1 to 6 credits. A student may earn a maximum of 12 credits in all enrollments for this course.  
R: Open only to graduate students in School of Music.  
Approval of school.  
Various areas of music history, such as major composers, development of genres, criticism, or cultural context.  
QA: MUS 802, MUS 812
- 898. Master's Research**  
Fall, Spring, Summer. 1 to 10 credits. A student may earn a maximum of 20 credits in all enrollments for this course.  
R: Open only to master's students in School of Music.  
Approval of school.  
Directed research in support of Plan B master's degree requirements.
- 899. Master's Thesis Research**  
Fall, Spring, Summer. 1 to 10 credits. A student may earn a maximum of 20 credits in all enrollments for this course.  
R: Open only to master's students in School of Music.  
Approval of school.  
Directed research in partial fulfillment of Plan A master's degree requirements.  
QA: MUS 899
- 935. Seminar in 18th Century Music**  
Spring of even-numbered years. 3(3-0)  
R: Open only to graduate students in School of Music.  
Research on topics in eighteenth-century music.  
QA: MUS 918
- 936. Seminar in 19th-Century Music**  
Fall of even-numbered years. 3(3-0)  
R: Open only to doctoral students in School of Music.  
Selected topics in 19th-century music.  
QP: MUS 824, MUS 415B QA: MUS 919
- 937. Seminar in 20th-Century Music**  
Spring of odd-numbered years. 3(3-0)  
R: Open only to doctoral students in School of Music.  
Selected topics in 20th-century music.  
QP: MUS 824, MUS 416B QA: MUS 920
- 950A. Piano**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Open only to doctoral students in Music Performance with an emphasis in piano. Approval of school.  
Audition required.  
Private instruction in piano.  
QA: MUS 950A
- 950B. Organ**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Open only to doctoral students in Music Performance with an emphasis in organ. Approval of school.  
Audition required.  
Private instruction in pipe organ.  
QA: MUS 950B
- 950C. Harp**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Open only to doctoral students in Music Performance with an emphasis in harp. Approval of school.  
Audition required.  
Private instruction in harp.  
QA: MUS 950C
- 951. Voice**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Open only to doctoral students in Music Performance with an emphasis in voice. Approval of school.  
Audition required.  
Private instruction in voice.  
QA: MUS 950D
- 952A. Violin**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Open only to doctoral students in Music Performance with an emphasis in violin. Approval of school.  
Audition required.  
Private instruction in violin.  
QA: MUS 950E
- 952B. Viola**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Open only to doctoral students in Music Performance with an emphasis in viola. Approval of school.  
Audition required.  
Private instruction in viola.  
QA: MUS 950F



- 952C. Cello**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Open only to doctoral students in Music Performance with an emphasis in cello. Approval of school. Audition required.  
Private instruction in cello.  
QA: MUS 950G
- 952D. Double Bass**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Open only to doctoral students in Music Performance with an emphasis in double bass. Approval of school. Audition required.  
Private instruction in double bass.  
QA: MUS 950H
- 953A. Flute**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Open only to doctoral students in Music Performance with an emphasis in flute. Approval of school. Audition required.  
Private instruction in flute.  
QA: MUS 950I
- 953B. Oboe**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Open only to doctoral students in Music Performance with an emphasis in oboe. Approval of school. Audition required.  
Private instruction in oboe.  
QA: MUS 950J
- 953C. Clarinet**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Open only to doctoral students in Music Performance with an emphasis in clarinet. Approval of school. Audition required.  
Private instruction in clarinet.  
QA: MUS 950K
- 953D. Saxophone**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Open only to doctoral students in Music Performance with an emphasis in saxophone. Approval of school. Audition required.  
Private instruction in saxophone.  
QA: MUS 950L
- 953E. Bassoon**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Open only to doctoral students in Music Performance with an emphasis in bassoon. Approval of school. Audition required.  
Private instruction in bassoon.  
QA: MUS 950M
- 954A. Trumpet**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Open only to doctoral students in Music Performance with an emphasis in trumpet. Approval of school. Audition required.  
Private instruction in trumpet.  
QA: MUS 950N
- 954B. Horn**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Open only to doctoral students in Music Performance with an emphasis in horn. Approval of school. Audition required.  
Private instruction in horn.  
QA: MUS 950O
- 954C. Trombone**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Open only to doctoral students in Music Performance with an emphasis in trombone. Approval of school. Audition required.  
Private instruction in trombone.  
QA: MUS 950P
- 954D. Euphonium**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Open only to doctoral students in Music Performance with an emphasis in euphonium. Approval of school. Audition required.  
Private instruction in euphonium.  
QA: MUS 950Q
- 954E. Tuba**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Open only to doctoral students in Music Performance with an emphasis in tuba. Approval of school. Audition required.  
Private instruction in tuba.  
QA: MUS 950R
- 955. Percussion**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Open only to doctoral students in Music Performance with an emphasis in percussion. Approval of school. Audition required.  
Private instruction in percussion.  
QA: MUS 950S
- 960. Seminar in Measurement in Music Education**  
Spring of even-numbered years. 2(2-0)  
P: MUS 864, MUS 965 or approval of school. R: Open only to graduate students in Music Education or approval of school.  
Theory and practice in measuring the outcomes of music instruction in the cognitive, affective and psychomotor domains.  
QP: MUS 811, MUS 956 QA: MUS 903
- 961. Seminar in Music Teacher Education**  
Fall of odd-numbered years. 2(2-0)  
R: Open only to graduate students in College of Arts and Letters and in College of Education.  
Issues, techniques, and problems in the preparation of school music educators.  
QA: MUS 903
- 962. Seminar in Aesthetics in Music Education**  
Fall of even-numbered years. 2(2-0)  
R: Open only to graduate students in College of Arts and Letters and in College of Education.  
Historical foundations of aesthetics. Concept of aesthetic education and implementation in the music classroom.  
QA: MUS 903
- 963. Seminar in Administration of Music Programs**  
Spring of odd-numbered years. 2(2-0)  
R: Open only to graduate students in College of Arts and Letters and in College of Education.  
Techniques and problems in administering music programs in schools, colleges, and universities.  
QA: MUS 954
- 964. Seminar in Music Education Trends**  
Fall of odd-numbered years. 2(2-0)  
R: Open only to graduate students in College of Arts and Letters and in College of Education.  
Trends in music education, 1950-present. Comparison with former trends in American music education, 1600-1950.  
QA: MUS 955
- 965. Advanced Research Methods in Music Education**  
Fall. 3(3-0)  
P: MUS 864. R: Open only to graduate students in College of Arts and Letters and in College of Education.  
Music education research projects using computerized statistical analysis.  
QP: MUS 811 QA: MUS 956
- 970. Pedagogy of Theory I**  
Fall of odd-numbered years. 2(2-0)  
R: Open only to graduate students in School of Music. Organization, goals, and procedures for teaching music theory to undergraduates. Choice and sequencing of topics, pacing, supplementary materials, educational philosophies, and relevance to performance.  
QA: MUS 843
- 971. Pedagogy of Theory II**  
Spring of odd-numbered years. 2(2-0)  
R: Open only to graduate students in School of Music. Organization, goals, and procedures for teaching music theory to undergraduates. Ear training and sight singing, and their application to general musicianship.  
QA: MUS 844
- 972. Analytical Studies I**  
Fall. 3(3-0)  
R: Open only to graduate students in School of Music. Melody, harmony, rhythm, color, texture, counterpoint, and structure in selected musical masterpieces from the 13th century to the early 19th century.  
QA: MUS 960
- 973. Analytical Studies II**  
Spring. 3(3-0)  
R: Open only to graduate students in School of Music. Melody, harmony, rhythm, color, texture, counterpoint, and structure in selected musical masterpieces from the nineteenth and twentieth centuries.  
QA: MUS 961
- 974. Atonality, Serialism, and Set Theory**  
Spring. 2(2-0)  
R: Open only to graduate students in School of Music. Atonal and paratonal music. Related compositional and analytical systems. Serialism, integral serialism, and set theory.  
QA: MUS 964
- 975. Readings in Music Theory**  
Spring of even-numbered years. 2(2-0)  
R: Open only to graduate students in School of Music. Current topics in music theory. Research paper required.
- 980. Composition**  
Fall, Spring. 2(2-0) A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Open only to graduate students in School of Music. Advanced guided projects in creative writing of music.  
QA: MUS 835
- 990. Doctoral Independent Study**  
Fall, Spring, Summer. 1 to 10 credits. A student may earn a maximum of 20 credits in all enrollments for this course.  
R: Approval of school.  
Special projects, directed reading, and research arranged by an individual doctoral candidate and a faculty member in areas supplementing the regular course offerings.
- 991. Special Topics**  
Fall, Spring, Summer. 1 to 10 credits. A student may earn a maximum of 25 credits in all enrollments for this course.  
R: Approval of school.  
Special topics supplementing regular course offerings proposed by faculty on a group study basis for doctoral students.
- 992. Seminar in Musicology**  
Spring. 3(3-0) A student may earn a maximum of 18 credits in all enrollments for this course.  
R: Open only to graduate students in School of Music. Topics in musicology such as early notations, music editing, or historical performance practices.  
QP: MUS 824 QA: MUS 924

**Descriptions—Music  
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Courses**

**999. Doctoral Dissertation Research**  
Fall, Spring, Summer. 1 to 40 credits. A student may earn a maximum of 40 credits in all enrollments for this course.  
R: Open only to doctoral students in School of Music. Approval of school.  
QA: MUS 999

**800. Problems in Biological or Physical Science for Teachers**  
Fall, Spring, Summer. 2 to 8 credits. A student may earn a maximum of 8 credits in all enrollments for this course.  
R: Teacher Certification required. Approval of college. Supervised study of problems in biological or physical science.  
QA: BS 800, PHS 890

**856. Environmental and Behavioral Biology Laboratory**  
Summer. 3 credits. Given only at W.K. Kellogg Biological Station.  
P: Secondary certification in biology, 3 years teaching experience; C: NSC 855 R: Approval of college. Laboratory and field examinations of lake, stream and forest ecosystems.  
QA: NSC 856

**802. Essentials of Electron Microscopy**  
Fall, Spring. 2(2-0)  
Principles of operation and uses of transmission and scanning electron microscopy. Related electron beam instruments. Specimen preparation and analytical methods.  
QA: NSC 802

**860. Problem Solving Techniques in Physical Science**  
Summer. 3 credits.  
P: NSC 861, NSC 862, NSC 863. R: Secondary certification in chemistry or physics or earth science or physical science, 3 years teaching experience. Approval of college. Measurement and analysis of chemical, physical, and geological phenomena.

**810. Transmission Electron Microscopy Laboratory**  
Fall, Spring, Summer. 3(1-4)  
P: NSC 802. R: Approval of department.  
Use of transmission microscope and preparative equipment. Preparation techniques for specimens, photographic and darkroom use, and interpretation of micrographs.  
QP: NSC 802 QA: NSC 810

**861. Chemistry for Teachers**  
Summer. 2 credits.  
P: Secondary certification in chemistry or physics or earth science or physical science, 3 years teaching experience  
R: Approval of college.  
Intensive lecture and laboratory study of basic chemistry from a modern viewpoint.

**820. Scanning Electron Microscopy; Energy Dispersive X-ray Microanalysis**  
Fall, Spring. 3(1-4)  
P: NSC 802 or concurrently;  
Use of scanning electron microscope and energy dispersive x-ray microanalysis. Machine variables, artifacts, quantitative analysis, specimen preparation, darkroom procedures.  
QP: NSC 802 QA: NSC 820, NSC 840

**862. Physics for Teachers**  
Summer. 2 credits.  
P: Secondary certification in chemistry or physics or earth science or physical science, 3 years teaching experience  
R: Approval of college.  
Intensive lecture and laboratory study of basic physics from a modern viewpoint.

**825. Special Problems in Electron Microscopy**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 40 credits in all enrollments for this course.  
P: NSC 802; NSC 810 or NSC 820.  
Use of electron microscopy techniques for selected research topics.  
QP: NSC 802, NSC 810 or NSC 820 QA: NSC 801

**863. Earth Science for Teachers**  
Summer. 2 credits.  
P: Secondary certification in chemistry or physics or earth science or physical science, 3 years teaching experience  
R: Approval of college.  
Intensive lecture and laboratory study of basic earth sciences from a modern viewpoint.

**850. Cell and Molecular Biology**  
Summer. 2 credits.  
P: Secondary certification in biology, 3 years teaching experience; C: NSC 851 R: Secondary certification in biology, 3 years teaching experience; approval of college.  
Molecular basis of structure and function of cells. Protein structure and function, cell physiology, metabolic energy and transmission of genetic information.  
QA: NSC 850

**864. Interdisciplinary Seminar in Physical Science**  
Summer. 2 credits.  
P: NSC 860. R: Approval of college.  
Interrelationships of the physical sciences. The role of society in regulation of science to technology transfer.

**851. Cell and Molecular Biology Laboratory**  
Summer. 3 credits.  
P: Secondary certification in biology; 3 years teaching experience; C: NSC 850 R: Approval of college.  
Generation of laboratory exercises appropriate for secondary students.  
QA: NSC 851

**889. Research for Inservice Teachers**  
Fall, Spring, Summer. 1 to 8 credits. A student may earn a maximum of 10 credits in all enrollments for this course.  
R: Open only to inservice K-12 teachers with baccalaureate degrees.  
Research in faculty laboratories. Oral and written presentations.

**852. Interdisciplinary Seminar in Biological Science**  
Fall, Spring, Summer. 1 credit.  
P: Secondary certification in biology; 3 years teaching experience. R: Approval of college.  
Interrelationships of biological science and technology. Role of society in regulation of research and technological innovations.  
QA: NSC 852

**899. Master's Thesis Research**  
Fall, Spring, Summer. 3 to 8 credits. A student may earn a maximum of 10 credits in all enrollments for this course.  
R: Open only to Master's candidates in College of Natural Science. Approval of college.  
QA: BS 899, PHS 899

**855. Environmental and Behavioral Biology**  
Summer. 2 credits. Given only at W.K. Kellogg Biological Station.  
P: Secondary certification in biology; 3 years teaching experience; C: NSC 856 R: Approval of college.  
Biotic and abiotic features of lakes, streams, forest ecosystems, and microbial ecosystems.  
QA: NSC 855

**901. Frontiers in Biological Science**  
Fall, Spring. 1 credit. A student may earn a maximum of 36 credits in all enrollments for this course.  
P: Secondary certification in chemistry or physics or earth science or physical science or biology, R: 3 years teaching experience. Approval of college.  
Weekend workshops with research faculty exploring background and latest findings in their area of research.  
QA: NSC 901

**NATURAL SCIENCE NSC**

**College of Natural Science**

**201. Science Problem Solving Seminar I**  
Fall. 2(2-0)  
P: Drew Section of MTH 0823 or MTH 116 or MTH 132 concurrently. R: Approval of college.  
Problem solving principles and strategies used in the disciplines of science and mathematics. Activities reflecting the types of problems encountered.  
QA: NSC 201

**202. Science Problem Solving Seminar II**  
Spring. 2(2-0)  
P: NSC 201. R: Approval of college.  
Continuation of NSC 201.  
QA: NSC 202

**203. Drew Laboratory Directed Studies**  
Fall, Spring, Summer. 1 to 2 credits. A student may earn a maximum of 6 credits in all enrollments for this course.  
P: NSC 202. R: Open only to Drew Laboratory students.  
Using topics related to a faculty member's ongoing research, students explore the relationship between science and technology and social issues.  
QA: NSC 203

**390. Special Problems**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course.  
R: Approval of department.  
Faculty directed individualized study of an interdisciplinary problem.

**401. Science Laboratories for Secondary Schools**  
Fall. 4(2-6)  
R: Open only to seniors in the College of Natural Science with a teacher certification option.  
Laboratory equipment, supplies, demonstrations, exercises, and safety. Care of live organisms. Disposal of biological and chemical wastes. Field trips required.

**490. Special Problems**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course.  
R: Approval of department.  
Faculty directed individualized study of an interdisciplinary problem.  
QA: BS 499, NS 300

**491. Selected Topics**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course.  
R: Approval of department.  
Selected interdisciplinary topics not normally covered in other courses.  
QA: BS 405, PHS 405

**499. Research**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course.  
R: Open only to juniors and seniors in the College of Natural Science with a teacher certification option.  
Research in faculty laboratories. Oral and written presentations.