531A. Medical Microbiology: Immunology
Winter. 4(4-0) MPH 427.
Second-term Veterinary Medicine students or approval of department.
Basic principles of immunology (immunobiology and immunohematology) and their relation to disease in animals.

531B. Medical Microbiology: Bacteriology and Mycology
Spring. 3(3-6) Third-term Veterinary Medicine students or approval of department.
Basic principles of bacteriology and mycology and their relation to disease in animals.

531C. Medical Microbiology: Virology
Fall. 3(3-2) Fourth-term Veterinary Medicine students or approval of department.
General properties of animal viruses; pathogenesis, immune response and immunopathology in viral diseases; principles of clinical virology.

531D. Medical Microbiology: Parasitology
Winter. 4(3-3) Fifth-term Veterinary Medicine students or approval of department.
Basic principles of parasitology (protozoology, helminthology, and entomology) and their relation to disease in animals.

618. Infectious Disease Clerkship
Fall, Winter, Spring, Summer. 1 to 17 credits. May reenroll for a maximum of 12 credits. Approval of department. The clerkship emphasizes acquisition in depth of knowledge and skills essential in solution of clinical problems in infectious and immunologic diseases. Integrated basic science input is afforded through relevant seminars.

900. Seminar
Fall, Winter, Spring, Summer. 1(1-0) May reenroll for a maximum of 9 credits. Approval of department.

810. Topics in Microbiology
Fall, Winter, Spring, Summer. 2 to 4 credits. May reenroll for a maximum of 10 credits if different topic is taken. Approval of department.
Topics will be selected from taxonomic subdisciplines such as bacteriology, virology, protozoology, mycology, and helminthology; and from transdisciplinary fields such as microbial genetics, immunology, physiology, and ecology.

813. Molecular Virology
Fall. 4(4-0) 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.

821. Advanced Microbial Physiology
Spring. 4(4-0) MPH 422.
Mechanism and regulation of physiologic and metabolic activities unique to procaryotes including fermentation, photosynthesis, respiration and autotrophy.

827. Immunohematology
Spring. 3(3-0) MPH 427, 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. Intermediate Laboratory
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

829. Host-Parasite Relationships
Fall. 3(3-0) MPH 427, MPH 429 or approval of department.
Pathogenesis and host responses to selected bacterial, parasitic, and fungal pathogens. Emphasis is on current research models which exemplify a variety of host-parasite relationships.

842. Advanced Soil Microbiology
Fall of odd-numbered years. 2(2-0) MPH 425 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.

843. Soil Microbiology Laboratory
Fall of odd-numbered years. 2(0-6) MPH 426 concurrently or approval of department. Interdepartmental with the Department of Crop and Soil Sciences.
Fundamentals techniques of dealing with microorganisms indigenous to soil. Metabolic activity of microorganisms. Interaction between microorganisms and plants.

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

MILITARY SCIENCE

All University

041. General Military Science
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.

A. Military Traditions—MS I
Winter. 0(0-1) Approval of department.

B. Advanced Drill and Ceremonies
Spring. 0(0-1) Approval of department or MS II standing.
of Military Science

Courses

C. Advanced Camp Preparation—M S III
Winter. 0(0-1) Approval of department or M S III standing.

D. Military Justice and Unit Administration
Fall. 0(0-1) Approval of department or M S IV standing.

121. Preview of Military Science
Fall. Winter. Spring. Summer. 1(1-0) Approval of department.
Role of the ROTC officer in the Army. Assists the student in planning a curriculum to satisfy approval of department.

122. Marksmanship and Hunter Safety
Fall. Spring. 1(0-2) M S 121 or approval of department.
Small arms marksmanship and safety. Practical exercises on live firing ranges. Individual basic military marksmanship and the skills necessary to participate in a competitive or recreational shooting program.

123. Fundamentals of Military Art and Tactical Science
Fall. 1(1-0) M S 121, M S 041A, M S 122.
Contemporary military tactical doctrine, operations, principles of modern land warfare; analysis of historical examples, application of current doctrine to hypothetical situations.

221. Terrain Analysis and Land Navigation
Winter, Spring. 2(2-0) M S 121 and approval of department.
Military topographic maps, special maps, map profiles, specifications and uses. Terrain analysis for military tactical operations. Land navigation with the lensatic and Silva compass.

224. 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.

225. Military Management
Spring. 4(3-2) M S 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 and Unit Administration
Fall. 2(3-0) Approval of department.
Military legal system and the responsibilities of the commander and junior leaders in the application of military justice. Operation and administration in military units to provide personnel and logistic support.

427. Seminar
Spring. 2(2-0) Approval of department.
Military professional ethics. Value inputs, reasoning, and decision making. Current military policies and trends as a pre-commission orientation.

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.

MUSIC

College of Arts and Letters

112. Chamber Music
Fall, Winter, Spring. Summer. 1(1-0) 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 credit. Membership determined by audition. The Marching Band participates at football games.

B. Spartan Brass
Winter. 1 credit. May reenroll for credit. Membership determined by audition. The Spartan Brass participates at basketball games.

C. Concert Band
Fall, Winter, Spring. 1 credit. May reenroll for credit. Membership determined by audition. Public appearances are scheduled on campus each term.

D. Symphonic Band
Fall, Winter, Spring. 1 credit. May reenroll 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 reenroll 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.

F. Repertory Band
Fall, Winter, Spring, Summer. 1 credit. May reenroll for a maximum of 15 credits. Membership determined by audition. Public appearances are scheduled on campus each term.

133A. Symphony Orchestra
(133) Fall, Winter, Spring. 1(0-5) May reenroll for a maximum of 12 credits. Admission by audition.
Preparation and performance of symphonic 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.

141. Class Instruments and Voice
Fall, Winter. 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
Spring. 1(0-2) MUS 141. Continuation of MUS 141.

143. Class Instruments and Voice
Spring. 1(0-2) MUS 142. Continuation of MUS 142.

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

150. Keyboard Instruments and Harp
Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll 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 reenroll for a maximum of 24 credits. Audition required.

152. Stringed Instruments
Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 24 credits. Audition required.

153. Woodwind Instruments
Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 24 credits. Audition required.

154. Brass Instruments
Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 24 credits. Audition required.

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

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