831. Bacterial Diversity
Spring of even-numbered years. 3(3-0)
MPH 302, MPH 304, BCH 401 or BCH 453 or concurrently.
Morphological and physiological properties of diverse groups of bacteria and how these properties relate to their ecological niche and importance.

832. Bacterial Diversity Laboratory
Spring of even-numbered years. 3(0-6)
MPH 831 or concurrently.
Representative groups of bacteria will be isolated and studied.

842. Advanced Soil Microbiology
Fall of odd-numbered years. 3(3-0)
MPH 426 or approval of department.
Interdepartmental with the Department of Crop and Soil Sciences.
Biochemistry, biology, and community ecology of microorganisms indigenous to soil. Emphasis on current research problems.

890. Special Problems in Microbiology
Fall, Winter, Spring, Summer. 2 to 6 credits. May reenroll for a maximum of 12 credits. Approval of department.

999. Doctoral Dissertation Research
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

MUSIC

College of Arts and Letters

112. Chamber Music
Fall, Winter, Spring, Summer. 1(0-0)
May reenroll for a maximum of 18 credits. Approval of department.
Performance of works for small ensembles.

118. Band
A. Marching Band
Fall. 1 credit. May reenroll for a maximum of 6 credits. Membership determined by audition.
The Marching Band participates at football games.
B. Spartan Brass
Winter. 1 credit. May reenroll for a maximum of 6 credits. Membership determined by audition.
The Spartan Brass participates at basketball and hockey games.
C. Concert Band
Fall, Winter, Spring. 1 credit. May reenroll for a maximum of 12 credits. Membership determined by audition.
Public appearances are scheduled on campus each term.

MILITARY SCIENCE

Office of the Provost

101. Introduction to the Military Profession
(MS 121.) Fall, Winter, Spring. 1(1-1)
Approval of department.
Analysis of the military profession from several academic perspectives. Exploration of the technical, ethical, and personal ramifications of service as an officer in the U.S. Army. Lab introduces military skills.

102. Military Leadership I
(MS 41A.) Winter. 1(1-1) M S 101 or approval of department.
Introduction to military leadership. Discusses examples from military history to illustrate what a military leader must be, know, and do to lead soldiers in battle. Lab includes both military skills and leadership applications.

103. Army Physical Fitness Training
Spring. 1(0-3) M S 102 or approval of department.
The leader's role in implementing the Army Physical Fitness Program to provide for the physical well being of subordinates. Individual and group fitness programs are introduced. Includes rappelling and small arms rifle marksmanship.

201. Military First Aid
(MS 221.) Fall. 1(1-1) M S 103 or approval of department.
Emergency first aid techniques including casualty evaluation, lifesaving measures, CPR, and environmental injury prevention. Lab includes military skills and first aid applications.

202. Military Leadership II
(MS 41B.) Winter. 1(1-1) M S 201 or approval of department.
Descriptive model of small unit leadership. Provides a realistic preview of the small unit leader's role in the Army. Lab includes small unit drill and ceremonies.

203. Land Navigation
(MS 223.) Spring. 1(1-2) M S 202 or approval of department.
Use of military topographic and special use maps to include interpretation, resection, modified resection, and polar coordinates. Development of overlays for tactical operations. Lab includes actual land navigation in the field using the lenticular compass.

301. Command and Control Communications
Fall. 3(2-3) M S 303 or approval of department.
Tactical wire and radio communications systems and employment during tactical operations to provide effective control of military operations. Encryption/decryption, use of codes, and electronic warfare. Lab emphasizes practical application of communication skills.

302. Military Leadership III
Winter. 3(2-3) M S 301 or approval of department.
Application of the theories and models of the behavioral sciences to leadership as it functions in a military environment. Case studies from military history illustrate what examples of conduct in the profession of arms. Lab includes practical leadership applications.

303. Small Unit Tactics
(MS 325.) Spring. 3(2-3) M S 302 or approval of department.
Defensive and offensive military tactics. Incorporates practical exercises which allow cadets to view the modern battlefield through the eyes of the infantry platoon leader. Lab emphasizes tactical employment of the infantry squad and platoon.

401. Training Management and Unit Administration
(MS 42B.) Fall. 3(2-2) M S 301 or approval of department.
The Army training management system and the leader's role as a trainer. Operations and administration in military units to provide effective personnel management and logistic support. Oral and written military communication. Lab includes practical experience in unit administration.

402. Military Leadership IV
(MS 41C.) Winter. 3(3-2) M S 401 or approval of department.
Leadership assessment, development, and training practices. Integration of theory, practice, and self-assessment in leader development of subordinates and the role of the noncommissioned officer. Lab includes leadership development and assessment exercises.

403. Military Law, Ethics, and Professionalism
(MS 42T.) Spring. 3(2-2) M S 402 or approval of department.
Military legal system and the responsibilities of leaders in the application of military justice. Examination of fundamental values and principles of conduct in the profession of arms. Lab includes practical exercises in professional development.

499. Independent Study in Military Science
Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 6 credits. Approval of department and Juniors.
Individual research and study in an area related to military science as approved and directed by the Department of Military Science.
133A. Symphony Orchestra
Fall, Winter, Spring. 1(0-5) May reenroll for a maximum of 15 credits. Admission by audition.
Preparation and performance of symphony and operatic repertoire under direction of faculty and guest conductors of international reputation.

133B. Chamber Orchestra
Fall, Winter, Spring. 1(0-5) May reenroll for a maximum of 12 credits. Membership determined by audition.
A specialized ensemble of advanced performers concentrating on the repertoire of the classic composers and modern repertoire for chamber orchestra. Rehearsals and performances with faculty and guest artists.

135. Music in Elementary Education
Fall, Winter, Spring, Summer. 4(3-3)
Elementary education majors.
Study of music learning strategies in the elementary schools. Music concepts and literature are developed through listening, performing, creative and analytical skills. Methods and materials are emphasized.

141A. Class Violin and Viola
(MUS 141.) Fall. 2(0-4) Knowledge of notation. Music majors or approval of school.
Class instruction in violin and viola.

141B. Class Percussion I
(MUS 340.) Fall. I(0-2) Knowledge of notation. Music majors or approval of school.
Class instruction in percussion.

141C. Class French Horn
(MUS 340.) Fall. I(0-2) Knowledge of notation. Music majors or approval of school.
Class instruction in French horn.

141D. Class Flute
(MUS 340.) Fall. I(0-2) Knowledge of notation. Music majors or approval of school.
Class instruction in flute.

141E. Class Oboe
(MUS 340.) Fall. I(0-2) Knowledge of notation. Music majors or approval of school.
Class instruction in oboe.

141F. Class Voice
(MUS 141.) Fall. I(0-2) Knowledge of notation. Music majors or approval of school.
Class instruction in voice.

141G. Class Piano
(MUS 141.) Fall, Winter. I(0-2) Knowledge of notation. Music majors or approval of school.
Class instruction in piano.

141J. Class Guitar
Fall, Winter. I(0-2) Knowledge of notation. Music majors or approval of school.
Class instruction in guitar.

142A. Class Cello and Stringed Bass
(MUS 142.) Winter. I(0-3) Knowledge of notation. Music majors or approval of school.
Class instruction in cello.

142B. Class Trumpet
(MUS 142.) Winter. I(0-3) Knowledge of notation. Music majors or approval of school.
Class instruction in trumpet.

142C. Class Trombone
(MUS 340.) Winter. I(0-2) Knowledge of notation. Music majors or approval of school.
Class instruction in trombone.

142D. Class Bassoon
(MUS 340.) Winter. I(0-2) Knowledge of notation. Music majors or approval of school.
Class instruction in bassoon.

142F. Class Voice
(MUS 142.) Winter. I(0-2) MUS 141F.
Continuation of MUS 141F.

142G. Class Piano
(MUS 142.) Winter, Spring. I(0-2) MUS 141G.
Continuation of MUS 141G.

142J. Class Guitar
Winter, Spring. I(0-2) MUS 141J.
Continuation of MUS 141J.

143A. Class Clarinet
(MUS 143.) Spring. I(0-2) Knowledge of notation. Music majors or approval of school.
Class instruction in clarinet.

143B. Class Tuba and Euphonium
Spring. I(0-2) Knowledge of notation. Music majors or approval of school.
Class instruction in tuba and euphonium.

143C. Class Percussion II
Spring, I(0-2)
Continuation of MUS 141B.

143D. Class Saxophone
Spring. I(0-2) Knowledge of notation. Music majors or approval of school.
Class instruction in saxophone.

143E. Class Voice
(MUS 143.) Spring. I(0-2) MUS 142F.
Continuation of MUS 142F.

143G. Class Piano
(MUS 143.) Spring. I(0-2) MUS 142G.
Continuation of MUS 142G.

143J. Class Guitar
Spring. I(0-2) MUS 142J.
Continuation of MUS 142J.

147. Elementary Piano
Fall, Winter, Spring. 2(2-2) Elementary Education, Physical Education and Exercise Science, and Health Education and Human Performance majors or approval of school.
Beginning class piano instruction. Development of ability to play the three principal chords in all keys and to harmonize simple melodies using these chords. Transposition of simple melodies. Ability to play melodies and rhythms suitable for use in lower intermediate grades or in recreation work.

148. Elementary Piano
Winter, Spring. 2(2-2) MUS 147. Elementary Education majors.
Continuation of MUS 147.

150A. Piano
(MUS 150.) Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 24 credits. Audition required.
Private instruction in piano.

150B. Organ
(MUS 150.) Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 24 credits. Audition required.
Private instruction in organ.

150C. Harp
(MUS 150.) Fall, Winter, Spring. 1 to 4 credits. May reenroll for a maximum of 24 credits. Audition required.
Private instruction in harp.

151. Voice
Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 24 credits. Audition required.

152A. Violin
(MUS 152.) Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 18 credits. Audition required.
Private instruction in violin.

152B. Viola
(MUS 152.) Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 18 credits. Audition required.
Private instruction in viola.

152C. Cello
(MUS 152.) Fall, Winter, Spring. 1 to 4 credits. May reenroll for a maximum of 18 credits. Audition required.
Private instruction in cello.

152D. Stringed Bass
(MUS 152.) Fall, Winter, Spring. 1 to 4 credits. May reenroll for a maximum of 18 credits. Audition required.
Private instruction in stringed bass.

152E. Guitar
Fall, Winter, Spring. 1 to 4 credits. May reenroll for a maximum of 18 credits. Audition required.
Private instruction in guitar.

153A. Flute
(MUS 153.) Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 18 credits. Audition required.
Private instruction in flute.

153B. Oboe
(MUS 153.) Fall, Winter, Spring. 1 to 4 credits. May reenroll for a maximum of 18 credits. Audition required.
Private instruction in oboe.

153C. Clarinet
(MUS 153.) Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 18 credits. Audition required.
Private instruction in clarinet.

153D. Saxophone
(MUS 153.) Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 18 credits. Audition required.
Private instruction in saxophone.

153E. Bassoon
(MUS 153.) Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 18 credits. Audition required.
Private instruction in bassoon.
154A. Trumpet
(MUS 154). Fall, Winter, Spring, Summer. 1 to 6 credits. May reenroll for a maximum of 18 credits. Audition required.
Private instruction in trumpet.

154B. French Horn
(MUS 154). Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 18 credits. Audition required.
Private instruction in French horn.

154C. Trombone
(MUS 154). Fall, Winter, Spring, 1 to 4 credits. May reenroll for a maximum of 18 credits. Audition required.
Private instruction in trombone.

154D. Euphonium
(MUS 154). Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 18 credits. Audition required.
Private instruction in euphonium.

154E. Tuba
(MUS 154). Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 18 credits. Audition required.
Private instruction in tuba.

155. Percussion
Fall. Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 24 credits. Audition required.

180. Basic Harmony
Fall. 3(3-1)
Fundamentals of basic musicianship: notation, clefs, scales, intervals, triads, meter, rhythm, and tonality. The analysis and writing of diatonic harmony in the style of the Bach 4-part choral.

181. Basic Harmony
Winter. 3(3-1) MUS 180.
Continuation of MUS 180.

182. Basic Harmony
Spring. 3(3-1) MUS 181.
Continuation of MUS 181.

183. Aural Harmony
Fall. 1(0-2) MUS 180 concurrently.
The aural counterpart of basic harmony. Drill in harmonic, melodic and rhythmic dictation. Sight singing and keyboard harmony.

184. Aural Harmony
Winter. 1(0-2) MUS 183; MUS 181 concurrently.

185. Aural Harmony
Spring. 1(0-2) MUS 184; MUS 182 concurrently.

189. Collegiate Choir
Fall. Winter, Spring. 1(0-3) May reenroll for a maximum of 12 credits. Membership determined by audition. Three hours of choral rehearsals each week. Representative literature for mixed choir with emphasis on Renaissance, Baroque, Classical, Romantic, and contemporary composers. Attendance at all rehearsals and performances obligatory.

190. State Singers
Fall, Winter, Spring. 1(0-4) May reenroll for a maximum of 12 credits. Membership determined by audition; ability to sight read. Four hours of rehearsals a week. Attendance at all rehearsals and public performance obligatory.

191. Choral Union
Fall, Winter, Spring, Summer. 1(0-2-1/2) May reenroll for a maximum of 12 credits. Membership determined by audition. Two and one-half hours of rehearsals per week. Attendance at all rehearsals and public concerts obligatory.

192. Glee Club, Men and Women
Fall, Winter, Spring, 1(0-3) May reenroll for a maximum of 12 credits.
Three hours of rehearsals a week. Attendance at all rehearsals and public concerts obligatory.

193. University Chorale
Fall, Winter, Spring, Summer. 1(0-4) May reenroll for a maximum of 12 credits. Membership determined by audition.
Choral ensemble designed primarily for graduate and upper class undergraduate students. Representative literature for chamber choiral work with emphasis on Renaissance, Baroque, and contemporary composers.

195. Jazz Laboratory Band
Fall, Winter, Spring. 1(0-4) May reenroll for a maximum of 12 credits. Membership determined by audition.
Practical experience in playing music in the jazz idiom. Techniques of rehearsing a stage band. Playing of student arrangements; performance of jazz composition and arrangements in concert.

200H. Honor Work
Fall, Winter, Spring, Summer. 1 to 10 credits. May reenroll for a maximum of 16 credits. Approval of department.

208. Basic Keyboard Tuning; Theory and Practice I
Fall, Summer. 3(3-2). MUS 182, MUS 185 or approval of department.
Basic acoustics. Historical development of musical scales and tuning systems. Classical and modern methods of keyboard tuning.

209. Basic Keyboard Tuning; Theory and Practice II
Spring. 2(1-3) MUS 208.
Continuation of MUS 208.

210. Basic Keyboard Tuning; Theory and Practice III
Spring. 2(1-3) MUS 209.
Continuation of MUS 208.

211. Introduction to Music Literature I (A)
Fall. 4(4-0) Student may not receive credit in both HUM 261 and MUS 211.
Comparative study of selected musical works in historical context with emphasis on their relationships to society in general and the other arts in particular. From Antiquity through the Renaissance.

212. Introduction to Music Literature II (A)
Winter. Summer of odd-numbered years. 4(4-0) Student may not receive credit in both HUM 262 and MUS 212.
Comparative study of selected musical works in historical context with emphasis on their relationships to society in general and the other arts in particular. From Beethoven to the present.

213. Introduction to Music Literature III (A)
Spring. Summer of even-numbered years. 4(4-0) Student may not receive credit in both HUM 263 and MUS 213.
Comparative study of selected musical works in historical context with emphasis on their relationships to society in general and the other arts in particular. From Beethoven to the present.

224. History of Music
Fall. 3(3-0) MUS 183.
Music from ancient Greece through Romanesque and Gothic periods, concluding with the Renaissance. Greek theory and "ethos"; age of plainsong; development of polyphony; instruments peculiar to period under question.

225. History of Music
Winter. 3(3-0) MUS 224.
Baroque and classical periods. Special attention to fugue, opera, oratorio, sonata, and symphony. Analysis of characteristic works.

226. History of Music
Spring. 3(3-0) MUS 225.
Romantic period, impressionism, and contemporary trends. Continuation of development of form, melody, rhythm, and tonality.

231. Beginning Jazz Improvisation I
(MUS 234). Fall. 2(2-0) MUS 182 or approval of school.
Fundamentals of chord–scale relationships, basic forms, style, with emphasis on major key II–V–I progression.

232. Beginning Jazz Improvisation II
Winter. 2(2-0) MUS 231 or approval of school.
Continuation of MUS 231 with emphasis on minor key II–V–I progression and blues.

233. Beginning Jazz Improvisation III
Spring. 2(2-0) MUS 232 or approval of school.
Continuation of MUS 232 with emphasis on more complex forms using II–V–I progressions in major and minor, and altered blues forms.

241. Advanced Class Piano
Fall. 1(0-2) MUS 143 or approval of school. For Vocal-General Music Education majors only.
Continuation of Class Piano MUS 143. Special emphasis given to developing practical skills at the piano for use in the public school classroom.

242. Advanced Class Piano
Winter. 1(0-2) MUS 241 or approval of school.
Continuation of MUS 241.
Descriptions — Music of Courses

243. Advanced Class Piano
Spring. 1(0-2) MUS 242 or approval of department.
Continuation of MUS 242.

245. Music in Special Education
Fall, Winter, Spring, Summer. 3(3-0) MUS 335. Special education majors.
Methods of teaching music in special education programs.

250. Introduction to Music Education
Fall, Spring. 2(2-1) Sophomores in Music Education or approval of department.
An overview of the field of school music. Study and discussion of historical background, current trends, and teaching responsibilities at all curricular levels.

251. German Diction for Singers
Fall. 1(1-1) Three terms of MUS 151.
Practice and training in German lyric diction. Rules of pronunciation; emphasis on spoken drill and performance of German art songs in class.

252. French Diction for Singers
Winter. 1(1-1) Three terms of MUS 151.

275. Popular Music Styles
Winter. 3(3-0)
Style characteristics of prominent genres of popular music in twentieth century America. The evolution of popular musical taste.

276. Popular Music Styles
Spring. 3(3-0)
A survey of style characteristics of prominent genres of popular music in the United States from 1950 to the present.

280. Advanced Harmony
Fall. 3(3-1) MUS 182.
Continuation of MUS 182, with added vocabulary and technique through nineteenth century harmony. Creative writing in small forms.

281. Advanced Harmony
Winter. 3(3-1) MUS 280.
Continuation of MUS 280.

282. Advanced Harmony
Spring. 3(3-1) MUS 281.
Continuation of MUS 281.

283. Advanced Aural Harmony
Fall. 1(0-2) MUS 183; MUS 280 concurrently.
Aural counterpart of advanced harmony. Drill in harmonic, melodic, and rhythmic dictation. Sight singing and keyboard harmony.

284. Advanced Aural Harmony
Winter. 1(0-2) MUS 283; MUS 281 concurrently.

285. Advanced Aural Harmony
Spring. 1(0-2) MUS 284; MUS 282 concurrently.

286. Advanced Keyboard Tuning: Theory and Practice I
Fall. 3(2-0) MUS 210 or approval of department.

289. Advanced Keyboard Tuning: Theory and Practice II
Winter. 3(2-0) MUS 308.
Continuation of MUS 308.

306. Advanced Keyboard Tuning: Theory and Practice I
Fall. 3(2-0) MUS 210 or approval of department.

309. Advanced Keyboard Tuning: Theory and Practice II
Winter. 3(2-0) MUS 308.
Continuation of MUS 308.

310. Advanced Keyboard Tuning: Theory and Practice III
Spring. 3(2-2) MUS 309.
Continuation of MUS 309.

320. Music Workshop
Summer. 1 to 6 credits. May reenroll for a maximum of 12 credits. Approval of department.

328. Composing and Arranging for Jazz Ensemble I
(MUS 334.) Fall. 3(3-0) MUS 182; approval of school.
Techniques of orchestration, chord progressions, voicings, forms, and part/score writing for contemporary jazz ensemble. Analysis of recordings and scores.

329. Composing and Arranging for Jazz Ensemble II
Winter. 3(0-0) May reenroll for a maximum of 6 credits. MUS 325 or approval of school.
Techniques of composition for large jazz ensemble.

330. Jazz in America
Spring. 3(0-0) Juniors or approval of department.
Jazz fundamentals, history, styles, and social significance.

331. Advanced Jazz Improvisation I
Fall. 2(0-0) MUS 233 or approval of school.
Continuation of MUS 233. Emphasis on continued proficiency of jazz skills. Introduction of pentatonic scales, resources for all chord types.

332. Advanced Jazz Improvisation II
Winter. 2(0-0) MUS 331 or approval of school.
Continuation of MUS 331. Emphasis on continued proficiency of pentatonic scales, introduction of several new scale sources and patterns. Piano chord voicings.

333. Advanced Jazz Improvisation III
Spring. 2(0-0) MUS 332 or approval of school.
Continuation of MUS 333. Emphasis on chromatonic motive development and nontraditional improvisation, i.e. solo improvisation, chord improvisation, and unusual instrument combinations.

335. Ensemble and Conducting
Fall, Spring. 3(1-4) MUS 185 or approval of department.
Principles of conducting correlated with application in ensemble of vocal and instrumental class instruction. Survey of vocal and instrumental ensemble literature suitable for school use. Individual conducting stressed.

336. Ensemble and Conducting
Winter. 3(1-4) MUS 335.
Continuation of MUS 335.

345. Teaching Music in the Elementary School I
Fall, Winter, Spring, Summer. 3(3-0) Approval of department.
Procedures and program of music instruction in the elementary school. Special emphasis on instructional problems of early elementary children.

347. Methods and Literature
Fall. Summer of odd-numbered years. 2(1-2) Six terms of study on applied instrument or voice, or approval of department.
Methods of teaching voice or instruments. Study of appropriate teaching literature.

348. Methods and Literature
Spring. Summer of even-numbered years. 2(1-2) Six terms of study on applied instrument or voice, or approval of department.
Methods of teaching voice or instruments. Study of appropriate teaching literature.

350A. Piano
(MUS 350.) Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 24 credits. Six terms of MUS 150A or approval of school.
Private instruction in piano.

350B. Organ
(MUS 350.) Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 24 credits. Six terms of MUS 150B or approval of school.
Private instruction in organ.

350C. Harp
(MUS 350.) Fall, Winter, Spring, 1 to 4 credits. May reenroll for a maximum of 24 credits. Six terms of MUS 150C or approval of school.
Private instruction in harp.

351. Voice
Fall, Winter, Spring. Summer. 1 to 4 credits. May reenroll for a maximum of 24 credits. Six terms of MUS 151 or approval of department.
Continuation of MUS 151.

352A. Violin
(MUS 352.) Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 24 credits. Six terms of MUS 152A or approval of school.
Private instruction in violin.

352B. Viola
(MUS 352.) Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 24 credits. Six terms of MUS 152B or approval of school.
Private instruction in viola.

352C. Cello
(MUS 352.) Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 24 credits. Six terms of MUS 152C or approval of school.
Private instruction in cello.
352D. Stringed Bass
(MUS 352.) Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 24 credits. Six terms of MUS 152D or approval of school. Private instruction in stringed bass.

352E. Guitar
Fall, Winter, Spring. 1 to 4 credits. May reenroll for a maximum of 21 credits. Six terms of MUS 152E or approval of school. Private instruction in guitar.

353A. Flute
(MUS 353.) Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 24 credits. Six terms of MUS 153A or approval of school. Private instruction in flute.

353B. Oboe
(MUS 353.) Fall, Winter, Spring. 1 to 4 credits. May reenroll for a maximum of 24 credits. Six terms of MUS 153B or approval of school. Private instruction in oboe.

353C. Clarinet
(MUS 353.) Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 24 credits. Six terms of MUS 153C or approval of school. Private instruction in clarinet.

353D. Saxophone
(MUS 353.) Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 24 credits. Six terms of MUS 153D or approval of school. Private instruction in saxophone.

353E. Bassoon
(MUS 353.) Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 24 credits. Six terms of MUS 153E or approval of school. Private instruction in bassoon.

354A. Trumpet
(MUS 354.) Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 24 credits. Six terms of MUS 154A or approval of school. Private instruction in trumpet.

354B. French Horn
(MUS 354.) Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 24 credits. Six terms of MUS 154B or approval of school. Private instruction in French horn.

354C. Trombone
(MUS 354.) Fall, Winter, Spring. 1 to 4 credits. May reenroll for a maximum of 24 credits. Six terms of MUS 154C or approval of school. Private instruction in trombone.

354D. Euphonium
(MUS 354.) Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 24 credits. Six terms of MUS 154D or approval of school. Private instruction in euphonium.

354E. Tuba
(MUS 354.) Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 24 credits. Six terms of MUS 154E or approval of school. Private instruction in tuba.

355. Percussion
Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 24 credits. Six terms of MUS 155 or approval of department. Continuation of MUS 155.

356. Piano Sight Reading and Accompanying
Fall, Winter, Spring. 2(0-4) May reenroll for a maximum of 12 credits. Piano major or approval of department.

357. Piano Accompanying
Fall, Winter, Spring. 1(9-5) May reenroll for a maximum of 12 credits. Piano major or approval of instructor.
Instruction in the art of accompaniment. Accompaniment of instrumental and vocal soloists.

360. Studies in Style and Form
Fall, Summer. 2(3-1) MUS 282.
Analysis and creative writing of technical and structural practices in music of various periods, with special emphasis on the twentieth century.

361. Studies in Style and Form
Winter, Summer. 2(2-1) MUS 282.
Analysis and creative writing of technical and structural practices in music of various periods, with special emphasis on the twentieth century.

362. Studies in Style and Form
Spring, Summer. 2(2-1) MUS 282.
Analysis and creative writing of technical and structural practices in music of various periods, with special emphasis on the twentieth century.

363. Orchestration
Fall, Summer. 2(2-0) MUS 282.
Modern orchestral resources and scoring for various instrumental groups.

364. Orchestration
Winter, Summer. 2(2-0) MUS 383.
Continuation of MUS 383.

365. Orchestration
Spring, Summer. 2(2-0) MUS 384.
Continuation of MUS 384.

366. Counterpoint
Fall of even-numbered years. 2(2-0) MUS 282.
Creative and analytical work with two-part counterpoint in the style of J. S. Bach.

367. Counterpoint
Winter of odd-numbered years. 2(2-0) MUS 386.
Creative and analytical work with three-part counterpoint in the style of J. S. Bach.

368. Counterpoint
Spring of odd-numbered years. 2(2-0) MUS 387.
Creative and analytical work with three and four-part counterpoint in the style of J. S. Bach.

370. Clinical Training in Music Therapy
Fall, Winter, Spring, Summer. 1 to 18 credits. Music therapy majors. Six months internship in an accredited neuropsychiatric hospital.

400H. Honors Work
Fall, Winter, Spring, Summer. 1 to 16 credits. May reenroll for a maximum of 16 credits. Approval of department.

408. Piano Technology I
Fall. 3(2-2) MUS 310 or approval of department.
Methods of and practice in restoring the original tone of old pianos. Repairing or replacing all worn parts. Advanced concert tuning and tone regulation.

409. Piano Technology II
Winter. 3(2-2) MUS 408.
Continuation of MUS 408.

410. Piano Technology III
Spring. 3(2-2) MUS 409.
Continuation of MUS 409.

411. Opera
Winter of odd-numbered years. 2(1-3) Six terms of voice or approval of department. History of opera from 1600 to the present.

412. Oratorio
Fall of even-numbered years. Summer. 2(1-2) Six terms of voice or approval of department. History of oratorio from 1600 to the present.

415A. Renaissance Music
Fall. 2 credits. MUS 182 or approval of department.

415B. 19th Century Music
Fall. 2 credits. MUS 182 or approval of department.

415C. Keyboard Music, Seventeenth through Eighteenth Centuries
Fall of even-numbered years. 2 credits. MUS 182 or approval of department.

415E. German Lieder
Fall of odd-numbered years. 2 credits. MUS 182 or approval of department.

415F. Organ Literature to 1700
Fall of even-numbered years. 2 credits. MUS 182 or approval of department.

416A. Baroque Music
Winter. 3 credits. MUS 182 or approval of department.

416B. Twentieth Century Music, European
Winter. 2 credits. MUS 182 or approval of department.

416C. Piano Music, Nineteenth Century
Winter of odd-numbered years. 2 credits. MUS 182 or approval of department.

416E. French-Italian Art Song
Winter of even-numbered years. 2 credits. MUS 182 or approval of department.

417A. Classical Music
Spring. 2 credits. MUS 182 or approval of department.

417B. American Music
Spring. 2 credits. MUS 182 or approval of department.
Descriptions — Music of Courses

417C. Piano Music, Twentieth Century
Spring of odd-numbered years. 2 credits. MUS 182 or approval of department.

417E. English-American Art Song
Spring of even-numbered years. 2 credits. MUS 182 or approval of department.

417F. Organ Literature From 1900 to Present
Spring of even-numbered years. 2 credits. MUS 182 or approval of department.

421. Music and Worship
Fall. 3(3-0) MUS 226 or approval of department.

430. Marching Band Methods and Materials
Winter. 2(2-0) Music Education Juniors or approval of instructor.

431. Computers in School Music
Spring. 2(2-0) Music Education Juniors.

434. Aesthetic Theory and Modernism
Fall. 4(4-0) Juniors. Interdepartmental with History of Art, Linguistics and Oriental and African Languages, Romance Languages, and the departments of English and Philosophy. Administered by the Department of Philosophy. Problems, assumptions, and arguments of modern aesthetic theory examined in the context of debates over modernity and modernist artistic practice.

435. Advanced Conducting
Spring, Summer. 2(2-0) Approval of department.

438. Brass and Woodwind Techniques
Spring. 2(1-2) Senior music majors.

439. Electronic and Computer Music Literature
Fall. Summer. 2(2-0) MUS 282 or approval of school.

440. Introduction to Electronic Music Composition
Fall. Summer. 2(2-0) MUS 282 or approval of school.

441. Introduction to Computer Music Composition
Spring. Summer. 2(1-2) MUS 282 or approval of school.

444. Independent Projects in Electronic and Computer Music Composition
Fall. Winter. Spring. Summer. 2 credits. May reenroll for a maximum of 6 credits. MUS 444 or MUS 871 or approval of school.

445. Recreational Music
Spring. Summer of odd-numbered years. 2(2-0) Majors.

446. Studio Teaching and Observation
Fall. 2(1-2) MUS 347, MUS 348, MUS 349.

447. Influence of Music on Behavior
Fall. 3(3-0) Nine credits of psychology or approval of department.

448. Music Therapy Techniques
Winter. 3(3-0) MUS 470.

449. Composition
Fall. Winter. Spring. Summer. 2(2-0) May reenroll for a maximum of 18 credits. MUS 282 or approval of department.

450. Recreational Music
Spring, Summer of even-numbered years. 2(2-0) Majors.

451. Computers in School Music
Spring. 2(2-0) Music Education Juniors.

452. Studio Teaching and Observation
Winter. 2(1-2) MUS 462.

453. Composition
Spring. 2(2-0) MUS 463.

454. Studio Teaching and Observation
Spring. 2(1-2) MUS 463.

455. Philosophy of Music
Fall. Summer. 3(3-0) Approval of department.

456. Studio Teaching and Observation
Fall. Winter. Spring. Summer. 1 to 2 credits. May reenroll for a maximum of 8 credits. Approval of department.

457. Psychology of Music
Fall. Summer. 3(2-2) PSY 486 or approval of department. Interdepartmental with and administered by the Department of Psychology.

458. Computer Music Composition
Spring. Summer. 2(1-2) MUS 282 or approval of school.

459. Studio Teaching and Observation
Fall. Winter. Spring. Summer. 1 to 5 credits. May reenroll for a maximum of 10 credits if a different topic is taken. Juniors, or approval of department.

460. Recreational Music
Spring of odd-numbered years. 2 credits. May reenroll for a maximum of 6 credits. Approval of department.

461. Introduction to Electronic Music Composition
Summer. 2(1-2) MUS 282 or approval of school.

462. Studio Teaching and Observation
Fall. Winter. Spring. 2(1-2) MUS 462.

463. Studio Teaching and Observation
Winter. 2(1-2) MUS 462.

464. Studio Teaching and Observation
Spring. 2(2-0) MUS 463.

465. Studio Teaching and Observation
Spring. 2(2-0) MUS 463.

466. Composition
Summer. 3(3-0) Approval of department.

467. Music Therapy Techniques
Winter. 3(3-0) MUS 470.

468. Music Therapy Techniques
Spring. 3(3-0) MUS 471.

469. Composition
Summer. 3(3-0) Approval of department.

470. Psychology of Music
Fall. Summer. 3(3-0) Approval of department.

471. Studio Teaching and Observation
Fall. Winter. Spring. 2(2-0) May reenroll for a maximum of 18 credits. MUS 282 or approval of department.

472. Studio Teaching and Observation
Fall. Winter. Spring. 2(2-0) May reenroll for a maximum of 18 credits. MUS 282 or approval of department.

473. Composition
Fall. Winter. Spring. Summer. 2(2-0) May reenroll for a maximum of 18 credits. MUS 282 or approval of department.

474. Composition
Fall. Winter. Spring. Summer. 1 to 5 credits. May reenroll for a maximum of 10 credits if a different topic is taken. Juniors, or approval of department.

475. Composition
Fall. Winter. Summer. 3(2-2) PSY 486 or approval of department. Interdepartmental with and administered by the Department of Psychology.

476. Composition
Fall. Summer. 3(3-0) Approval of department.

477. Composition
Fall. Summer. 3(3-0) Approval of department.

478. Composition
Fall. Summer. 3(3-0) Approval of department.

479. Composition
Fall. Summer. 3(3-0) Approval of department.

480. Composition
Fall. Summer. 3(3-0) Approval of department.

481. Composition
Fall. Summer. 3(3-0) Approval of department.

482. Composition
Fall. Summer. 3(3-0) Approval of department.

483. Composition
Fall. Summer. 3(3-0) Approval of department.

484. Composition
Fall. Summer. 3(3-0) Approval of department.

485. Composition
Fall. Summer. 3(3-0) Approval of department.

486. Composition
Fall. Summer. 3(3-0) Approval of department.
812. Research Problems in Music
Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 15 credits.

813. Chamber Music
Fall, Winter, Spring, Summer. 1(1-0)
May reenroll for a maximum of 6 credits. Approval of department.

814. Pedagogy of Theory
Fall, Summer. 3(3-0) Approval of department.

815. Pedagogy of Conducting
Fall, Winter, Spring, Summer. 1(1-0)
May reenroll for a maximum of 12 credits. Approval of department.

816. Seminar in Chamber Music: 20th Century
Spring. 2(2-0) Approval of department.

817. Seminar in Chamber Music: 20th Century
Spring. 2(2-0) Approval of department.

818. Seminar in Chamber Music: 20th Century
Spring. 2(2-0) Approval of department.

819. Seminar in Chamber Music: 20th Century
Spring. 2(2-0) Approval of department.

820. Music Workshop
Summer. 1 to 9 credits. May reenroll for a maximum of 9 credits. Approval of department.

821. Advanced Methods and Materials in Elementary Music
Fall, Winter, Spring, Summer. 3(3-0)
May reenroll for a maximum of 9 credits. Different topics are taken. Graduate students in Music Education or approval of department.

822. Research Methods and Materials in Elementary Music
Fall. 3 or 4 credits.
A critical examination of encyclopedias, indices, and other aids to research, and of the organization, presentation and documentation of research results.

823. Sixteenth Century Counterpoint
Fall of even-numbered years, Summer. 3(3-0) MUS 830.
Study and writing of counterpoint based upon the works of Orlando Lasso and Palestrina.

824. Sixteenth Century Counterpoint
Winter of odd-numbered years, Summer. 3(3-0) MUS 830.
Continuation of MUS 830.

825. Seminar in Composition
Fall, Winter, Spring, Summer. 2(2-0)
May reenroll for a maximum of 24 credits. Approval of department.
Study of contemporary music with emphasis on compositional procedures.

826. Seminar in Conducting
Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 18 credits. Approval of department.

827. Pedagogy of Theory
Fall, Summer. 3(3-0) Approval of department.

828. Materials of Music
Fall, Winter, Summer. 1 to 4 credits. MUS 280.
Correlation of the areas of music theory as a basis for the study of 19th and 20th century music.

829. Materials of Music
Winter, Spring. 1 to 4 credits. MUS 280.
Continuation of MUS 280.

830. Master's Thesis Research
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

831. Proseminar in Music Education
Fall, Winter, Spring, Summer. 3(3-0)
May reenroll for a maximum of 9 credits. Approval of department.

832. Renaissance Music
Winter. 3(3-0) Approval of department.
Investigation of developments in European music from 1450 to 1600, tracing developments in both sacred and secular music.

833. Baroque Music
Spring. 3(3-0) Approval of department.
Instrumental and vocal music of Early Baroque period.

834. Renaissance Music
Winter. 3(3-0) Approval of department.

835. Baroque Music
Spring. 3(3-0) Approval of department.

836. Renaissance Music
Winter. 3(3-0) Approval of department.

837. Baroque Music
Spring. 3(3-0) Approval of department.

838. Renaissance Music
Winter. 3(3-0) Approval of department.

839. Baroque Music
Spring. 3(3-0) Approval of department.

840. Renaissance Music
Winter. 3(3-0) Approval of department.

841. Baroque Music
Spring. 3(3-0) Approval of department.

842. Renaissance Music
Winter. 3(3-0) Approval of department.

843. Baroque Music
Spring. 3(3-0) Approval of department.

844. Pedagogy of Theory
Winter, Summer. 3(3-0) Approval of department.
Continuation of MUS 843 with emphasis upon new instructional media, and upon methods and materials in ear training and sight singing.

845. Minor Instrument Study: String
Fall, Winter, Spring, Summer. 1(1-0)
May reenroll for a maximum of 12 credits.
Secondary instrument for students enrolled in string specialist program.

846. Minor Instrument Study: Brass
Fall, Winter, Spring, Summer. 1(1-0)
May reenroll for a maximum of 12 credits.
Secondary instrument for students enrolled in brass specialist program.

847. Minor Instrument Study: Woodwinds
Fall, Winter, Spring, Summer. 1(1-0)
May reenroll for a maximum of 12 credits.
Secondary instrument for students enrolled in woodwind specialist program.

848. Minor Instrument Study: Piano
Fall, Winter, Spring, Summer. 1(1-0)
May reenroll for a maximum of 12 credits.
Secondary instrument for students enrolled in piano specialist program.

849. Minor Instrument Study: Voice
Fall, Winter, Spring, Summer. 1(1-0)
May reenroll for a maximum of 12 credits.
Approval of department.
Study of vocal techniques for students in majors other than applied music.

850. Applied Music
Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 27 credits.

851. Intermediate Music
Fall, Winter, Spring, Summer. 1(1-0)
May reenroll for a maximum of 12 credits.

852. Choral Technique and Materials
Spring, Summer. 3(3-0) May reenroll for a maximum of 9 credits. Completion of undergraduate program in music education.
Advanced course for further development of choral proficiency. Demonstrations of choral techniques, conducting by students, examination and evaluation of new materials.

853. Problems in Analysis
Summer. 4(4-0) May reenroll for a maximum of 8 credits. Approval of department.
An application of analytical procedures to school music repertoire.

854. Composition with Computers
Winter. 2(2-0) MUS 834 or approval of school.
Techniques and principles of composition with computers. Use of computer equipment and software.

855. Computer Music Projects
Spring. 1 to 3 credits. May reenroll for a maximum of 12 credits. MUS 870, MUS 894, or approval of school.
Music theory and composition projects using computer equipment and software.

856. Computer Aided Instruction in Music Theory
Spring. 2(2-0) MUS 844 or approval of school.
Problems of design, implementation, and evaluation of college-level computer aided instruction software in music theory.

857. Administration of Music Education Programs
Spring of even-numbered years. 3(3-0) Approval of department.
Techniques for administering school music and higher education music programs.
955. Current Tendencies in Music Education

Winter of even-numbered years, 3(3-0)
Approval of department.
Current trends and practices in public school music education.

956. Advanced Research Techniques in Music

Winter, 3(3-0) Approval of department.
Selected research techniques in music education with emphasis on experimental design and computerized data analysis.

960. Analytical Studies

Fall, 3(3-0) Approval of department.
Analysis of melody, harmony, rhythm, color, texture, counterpoint, and form in music from the thirteenth/early seventeenth century through the late sixteenth/early eighteenth century.

961. Analytical Studies

Winter, 3(3-0) Approval of department.
Analysis of melody, harmony, rhythm, color, texture, counterpoint, and form in music from the late sixteenth/early eighteenth century through the nineteenth century.

962. Analytical Studies

Spring, 3(3-0) Approval of department.
Analysis of melody, harmony, rhythm, color, texture, counterpoint, and form in music from the late eighteenth/early nineteenth century through the twentieth century.

963. Schenker Analysis

Winter, 2(2-0) Approval of school.
Analytical techniques and concepts of Heinrich Schenker. Examination of his sketches and writings, reading about him, and analysis of music using his techniques.

964. Set-Theory Analysis of Atonal Music

Fall, 2(2-0) Approval of school.
Set-Theory principles and their application to the analysis of atonal music.

970. Contrapuntal Techniques

Fall of odd-numbered years, Summer.
3(3-0) Approval of school.
Advanced contrapuntal practice from the sixteenth century to the present.

971. Contrapuntal Techniques

Winter of even-numbered years, Summer.
3(3-0) MUS 970.
Continuation of MUS 970.

972. Contrapuntal Techniques

Spring of even-numbered years, Summer.
3(3-0) MUS 971.
Continuation of MUS 971.

999. Doctoral Dissertation Research

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

NATURAL SCIENCE

College of Natural Science

115. The Nature and Continuity of Life (N)

Fall, Winter, Spring, Summer. 4(3-2)
Not open to students with credit in NS 1814.
A—The development and testing of scientific concepts as examples of our attempts to understand the world. Selected topics from the life sciences illustrate the nature of scientific investigation.
B—Theories of the origin, development, and structure of life and the universe of which it is a part. Examination of contemporary problems associated with defining life and death.
C—Consideration of social and ethical issues relating to our increasing control of reproduction and heredity. Reproduction and heredity from molecular, cellular, and organismic perspectives, including human structure and function.
D—The nature of living things, contrasting various scientific and non-scientific views. The implications of the modern scientists understanding of life for our beliefs and values.

122. Human Bio social Evolution (N)

Fall, Winter, Spring, 4(3-2)
Current understanding of human beings and their beliefs as products of biological and cultural evolution. Implications for the future of humanity.

125. Time and Change in Nature (N)

Fall, Winter, Spring, Summer. 4(3-2)
Not open to students with credit in NS 1824.
A—Our attempts to explain the present in terms of past events are explored through selected topics from the life sciences and earth sciences. Stresses the role of controversy in science and the nature of scientific evidence.
B—Heredity, evolution and diversity of life are examined from the viewpoint of the biological and cultural development of the human species. Evolutionary relationships between humans and their environment.
C—The origin and evolution of earth and living things are studied as vital and related problems. Emphasis on problem-solving in science and the implications of evolutionary concepts on human societies.

129. Biotecnology and Human Values (N)

Winter, Spring, 4(4-0)
Consideration of social and ethical issues which arise from our increasing control of the human body through biotechnology.

135. Changing Concepts of the Universe (N)

Fall, Winter, Spring, Summer. 4(3-2)
Students may not receive credit in more than one of the following: AST 119, AST 217, AST 229, NS 125, NS 135 or NS 1834.
A—The origin and development of scientific explanations of the physical world. The origins of modern science and scientific revolutions.
B—The role of science in the development of Western ideas about reality. The origin and development of mechanistic concepts of the physical world and their part in intellectual dialogue.
C—Growth of theories of celestial motion and of matter. Their interrelationship. Impact of scientific knowledge on society. The contribution of science to the clarification and solution of social problems.

142. Life, Its Environment (N)

Fall, Winter, Spring, 4(3-2)
Natural ecological systems and the impact of human biological and cultural development on them. Examination of specific ecological problems and the role of science in seeking solutions.

152. Science and Culture in the 20th Century (N)

Fall, Winter, Spring, 4(4-0)
Controversies concerning interpretation of modern scientific concepts such as evolution, uncertainty and relativity are discussed in terms of developing a personal philosophy.

155. Cosmology, Humanity's Place in the Universe (N)

Fall, Winter, Spring, Summer. 4(3-2)
Students may not receive credit in more than one of the following: AST 119, AST 217, AST 229, NS 125, NS 135, NS 1834.
Our attempts to understand the universe and our place within it. The interaction between scientific concepts and the beliefs and values of the culture in which they are proposed.

162. Race, The Evolution of an Idea (N)

Fall, Winter, Spring, 4(4-0) NS 115 or approval of department.
Human races and evolution. The biological concept of race based on the theories of the gene, evolution, and natural selection.

171H. Our Biological Nature (N)

Fall, 4(4-0) Honors College students or approval of department.
Various issues confronting us in our attempt to understand our biological selves. Focus on the role that science can play in helping to resolve these issues.

172H. Our Place in Nature (N)

Winter, 4(4-0) Honors College students or approval of department.
Various issues confronting us in our attempt to understand our place in and relation to the environment. Focus on the role of science in helping to resolve these issues.

173H. Science-Technology and Human Values (N)

Spring, 4(4-0) Honors College students or approval of department.
The nature and significance of science and technology in Western culture, with emphasis on their relationship to other creative activities, particularly those within the arts.

1814. Natural Science (N)

Fall, 4(3-2) Not open to students with credit in NS 115. Enrollment in Remedial-Developmental Writing Program or approval of department.
Scientific methods emphasizing development and modification of explanation systems. The nature of cells and sexual reproduction as background for Mendelian gene theory and its modifications. Social implications are emphasized.

1824. Natural Science (N)

Winter, 4(4-0) Not open to students with credit in NS 124. NS 1814 or approval of department.
Scientific methods with emphasis on evolutionary ideas regarding origin of earth features as related to modern problems. Human origins and development are considered, with a number of modern problems.