

531B. Medical Microbiology: Bacteriology and Mycology
Winter. 3(2-4) A course in biochemistry and admission to the veterinary professional program, or approval of department.
 Basic principles of bacteriology and mycology and their relation to disease in animals.

531C. Medical Microbiology: Virology
Spring. 2(1-2) A course in biochemistry and admission to the veterinary professional program, or approval of department.
 Basic principles of virology and their relation to disease in animals.

531D. Medical Microbiology: Parasitology
Spring. 3(2-4) Admission to the veterinary professional program, or approval of department.
 Basic principles of parasitology (protozoology, helminthology, and entomology) and their relation to disease in animals.

532. Veterinary Microbiology and Public Health
 (567.) *Winter, Summer. 8(5-11) 531 or approval of department.*

Biology, immunology, pathogenicity, and medical aspects of microorganisms associated with infectious diseases of animals. Epidemiology of animal diseases significant to human health.

536. Veterinary Parasitology I
 (501.) *Winter, Summer. 4(3-4) Veterinary Medicine students or approval of department.*

Distribution, biology, and control of parasitic animals of importance to veterinary medicine.

537. Veterinary Parasitology II
 (502.) *Fall, Spring. 4(2-6) 536 or approval of department.*
 Continuation of 536.

800. Seminar
 (830.) *Fall, Winter, Spring, Summer. 1(1-0).*

813. Molecular Virology
Fall. 3(3-0) Background in biochemistry, and approval of department.
 Molecular nature and biochemistry of replication of bacterial and animal viruses. Emphasis is on current advances, research concepts, and the role of viruses in molecular biology research.

816. Parasitic Metazoa
 (802.) *Spring of odd-numbered years. 4(3-4) 416 or ZOL 481 or approval of department.*
 Comparative biology, physiology, and host-parasite relationships of parasitic helminths and arthropods.

817. Parasitic Protozoa
 (803.) *Spring of even-numbered years. 3(2-4) 416 or ZOL 482 or approval of department.*
 Comparative biology, physiology, and host-parasite relationships of parasitic protozoa.

826. Ecology of Animal Parasites
Summer. 3 credits. 416, approval of department. Given at W. K. Kellogg Biological Station.
 Interaction of parasitic animals (protozoa, helminths, and arthropods) with their natural environment, including host, biotic, and physical aspects.

827. Immunochemistry
Spring. 3(3-0) 427; 423, BCH 452, or ZOL 441, and CEM 383 recommended.
 Structure and reactivity of antigens and antibodies; synthesis of immunoglobulins. Emphasis is on current advances and research concepts.

828. Immunochemistry Laboratory
Spring. 2(0-6) 427; 827 or concurrently.
 Laboratory based partially on subject matter of 827. Experimental techniques used in immunological assays and immune systems.

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

900. Topics in Microbiology
Fall, Winter, Spring Summer. 2(2-0) May re-enroll if different topic is taken. Approval of department.

Topics will be selected from taxonomic subsciences such as bacteriology, virology, protozoology, mycology, algology, and helminthology; and from transecting disciplines such as microbial genetics, immunology, physiology, and ecology.

901. Experimental Microbiology
Fall, Winter, Spring, Summer. 3(0-9) May re-enroll for a maximum of 9 credits. Approval of department.

Experiments, demonstrations, and discussions of current research programs in various areas of microbiology.

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

MILITARY SCIENCE M S MUSIC MUS

All University

041. General Military Science
Fall, Winter, Spring. Zero credit. Approval of department.

Application of leadership techniques, the decision making process and staff planning. Military customs and traditions. Students will concurrently enroll in a selected non-Military Science course to fulfill military professional requirements.

121. Preview of Military Science
Fall, Winter. 1(1-0) Approval of department.

Role of the ROTC officer in the Army. Assists the student in planning a curriculum to satisfy requirements for a commission.

122. Marksmanship and Hunter Safety
Fall, Spring. 1(0-2) 121 or approval of department.

Small arms marksmanship and safety. Practical exercises on local firing ranges. Individual basic military marksmanship and the skills necessary to participate in a competitive or recreational shooting program.

223. Terrain Analysis and Land Navigation
Winter, Spring. 3(3-0) 121 and approval of department.

Military maps, map construction, specifications and uses. Includes both a study of aerial photographs and an introduction to remote energy sensors employed by defense agencies as they relate to tactical operations.

324. Military Teaching
Fall, Winter. 4(4-2) Basic course, approval of department.

Methods of teaching manipulative skills to groups with varying educational backgrounds. Emphasis on determination of entry behavior, progress analysis, testing and test construction. Introduction to current teaching aids. Practical experience in simulated field situations is stressed during laboratory.

325. Military Management
Spring. 4(3-2) 324 or approval of department.

Task analysis approach to missions. The subject of tactics is used as a teaching vehicle for the managerial approach to the preparation and execution phases of military operations. Emphasis is placed on physical and moral leadership during the laboratory sections.

426. Military Law
Winter. 4(4-0) Approval of department.

Civilian and military law as they pertain to individuals and organizations associated with the Department of Defense.

427. Seminar
Spring. 1(1-0) Approval of department.

Precommissioning orientation stressing current military policies, procedures, customs and trends.

College of Arts and Letters

094. Band
Summer. Zero credit. Membership determined by audition.
 Attendance at all rehearsals and public concerts obligatory. See 118.

100. Theory Review
Fall, Summer. 2(3-2) For majors who need theory review.
 Basic course in fundamentals and ear training.

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

118. Band
 A. *Marching Band.*
Fall. 1 credit. May re-enroll for credit. Membership determined by audition.
 The Marching Band participates at football games.

B. *Spartan Brass*
Winter. 1 credit. May re-enroll for credit. Membership determined by audition.
 The Spartan Brass participates at basketball games.

C. Concert Band.
Fall, Winter, Spring. 1 credit. May re-enroll for credit. Membership determined by audition.

Public appearances are scheduled on campus each term.

D. Symphonic Band

Fall, Winter, Spring. 1 credit. May re-enroll for credit. Membership determined by audition. A high level of achievement in performing ability is required.

Concerts are scheduled both on and off campus.

E. WIND ENSEMBLE

Fall, Winter, Spring. 1 credit. May re-enroll for a maximum of 12 credits. Membership determined by audition. The highest level of performance is required.

Full range of wind literature is performed. Public concerts are presented both on and off campus.

133. Orchestra

Fall, Winter, Spring. 1(0-5) May re-enroll for a maximum of 12 credits. Membership determined by audition.

Standard overtures and symphonies studied and publicly performed. Attendance at all rehearsals and public concerts obligatory.

135. Music in Elementary Education

Fall, Winter, Spring, Summer. 4(2-3) Elementary education majors.

Basis, scope and sequence of music instruction in the elementary schools with an introduction to basic knowledge and skills used in elementary school music.

141. Class Instruments and Voice

Fall. 1(0-2) Knowledge of notation. Music majors, or approval of department.

Class instruction in piano, voice, violin, cello, clarinet, and cornet.

142. Class Instruments and Voice

Winter. 1(0-2) 141.

Continuation of 141.

143. Class Instruments and Voice

Spring. 1(0-2) 142.

Continuation of 142.

145. Music Foundations I

Fall, Winter, Spring. 3(3-0) 135 and approval of department.

Development of understanding and knowledge of music fundamentals, ear training, music reading, rhythm, and other basic music perceptions. Designed specifically for elementary classroom teachers who elect a strong concentration in music.

146. Music Foundations II

Winter, Spring. 3(3-1) 145.

Continuation of 145 with particular emphasis on music literature as a basis for development of enlarged musical understanding. Music writing skills are also stressed.

147. Elementary Piano

Fall, Winter, Spring. 2(2-2) 145 or approval of department. Elementary Education and Physical Education and Recreation majors.

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) 147. Elementary Education majors.

Continuation of 147.

150. Keyboard Instruments and Harp

Fall, Winter, Spring, Summer. 1 to 4 credits. May re-enroll for a maximum of 24 credits. Audition required.

Instruction in piano, organ and harp.

151. Voice

Fall, Winter, Spring, Summer. 1 to 4 credits. May re-enroll for a maximum of 24 credits. Audition required.

152. Stringed Instruments

Fall, Winter, Spring, Summer. 1 to 4 credits. May re-enroll for a maximum of 24 credits. Audition required.

153. Woodwind Instruments

Fall, Winter, Spring, Summer. 1 to 4 credits. May re-enroll for a maximum of 24 credits. Audition required.

154. Brass Instruments

Fall, Winter, Spring, Summer. 1 to 4 credits. May re-enroll for a maximum of 24 credits. Audition required.

155. Percussion

Fall, Winter, Spring, Summer. 1 to 4 credits. May re-enroll 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 chorale.

181. Basic Harmony

Winter. 3(3-1) 180.

Continuation of 180.

182. Basic Harmony

Spring. 3(3-1) 181.

Continuation of 181.

183. Aural Harmony

Fall, Winter, Spring, Summer. 1(0-2) 180 concurrently.

The aural counterpart of basic harmony. Drill in harmonic, melodic and rhythmic dictation. Sight singing and keyboard harmony.

184. Aural Harmony

Fall, Winter, Spring, Summer. 1(0-2) 183; 181 concurrently.

185. Aural Harmony

Fall, Winter, Spring, Summer. 1(0-2) 184; 182 concurrently.

190. State Singers

Fall, Winter, Spring. 1(0-4) May re-enroll 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. Chorus

Fall, Winter, Spring, Summer. 1(0-2½) May re-enroll for a maximum of 12 credits.

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 re-enroll for a maximum of 12 credits. Membership determined by audition.

Three hours of rehearsals a week. Attendance at all rehearsals and public concerts obligatory.

193. University Chorale

Fall, Winter, Spring. 1(0-4) Audition.

Choral ensemble designed primarily for graduate and upper class undergraduate students. Representative literature for chamber chorale with emphasis on Renaissance, Baroque, and contemporary composers. Limited to 25 students.

195. Jazz Laboratory Band

Fall, Winter, Spring, Summer. 1(0-4) May re-enroll 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. Honors Work

Fall, Winter, Spring, Summer. 1 to 16 credits. May re-enroll for a maximum of 16 credits. Approval of department.

224. History of Music

Fall. 3(3-0) 183.

Music from ancient Greece through Romanesque and Gothic periods, concluding with the Renaissance. Greek theory and "ethos"; age of plain-song; development of polyphony; instruments peculiar to period under question.

225. History of Music

Winter. 3(3-0) 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) 225.

Romantic period, impressionism, and contemporary trends. Continuation of development of form, melody, rhythm, and tonality. Final examination is comprehensive, covering 224, 225 and 226.

241. Advanced Class Piano

Fall. 1(0-2) 143 or approval of department. For School Music Choral majors only.

Continuation of Class Piano 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) 241 or approval of department.

Continuation of 241.

243. Advanced Class Piano

Spring. 1(0-2) 242 or approval of department.

Continuation of 242.

245. Music in Special Education

Fall, Winter, Spring, Summer. 3(3-0) 135. Special education majors.

Methods of teaching music in special education programs.

271. Fundamentals of Music

Fall, Winter, Spring. 3(3-1) Non-majors.

Fundamentals of music to develop understanding and knowledge of scales and modes, key signatures, chord structures, chord progressions and non-harmonic tones.

272. Introduction to Music Literature I

Fall, Winter, Spring, Summer. 3(3-0) Non-majors.

An introduction to music in the Western tradition. The elements of musical expression and the techniques of musical analysis in connection with representative musical masterpieces of the Middle Ages, the Renaissance, the Baroque, the period of Classicism and Romanticism, and the twentieth century.

- 273. Introduction to Music Literature II**
Fall, Winter, Spring, Summer. 3(3-0)
272; non-majors.
Continuation of 272. Music of the eighteenth century. Among composers to be studied are: Vivaldi, D. Scarlatti, F. Couperin, Bach, Handel, Haydn and Mozart. Demonstrates the major types and media of composition from the late Baroque to early Romanticism and clarifies the stylistic trends of the time.
- 280. Advanced Harmony**
Fall. 3(3-1) 182.
Continuation of 182, with added vocabulary and technique through nineteenth century harmony. Creative writing in small forms.
- 281. Advanced Harmony**
Winter. 3(3-1) 280.
Continuation of 280.
- 282. Advanced Harmony**
Spring. 3(3-1) 281.
Continuation of 281.
- 283. Advanced Aural Harmony**
Fall, Winter, Spring, Summer. 1(0-2)
185; 280 concurrently.
Aural counterpart of advanced harmony. Drill in harmonic, melodic, and rhythmic dictation. Sight singing and keyboard harmony.
- 284. Advanced Aural Harmony**
Fall, Winter, Spring, Summer. 1(0-2)
283; 281 concurrently.
- 285. Advanced Aural Harmony**
Fall, Winter, Spring, Summer. 1(0-2)
284; 282 concurrently.
- 295. Opera Workshop**
Fall, Winter, Spring. 1 to 2 credits.
May re-enroll for a maximum of 6 credits.
Approval of department.
Repertoire coaching, diction, interpretation. Study and performance of entire operas and excerpts from the standard and contemporary repertoire; production of musicals (with Speech and Theatre Department); TV opera productions on Station WKAR.
- 314. Church Service Playing**
Fall, Winter, Spring, Summer. 2(2-0)
May re-enroll for a maximum of 6 credits. Three terms of pipe organ.
Instruction in adapting piano and orchestral accompaniment to organ; choosing organ and choir repertoire appropriate to church season; hymn playing, modulation, and ways to help unify service.
- 320. Music Workshop**
Summer. 1 to 6 credits. May re-enroll for a maximum of 12 credits. Approval of department.
- 323. Carillon**
Fall, Winter, Spring, Summer. 2 credits. May re-enroll for credit. 182; 6 terms of piano and approval of department.
Carillon playing technique, style and interpretation, arranging, adapting composition and improvisation. Survey of ensemble combinations with other instruments. Mechanical aspects of the instrument and bell acoustics. Carillon art and tradition, bell founders, literature and composers.
- 334. Composing and Arranging for Jazz Ensembles**
Fall, Winter, Spring, Summer. 3(2-2)
May re-enroll for a maximum of 9 credits. 182; approval of department.
Techniques of composition and arranging in jazz idiom for various instrumental and/or vocal ensembles. Analytical studies of scores, recorded examples and published stage band materials. Writing for films and commercials.
- 335. Ensemble and Conducting**
Fall, Spring. 3(1-4) 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) 335.
Continuation of 335.
- 340. Class Instruments**
Fall, Winter, Spring, Summer. 1(0-2)
May re-enroll for credit. Majors.
Study for one term of instruments not included among basic instruments. Not more than two may be studied at same time. Class instruction in viola, string bass, flute, oboe, bassoon, French horn, trombone, and percussion.
- 345. Teaching Music in the Elementary School I**
Fall, Winter. 3(3-0) 146.
Procedures and program of music instruction in the elementary school. Special emphasis on instructional problems of early elementary children.
- 346. Teaching Music in the Elementary School II**
Winter, Spring. 3(3-0) 345 and approval of department.
Continuation of 345 with emphasis on upper elementary music. Approaches to music reading, harmonization and analytical listening.
- 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**
Winter. 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 literature.
- 349. 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.
- 350. Keyboard Instruments and Harp**
Fall, Winter, Spring, Summer. 1 to 4 credits. May re-enroll for a maximum of 16 credits. Six terms of 150 or approval of department.
Continuation of 150.
- 351. Voice**
Fall, Winter, Spring, Summer. 1 to 4 credits. May re-enroll for a maximum of 16 credits. Six terms of 151 or approval of department.
Continuation of 151.
- 352. Stringed Instruments**
Fall, Winter, Spring, Summer. 1 to 4 credits. May re-enroll for a maximum of 16 credits. Six terms of 152 or approval of department.
Continuation of 152.
- 353. Woodwind Instruments**
Fall, Winter, Spring, Summer. 1 to 4 credits. May re-enroll for a maximum of 16 credits. Six terms of 153 or approval of department.
Continuation of 153.
- 354. Brass Instruments**
Fall, Winter, Spring, Summer. 1 to 4 credits. May re-enroll for a maximum of 16 credits. Six terms of 154 or approval of department.
Continuation of 154.
- 355. Percussion**
Fall, Winter, Spring, Summer. 1 to 4 credits. May re-enroll for a maximum of 16 credits. Six terms of 155 or approval of department.
Continuation of 155.
- 356. Sight Reading at the Piano**
Fall, Winter, Spring, Summer. 1 to 2 credits. May re-enroll for a maximum of 6 credits. Three terms of piano.
Establish principles of good sight reading, accompanying and free keyboard harmonization.
- 380. Studies in Style and Form**
Fall, Summer. 2(2-1) 282.
Analysis and creative writing of technical and structural practices in music of various periods, with special emphasis on the twentieth century.
- 381. Studies in Style and Form**
Winter, Summer. 2(2-1) 282.
Analysis and creative writing of technical and structural practices in music of various periods, with special emphasis on the twentieth century.
- 382. Studies in Style and Form**
Spring, Summer. 2(2-0) 282.
Analysis and creative writing of technical and structural practices in music of various periods, with special emphasis on the twentieth century.
- 383. Orchestration**
Fall, Summer. 2(2-0) 282.
Modern orchestral resources and scoring for various instrumental groups.
- 384. Orchestration**
Winter, Summer. 2(2-0) 383.
Continuation of 383.
- 385. Orchestration**
Spring, Summer. 2(2-0) 384.
Continuation of 384.
- 386. Counterpoint**
Fall, Summer. 2(2-0) 282.
Technique of writing tonal counterpoint in two, three, and four parts.
- 387. Counterpoint**
Winter, Summer. 2(2-0) 386.
Continuation of 386.
- 388. Counterpoint**
Spring, Summer. 2(2-0) 387.
Continuation of 387.
- 400. Clinical Training in Music Therapy**
Fall, Winter, Spring, Summer. 1 to 18 credits. May re-enroll for a maximum of 16 credits. Music Therapy majors.
Six months internship in an accredited neuropsychiatric hospital.
- 400H. Honors Work**
Fall, Winter, Spring, Summer. 1 to 16 credits. May re-enroll for a maximum of 16 credits. Approval of department.
- 403. Music Literature for Children**
Fall, Winter, Spring, Summer. 3(3-0)
346, or ED 327R or 327P.
Appropriate musical materials for both performance and listening instruction in elementary and secondary schools. Particular emphasis on the music of culturally different peoples.

- 411. Opera**
Winter of odd-numbered years. 2(1-2)
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. 182 or approval of department.
- 415B. 19th Century Music**
Fall. 2 credits. 182 or approval of department.
- 415C. Keyboard Music, 17th - 18th Century**
Fall of even-numbered years. 2 credits.
182 or approval of department.
- 415E. German Lieder**
Fall of odd-numbered years. 2 credits.
182 or approval of department.
- 415F. Organ Literature to 1700**
Fall of odd-numbered years. 2 credits.
182 or approval of department.
- 416A. Baroque Music**
Winter. 2 credits. 182 or approval of department.
- 416B. 20th Century Music, European**
Winter. 2 credits. 182 or approval of department.
- 416C. Piano Music, 19th Century**
Winter of odd-numbered years. 2 credits.
182 or approval of department.
- 416E. French-Italian Art Song**
Winter of even-numbered years. 2 credits.
182 or approval of department.
- 416F. Organ Literature From 1700 to 1900**
Winter of even-numbered years. 2 credits.
182 or approval of department.
- 417A. Classical Music**
Spring. 2 credits. 182 or approval of department.
- 417B. 20th Century Music, American**
Spring. 2 credits. 182 or approval of department.
- 417C. Piano Music, 20th Century**
Spring of odd-numbered years. 2 credits.
182 or approval of department.
- 417E. English-American Art Song**
Spring of even-numbered years. 2 credits.
182 or approval of department.
- 417F. Organ Literature From 1900 to Present**
Spring of even-numbered years. 2 credits.
182 or approval of department.
- 418H. Honors Course in Music Literature**
Fall. 3(3-0) or 4(3-0) Music 226 and approval of department.
A tutorial class. Primary emphasis on instrumental and vocal music 1750-1900, but work may be directed towards the student's special field of interest.
- 419H. Honors Course in Music Literature**
Winter. 3(3-0) or 4(3-0) 226 and approval of department.
Continuation of 418H.
- 420H. Honors Course in Music Literature**
Spring. 3(3-0) or 4(3-0) 226 and approval of department.
Continuation of 419H.
- 421. Music and Worship**
Fall. 3(3-0) 226 or approval of department.
Relationship of music and liturgy to Christian worship. Traditional liturgies and forms of service of the Christian churches with emphasis on function and place of music in worship.
- 422. Hymnology**
Winter. 3(3-0) 226 or approval of department.
Greek and Latin hymns, canticles, and transition from psalmody into hymnody. Hymns and tunes studied with emphasis on their natural place in church year. Special attention to anthem settings of hymns and adaptation of traditional melodies, especially Gregorian.
- 423. Choral Repertoire for the Church**
Spring, Summer. 3(3-0) Approval of department.
Choral literature for church choirs; emphasis on motets, anthems, responses, and materials for both youth and adult choirs.
- 424. Preparatory Musicology**
Fall. 3(3-0) 226, 282.
A seminar dealing with research in various fields of musicology, including ethno-musicology.
- 425. Preparatory Musicology**
Winter, Summer. 3(3-0) 424.
Selected topics in music history from the ancient Greeks to 1600.
- 429. Band Materials**
Spring, Summer. 1(0-2) May re-enroll for credit. Juniors.
Analysis and performance of literature suitable for school bands.
- 433. Advanced Conducting**
Fall. 2(2-0)
Continuation of baton techniques and analysis through study of orchestral and choral works.
- 434. Advanced Conducting**
Winter. 2(2-0) 433.
Continuation of 433.
- 435. Advanced Conducting**
Spring, Summer. 2(2-0) 434.
Continuation of 434.
- 438. Brass and Woodwind Techniques**
Summer. 2(1-2) Senior music majors.
Materials and contemporary pedagogical practices of group wind instrumental instruction.
- 440. Fundamentals of Electronic Music**
Fall, Summer. 2(2-0) 382 or approval of department.
Instruction in the use of the Moog designed synthesizer, mixer and recorders.
- 441. Fundamentals of Electronic Music**
Winter, Summer. 2(2-0) 440 or approval of department.
Supervised use of the Moog synthesizer.
- 442. Creative Composition in Electronic Music**
Fall, Winter, Spring, Summer. Variable credit. May re-enroll for maximum of 8 credits. 441 or approval of department.
Assigned use of the Electronic Music Studio.
- 450. Recreational Music**
Spring. Summer of odd-numbered years. 2(2-0) Majors.
Organization and administration of a community music program for adults; community chorus, orchestra, and band. Nonsymphonic instruments and their use in recreation. Summer camp and playground music. Recreational music as it is organized and used by industries.
- 462. Studio Teaching and Observation**
Fall. 2(1-2) 347, 348, 349.
Supervised studio teaching in classes and private lessons plus one-hour seminar each week.
- 463. Studio Teaching and Observation**
Winter. 2(1-2) 462.
Continuation of 462.
- 464. Studio Teaching and Observation**
Spring. 2(1-2) 463.
Continuation of 463.
- 465. Practicum: Sacred Music**
Fall, Winter, Spring. 3(0-6) May re-enroll for a maximum of 6 credits. 314, 336, 348.
Supervised experience in all phases of sacred music by assisting at adult and junior choir rehearsals and church services, service planning, preparation and performance.
- 470. Influence of Music on Behavior**
Fall. 3(3-0) Nine credits of psychology or approval of department.
Study of the physiological and psychological effects of music; relation of music to health. Experimental studies, related philosophical and psychological theory will be reviewed.
- 471. Music Therapy Techniques**
Winter. 3(3-0) 470.
Survey of procedures in music therapy; investigation of the rise of music as a tool in treatment of mentally ill, mentally and physically handicapped; introduction to hospital organization.
- 472. Music Therapy Techniques**
Spring. 3(3-0) 471.
Continuation of 471.
- 480. Advanced Studies in Style and Form**
Fall. 2(2-1) 380, 381, 382.
Continuation of 382.
- 481. Advanced Studies in Style and Form**
Winter. 2(2-1) 480.
Continuation of 480.
- 482. Advanced Studies in Style and Form**
Spring. 2(2-1) 481.
Continuation of 481.
- 483. Composition**
Fall, Winter, Spring, Summer. 2(2-0) May re-enroll for a maximum of 6 credits. 282 or approval of department.
Guided projects in creative writing.
- 486. Psychology of Music**
Fall, Summer. 3(3-0) Approval of department. Interdepartmental with and administered by the Psychology Department.
Musical behavior with emphasis on psychological aspects of perception, learning, affective response, and ability. Emphasis on social and cultural influences in forming musical tastes, including mass media music.

- 487. Psychology of Music**
Winter, Summer. 3(2-2) PSY 486.
Interdepartmental with and administered by the Psychology Department.
Basic research concepts and experimental methods in psychology of music research. Practical training in conducting experimental research of musical behavior.
- 490. Independent Study: Special Problems in Music Research**
Fall, Winter, Spring, Summer. 1 to 4 credits. May re-enroll for credit. Seniors and approval of department.
Individual problems in music research.
- 495. Opera Workshop**
Fall, Winter, Spring. 1 to 2 credits. May re-enroll for a maximum of 6 credits. Approval of department.
Practical experience in performance and production of opera and opera scenes.
- 802. Seminar in History of Music**
Summer of odd-numbered years. 4(8-2)
Critical study in depth of music literature and performance practices within historical perspective.
- 803. Seminar in Music Education**
Fall, Summer. 3(3-0) Approval of department.
Consideration of the historical and philosophical basis for music instruction in education.
- 804. Seminar in Music Learning**
Winter, Summer. 3(3-0) Approval of department.
Detailed analysis of the conditions of music learning for teachers of music including consideration of perception, maturation and concept formation.
- 805. Seminar in Music Curriculum**
Spring, Summer. 3(3-0) Approval of department.
Development of goals, objectives, learning sequence and evaluative techniques for music learning at all instructional levels.
- 812. Research Problems in Music**
Fall, Winter, Spring, Summer. Variable credit.
- 813. Chamber Music**
Fall, Winter, Spring, Summer. 1(1-0)
May re-enroll for a maximum of 6 credits. Approval of department.
Performance of works for small ensembles.
- 815. Seminar in Chamber Music: 18th Century**
Fall, Summer. 2(2-0) Approval of department.
Intensive study of selected chamber music works of the 18th century.
- 816. Seminar in Chamber Music: 19th Century**
Winter, Summer. 2(2-0) Approval of department.
Intensive study of selected chamber music works of the 19th century.
- 817. Seminar in Chamber Music: 20th Century**
Spring, Summer. 2(2-0) Approval of department.
Intensive study of selected chamber music works of the 20th century.
- 820. Music Workshop**
Summer. 1 to 6 credits. May re-enroll for a maximum of 6 credits. Approval of department.
- 824. Research Methods and Materials**
Fall, Winter, Summer. 3(3-0)
A critical examination of encyclopedias, indices, and other aids to research.
- 825. Acoustics for Musicians**
Winter. Summer of even-numbered years. 3(3-0)
Classical theory of sound, stressing its application to musical instruments and the human voice.
- 830. Sixteenth Century Counterpoint**
Fall of even-numbered years, Summer. 3(3-0) 482 or approval of department.
Study and writing of counterpoint based upon the works of Orlando Lasso and Palestrina.
- 831. Sixteenth Century Counterpoint**
Winter of odd-numbered years, Summer. 3(3-0) 830.
Continuation of 830.
- 832. Sixteenth Century Counterpoint**
Spring of odd-numbered years, Summer. 3(3-0) 831.
Continuation of 831 to include a study of madrigal counterpoint.
- 834. Seminar in Composition**
Fall, Winter, Spring, Summer. 3(3-0)
May re-enroll for credit. 482.
- 840. Pedagogy of Theory**
Fall, Summer. 3(3-0) Approval of department.
Music theory treatises and pedagogical practices of historical importance.
- 841. Pedagogy of Theory**
Winter, Summer. 3(3-0) 840.
Current literature in the field of music theory and approaches to theory pedagogy.
- 842. Pedagogy of Theory**
Spring, Summer. 3(3-0) 841.
Continuation of 841 with emphasis upon new instructional media.
- 850. Applied Music**
Fall, Winter, Spring, Summer. 3 credits for Applied Music majors; 2 credits for others. May re-enroll for credit.
- 852. Choral Technique and Materials**
Spring, Summer. 3(3-0) 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.
- 860. Problems in Analysis**
Fall, Winter, Spring, Summer. 4(4-0)
May re-enroll for a maximum of 8 credits. Approval of department.
An application of analytical procedures to school music repertoire.
- 880. Materials of Music**
Fall, Winter, Spring, Summer. 1 to 4 credits. 282.
Correlation of the areas of music theory as a basis for the study of 19th and 20th century music.
- 881. Materials of Music**
Fall, Winter, Spring, Summer. 1 to 4 credits. 880.
Continuation of 880.
- 882. Materials of Music**
Fall, Winter, Spring, Summer. 1 to 4 credits. 881.
Continuation of 881.
- 899. Research**
Fall, Winter, Spring, Summer. Variable credit. Approval of department.
- 903. Proseminar in Music Education**
Fall, Winter, Spring, Summer. 3(3-0)
May re-enroll for a maximum of 9 credits. Approval of department.
Consideration of problems of music teaching and learning with readings from aesthetics, psychology, human growth, and education.
- 915. Medieval Music**
Fall. 3(3-0)
Investigation of various developments in European music to middle of fifteenth century. Some attention given to Gregorian Chant as well as to various types of secular Monody, but greater stress is laid on the forms and styles of Polyphonic music.
- 916. Renaissance Music**
Winter. 3(3-0)
Investigation of developments in European music from 1450 to 1600, tracing developments in both sacred and secular music.
- 917. Music of the Seventeenth Century**
Spring. 3(3-0)
Instrumental and vocal music of Early Baroque period.
- 924. Seminar in Musicology**
Fall, Winter, Spring. 3 credits. May re-enroll for credit. 426 or approval of department.
- 954. Music Supervision**
Summer of even-numbered years. 3(3-0)
Completion of undergraduate program in Music Education.
- 955. Current Tendencies in Music Education**
Summer of odd-numbered years. 3(3-0)
Completion of undergraduate program in Music Education.
- 956. Advanced Research Techniques in Music**
Spring, Summer. 3(3-0) Approval of department.
Application of behavioral research to music including development and validation of original data gathering devices.
- 960. Analytical Studies in Music Literature**
Fall, Summer. 3(3-0) 382 and two years of music literature or approval of department.
Melodic, formal, contrapuntal and harmonic analysis of music from plainsong to contemporary music.
- 961. Analytical Studies in Music Literature**
Winter, Summer. 3(3-0) 960.
Continuation of 960.

- 962. Analytical Studies in Music Literature**
Spring, Summer. 3(3-0) 961.
Continuation of 961.
- 970. Contrapuntal Techniques**
Fall of odd-numbered years, Summer. 3(3-0) 482 or approval of department.
Advanced contrapuntal practice from the sixteenth century to the present.
- 971. Contrapuntal Techniques**
Winter of even-numbered years, Summer. 3(3-0) 970.
Continuation of 970.
- 972. Contrapuntal Techniques**
Spring of even-numbered years, Summer. 3(3-0) 971.
Continuation of 971.
- 980. Seminar in Theory**
Fall, Winter, Spring, Summer. 3(3-0)
May re-enroll for a maximum of 9 credits. 482 or approval of department.
- 999. Research**
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

NATURAL RESOURCES N R

College of Agriculture and Natural Resources

- 202. Soils and Man's Environment**
Winter. 3(3-0) Interdepartmental with the Resource Development, and Fisheries and Wildlife Departments and Soil Science and administered by Soil Science.
Use of soil and water resources in a technological society as it relates to environmental quality. Nature of pollution problems and their possible solutions. Food production and world population.
- 220. Plants and Their Environment**
Winter. 3(3-0) Interdepartmental with and administered by the Forestry Department.
Fundamental ecological relationships between various climatic, edaphic and biotic environmental factors of the ecosystem and plant response, including structure, function and evaluation of species.
- 275. Exploring International Agriculture**
Spring. 3(3-0) Interdepartmental with and administered by Agriculture.
Exploration of overseas assignments with international agencies; potential world food actualities and potentialities; special problems of the tropics compared with those in temperate regions.
- 450. Natural Resource Administration**
Fall, Spring. 4(4-0) Interdepartmental with Fisheries and Wildlife, Forestry, Parks and Recreation Resources and Resource Development Departments. Administered by the Forestry Department.
Concepts and methods of administering wildland properties. The legal, economic and social environment. Benefit-cost analysis of management changes. Unit organization, personnel management and accounting. Presents a systems view of administration.

- 475. International Studies in Agriculture and Natural Resources**
Summer. 3 to 9 credits. Approval of the college. Interdepartmental with and administered by Agriculture.
Study-travel experience emphasizing contemporary problems affecting agriculture in the world, national, and local communities. Field trips, case studies, interviews with leading experts, government officials, community leaders. Supervised individual study.
- 491. Natural Resources and Modern Society**
Spring, Summer. 3(3-0) Juniors. Interdepartmental with the Forestry and the Resource Development Departments and administered by Forestry Department.
A survey of the social and economic significance of natural resources in modern industrial and urban society. Current problems of natural resources management and use are examined in terms of the society in which they exist.

NATURAL SCIENCE N S

University College

Students may earn credit in only one of the courses in each of the following three groups:

1. 111, 117, 121, 131,
 2. 112, 118, 122, 132, 134,
 3. 113, 116, 120, 133,
 1. 151, 171H, 181, 322
 2. 152, 172H, 182, 323
 3. 150, 160, 173H, 183, 321
- 111. The Nature of Science I**
(192A.) Fall, Winter, Spring, Summer. 4(2-3)
The development and validation of scientific concepts as examples of man's attempt to understand the world in which he lives. Selected topics from the life sciences illustrate the process of scientific investigation.
- 112. The Nature of Science II**
(193A.) Fall, Winter, Spring, Summer. 4(2-3) 111 preferred; or 117, 121, 131, 151, 171H, 181, or 322.
Man's 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.
- 113. The Nature of Science III**
(183, 191A.) Fall, Winter, Spring, Summer. 4(2-3) 112 preferred; or 118, 122, 132, 134, 152, 172H, or 182.
The origin and development of scientific explanations of the physical world. The origins of modern science and scientific revolutions.
- 116. Integrated Studies in Science I**
(191D.) Fall, Winter, Spring, Summer. 4(2-3)
Science as a process of studying of nature, explored through consideration of the organization science perceives in nature. Topics from the physical and life sciences used to illustrate the integration of the sciences into a concept of natural systems.
- 117. Integrated Studies in Science II**
(192D.) Fall, Winter, Spring, Summer. 4(2-3) 116 preferred; or 120, 150, 160, or 321.
The nature of scientific theories and the means of supporting or refuting them. Emphasis on the interaction of theories from the physical, earth and life sciences.
- 118. Integrated Studies in Science III**
(193D.) Fall, Winter, Spring, Summer. 4(2-3) 117 preferred; or 111, 121, 131, 151, 171H, 181, or 322.
The use and limitations of scientific problem-solving. The interaction of the physical, earth and life sciences in the development of integrative-interdisciplinary solutions to important contemporary problems.
- 120. Science, Beliefs and Values I**
(191B.) Fall, Winter, Spring, Summer. 4(2-3)
Man's attempts to understand the universe and his place within it. The interaction between scientific concepts and the beliefs and values of the culture in which they are proposed.
- 121. Science, Beliefs and Values II**
(192B.) Fall, Winter, Spring, Summer. 4(2-3) 120 preferred; or 116, 150, 160, or 321.
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. Science, Beliefs and Values III**
(193B.) Fall, Winter, Spring, Summer. 4(2-3) 121 preferred; or 111, 117, 131, 151, 171H, 181, or 322.
Man's current understanding of himself and his beliefs as products of biological and cultural evolution. Implications for man's future.
- 131. Science, Man and Society I**
(192C.) Fall, Winter, Spring, Summer. 4(2-3)
The role science plays in our lives is explored through consideration of aspects of reproduction and heredity. Emphasis on the origin of scientific explanations and their significance to the individual.
- 132. Science, Man and Society II**
(193C.) Fall, Winter, Spring, Summer. 4(2-3) 131 preferred; or 111, 117, 121, 151, 171H, 181, or 322.
The origin and evolution of earth and man are studied as vital and related problems. Emphasis on problem-solving in science and the impact of evolutionary concepts on human societies.
- 133. Science, Man and Society III**
(191C.) Fall, Winter, Spring, Summer. 4(2-3) 132 preferred; or 112, 118, 122, 134, 152, 172H, or 182.
Origin, growth and nature of theories in modern science. Includes aspects of astronomy and radioactivity. Emphasis on the application of scientific methodology and its products to problems of society.
- 134. Science, Man and Society IV**
(193F.) Fall, Winter, Spring, Summer. 4(2-3) 131 preferred; or 111, 117, 121, 151, 171H, or 181.
Biological concepts of race. Exploration of scientific alternatives to the currently held biological concept of race.
- 150. The Dynamics of Scientific Ideas I**
(191E.) Fall, Winter, Spring, Summer. 4(2-3)
The role of science in the development of western man's ideas about reality. The origin and development of mechanistic concepts of the physical world and their part in intellectual dialogue.
- 151. The Dynamics of Scientific Ideas II**
(192E.) Fall, Winter, Spring. 4(2-3) 150 preferred; or 116, 120, 160, or 321.
The influence of scientific ideas about the living world on the western intellectual tradition. Emphasis on the successes and failures of scientific ideas in offering a unified picture of reality.