

**475. International Studies in Agriculture and Natural Resources**  
 Fall, Spring, Summer. Given at various off campus sites. 2 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Approval of college; application required. Study-travel experience emphasizing contemporary problems affecting agriculture and natural resources in the world, national and local communities. Case studies and interviews with officials, community leaders and leading professionals.

**481. Agricultural Research Systems in Developing Countries**  
 Summer. 2(2-0) Interdepartmental with Agricultural Economics, Animal Science, and Crop and Soil Sciences. R: Open only to seniors and graduate students in the College of Agriculture and Natural Resources. Planning, organizing and managing agricultural research systems. Problems and alternative reforms to improve research productivity. Adapting new agricultural technology in developing countries.

**489. Integrated Approaches to Agriculture and Natural Resources Problems (W)**  
 Fall, Spring. 3(2-2)  
 P: MTH 110 or MTH 116; EC 201 or EC 202. R: Open only to seniors in the College of Agriculture and Natural Resources. Completion of Tier I writing requirement. Holistic solutions to resource management and allocation: an integrated, multidisciplinary team approach to case study problems.

**491. Selected Topics**  
 Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Not open to freshmen and sophomores. Special topics in agriculture and natural resources.

**493. Professional Internship in Agriculture and Natural Resources**  
 Fall, Spring, Summer. 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to juniors and seniors in the College of Agriculture and Natural Resources. Approval of department; application required. Supervised professional experiences in agencies and businesses related to a student's major field of study.

**AMERICAN STUDIES AMS**

**College of Arts and Letters**

**332. Technology and Culture**  
 Fall. 4(4-0) Interdepartmental with Lyman Briggs School. Administered by Lyman Briggs School. R: Open only to juniors and seniors in American Studies and Lyman Briggs School, and to graduate students in American Studies. Completion of Tier I writing requirement. History of technology with special emphasis on the interaction of technical innovation and other elements of culture.

**335. The Natural Environment: Perceptions and Practices**  
 Spring. 4(4-0) Interdepartmental with Lyman Briggs School. Administered by Lyman Briggs School. R: Not open to freshmen. Open only to students in American Studies and in Lyman Briggs School. Completion of Tier I writing requirement. American attitudes toward the natural environment and related public and private institutions.

**338. Eighteenth-Century American Art**  
 Fall. 3 credits. Interdepartmental with History of Art. Administered by History of Art. R: Not open to freshmen. Artistic production in North America in the Colonial and early Republican cultural contexts. SA: HA 438

**348. Nineteenth-Century American Art**  
 Spring. 3 credits. Interdepartmental with History of Art. Administered by History of Art. R: Not open to freshmen. Nineteenth-century artistic production in North America in its cultural context. SA: HA 448

**358. Twentieth-Century American Art Through Midcentury**  
 Fall. 3 credits. Interdepartmental with History of Art. Administered by History of Art. R: Not open to freshmen. Twentieth-century artistic production in North America in its cultural context. SA: HA 458

**441. American Genre Painting**  
 Fall, Spring. 3 credits. Interdepartmental with History of Art. Administered by History of Art. P: HA 438 or HA 448 or HA 458. Genre painting produced in the United States between 1790 and the early decades of the 20th century.

**442. The Art of Winslow Homer**  
 Fall, Spring. 3 credits. Interdepartmental with History of Art. Administered by History of Art. P: HA 438 or HA 448 or HA 458. R: Not open to freshmen and sophomores. Detailed consideration of Homer's career and his work in a variety of media and genres in the context of a changing nation between 1860 and 1910.

**491. Perspectives in American Studies**  
 Fall. 3(3-0) A student may earn a maximum of 6 credits in all enrollments for this course. R: Not open to freshmen and sophomores. Methods and significant works in American Studies. Topics vary.

**492. Seminar in American Studies**  
 Spring. 3(3-0) A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to majors in Arts and Letters, James Madison College, and Lyman Briggs School. Selected topics in American life emphasizing interdisciplinary approaches. Topics vary.

**881. American Studies Theory, Methods, and Bibliography**  
 Fall. 3(3-0)  
 Methods and bibliographical sources of American Studies research. Interdisciplinary approaches to studying American culture.

**890. Independent Study**  
 Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 12 credits in all enrollments for this course. R: Approval of college. Special projects, directed reading, and research arranged by an individual graduate student and a faculty member in areas supplementing regular course offerings.

**891. Special Topics in American Studies**  
 Fall, Spring, Summer. 4(4-0) A student may earn a maximum of 12 credits in all enrollments for this course. R: Approval of college. Special topics supplementing regular course offerings proposed by faculty for graduate students on a group study basis.

**899. Master's Thesis Research**  
 Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Approval of college. Directed research leading to a master's thesis in partial fulfillment of Plan A master's degree requirements.

**999. Doctoral Dissertation Research**  
 Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 30 credits in all enrollments for this course. R: Approval of college.

**AMERICAN THOUGHT AND LANGUAGE ATL**

**Department of American Thought and Language College of Arts and Letters**

**0102. Preparation for College Writing**  
 Fall, Spring. 0 credit. [1(0-2) See page A-2, item 3.] C: ATL 1004 concurrently. R: Designated score on English placement test. Practice in applying the principles of English grammar, syntax, and word usage to writing.

**1004. Preparation for College Writing**  
 Fall, Spring. 3(3-0)  
 C: ATL 0102 concurrently. R: Designated score on English placement test. Composing, revising, and editing. Active reading and pre-writing strategies. Style, mechanics, and usage. Organization and proofreading.

**101. Library Resources**  
 Fall, Spring, Summer. 1(1-0)  
 Use of libraries for researching college assignments and papers. Emphasis on bibliographic and reference tools.

**110. Writing: Science and Technology**  
 Fall, Spring. 4(4-0)  
 P: Designated score on English placement test or ATL 1004. R: Not open to students with credit in MC 111 or MC 112 or LBS 133 or AL 192 or AL 192H or ATL 110 or ATL 120 or ATL 125 or ATL 130 or ATL 135 or ATL 140 or ATL 145 or ATL 150 or ATL 195H or AL 192 or AL 192H. Drafting, revising, and editing compositions derived from readings on American science and technology to develop skills in narration, persuasion, analysis, and documentation.

**115. Writing: Law and Justice in the United States**  
 Fall, Spring. 4(4-0)  
 P: Designated score on English placement test or ATL 1004. R: Not open to students with credit in MC 111 or MC 112 or LBS 133 or AL 192 or AL 192H or ATL 110 or ATL 120 or ATL 125 or ATL 130 or ATL 135 or ATL 140 or ATL 145 or ATL 150 or ATL 195H. Drafting, revising, and editing compositions derived from readings on American law and justice to develop skills in narration, persuasion, analysis and documentation.

**120. Writing: American Philosophy, Literature, and the Arts**  
 Fall, Spring. 4(4-0)  
 P: Designated score on English placement test or ATL 1004. R: Not open to students with credit in MC 111 or MC 112 or LBS 133 or ATL 110 or ATL 115 or ATL 125 or ATL 130 or ATL 135 or ATL 140 or ATL 145 or ATL 150 or ATL 195H or AL 192 or AL 192H. Drafting, revising, and editing compositions derived from readings on American philosophy, literature, and the arts to develop skills in narration, persuasion, analysis, and documentation.

**Descriptions — American Thought and Language of Courses**

**125. Writing: The American Ethnic and Racial Experience**  
Fall, Spring, 4(4-0)

*P:* Designated score on English placement test or ATL 1004. *R:* Not open to students with credit in MC 111 or MC 112 or LBS 133 or ATL 110 or ATL 115 or ATL 120 or ATL 130 or ATL 135 or ATL 140 or ATL 145 or ATL 150 or ATL 195H or AL 192 or AL 192H.

Drafting, revising, and editing compositions derived from readings on the experience of American ethnic and racial groups to develop skills in narration, persuasion, analysis, and documentation.

**130. Writing: American Radical Thought**  
Fall, Spring, 4(4-0)

*P:* Designated score on English placement test or ATL 1004. *R:* Not open to students with credit in MC 111 or MC 112 or LBS 133 or ATL 110 or ATL 115 or ATL 120 or ATL 125 or ATL 135 or ATL 140 or ATL 145 or ATL 150 or ATL 195H or AL 192 or AL 192H.

Drafting, revising, and editing compositions derived from readings on American radical thought to develop skills in narration, persuasions, analysis, and documentation.

**135. Writing: Public Life in America**  
Fall, Spring, 4(4-0)

*P:* Designated score on English placement test or ATL 1004. *R:* Not open to students with credit in MC 111 or MC 112 or LBS 133 or ATL 110 or ATL 115 or ATL 120 or ATL 125 or ATL 130 or ATL 140 or ATL 145 or ATL 150 or ATL 195H or AL 192 or AL 192H.

Drafting, revising, and editing compositions derived from readings on American civic tradition and community service-learning experiences to develop skills in narration, persuasion, analysis, and documentation.

**140. Writing: Women in America**  
Fall, Spring, 4(4-0)

*P:* Designated score on English placement test or ATL 1004. *R:* Not open to students with credit in MC 111 or MC 112 or LBS 133 or ATL 110 or ATL 115 or ATL 120 or ATL 125 or ATL 130 or ATL 150 or ATL 145 or ATL 150 or AL 195H or AL 192 or AL 192H.

Drafting, revising, and editing compositions derived from readings on women in America to develop skills in narration, persuasion, analysis, and documentation.

**145. Writing: Men in America**  
Fall, Spring, 4(4-0)

*P:* Designated score on English placement test or ATL 1004. *R:* Not open to students with credit in MC 111 or MC 112 or LBS 133 or ATL 110 or ATL 115 or ATL 120 or ATL 125 or ATL 130 or ATL 135 or ATL 140 or ATL 150 or ATL 195H or AL 192 or AL 192H.

Drafting, revising, and editing compositions derived from readings on men in America to develop skills in narration, persuasion, and analysis, and documentation.

**150. Writing: The Evolution of American Thought**  
Fall, Spring, 4(4-0)

*P:* Designated score on English placement test or ATL 1004. *R:* Not open to students with credit in MC 111 or MC 112 or LBS 133 or ATL 110 or ATL 115 or ATL 120 or ATL 125 or ATL 130 or ATL 135 or ATL 140 or ATL 145 or ATL 195H or AL 192 or AL 192H.

Drafting, revising, and editing compositions derived from American historical, social, and cultural texts to develop skills in narration, persuasion, analysis, and documentation.

**195H. Writing: Major Topics in American Thought**  
Fall, Spring, 4(4-0)

*P:* Designated score on English placement test. *R:* Not open to students with credit in MC 111 or MC 112 or LBS 133 or ATL 110 or ATL 115 or ATL 120 or ATL 125 or ATL 130 or ATL 135 or ATL 140 or ATL 145 or ATL 150 or AL 192 or AL 192H.

Drafting, revising, and editing compositions derived from readings on major topics in American thought to develop advanced skills in narration, persuasion, analysis, and documentation.

**290. Independent Study**  
Fall, Spring, Summer, 1 to 4 credits.

*R:* Open only to freshmen and sophomores. Approval of department.

Special projects arranged by an individual student and a faculty member in areas supplementing regular course offerings.

**ANATOMY**

**Department of Anatomy  
College of Human Medicine  
College of Osteopathic Medicine  
College of Veterinary Medicine**

**316. General Human Anatomy**  
Spring, 3(3-0)

*P:* BS 110 or BS 111 or approval of department. Human structure. Major systems of the human body.

**480. Special Problems in Anatomy**

Fall, Spring, Summer, 1 to 5 credits. A student may earn a maximum of 15 credits in all enrollments for this course.

*R:* Approval of department. Topics from an anatomical field such as gross anatomy, histology, tissue culture, cytology, neurology, or embryology.

**515. Comparative Veterinary Gross Anatomy**  
Fall, 6(2-10)

*R:* Open only to graduate-professional students in the College of Veterinary Medicine. Canine anatomy. Comparisons with ruminant, porcine, and equine anatomy.

**516. Veterinary Histology and Cell Biology**  
Fall, 4(3-2)

*R:* Open only to graduate-professional students in the College of Veterinary Medicine. Principles of developmental, cellular, and molecular biology as related to veterinary medicine.

**517. Veterinary Neuroanatomy**  
Spring, 1(1-0)

*R:* Completion of 1 semester of the graduate-professional program in the College of Veterinary Medicine. Introduction to the anatomy of the nervous system using the canine species as a model.

**551. Medical Gross Anatomy**  
Fall, 6(4-6)

*R:* Graduate-professional students in colleges of Human and Osteopathic Medicine. Gross anatomy of the human body using prosections, medical imaging, clinical correlations, case studies, video tapes, and computer aided instruction.

**552. Medical Neuroscience**

Spring, 4(3-2) Interdepartmental with Physiology and Radiology.

*R:* Graduate-professional students in colleges of Human and Osteopathic Medicine. Correlation of normal structure and function of the human nervous system with clinical testing, classical lesions, and common diseases.

**562. Medical Histology**  
Spring, 3(2-2)

*R:* Graduate-professional students in colleges of Human and Osteopathic Medicine. Histology of the human body.

**585. Human Gross Anatomy Dissection**

Fall, Spring, Summer, 2 to 7 credits. A student may earn a maximum of 15 credits in all enrollments for this course.

*P:* ANT 551. *R:* Graduate-professional students in colleges of Human and Osteopathic Medicine. Dissection of selected regions of the human body.

**610. Veterinary Gross Anatomy Dissection**

Spring, 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course.

*P:* ANT 515. *R:* Open only to graduate-professional students in College of Veterinary Medicine. Dissection and prosection of selected regions of domestic animals.

**611. Research Problems in Veterinary Anatomy**

Fall, Spring, Summer, 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course.

*R:* Open only to graduate-professional students in the College of Veterinary Medicine. Approval of department. Veterinary gross anatomy, cell biology, histology, or neurobiology.

**802. Clinical Surgical Anatomy**

Spring, 4(2-4) Interdepartmental with Surgery. Administered by Surgery.

*R:* Open only to Master's students in Surgery. Review of surgical anatomy. Detailed anatomical information through lecture and dissection sessions. Clinical interpretation of anatomy and surgical approaches.

**813. Problems in Anatomy**

Fall, Spring, Summer, 1 to 5 credits. A student may earn a maximum of 5 credits in all enrollments for this course.

*R:* Approval of department. Fields such as gross anatomy, histology, tissue culture, cytology, neurology and embryology.

**814. Graduate Seminar**

Spring of even-numbered years, 1 to 3 credits.

*R:* Open only to graduate students in Anatomy. Supervised practice in evaluating abstracts and delivering oral presentations of anatomical sciences. Organization, timing and effective illustrations.

**820. Advanced Neuroanatomy**

Summer of odd-numbered years, 1 to 5 credits.

A student may earn a maximum of 12 credits in all enrollments for this course. *R:* Approval of department. Current topics in anatomy and physiology and processes of central nervous system cells.

**839. Systems Neuroscience**

Spring of odd-numbered years, 4(4-0) Interdepartmental with Pharmacology and Toxicology, and Physiology.

*R:* Open only to graduate students in the Colleges of Human Medicine, Osteopathic Medicine, Agriculture and Natural Resources, Natural Science, and Veterinary Medicine.

Anatomy, pharmacology, and physiology of multicellular neural systems. Sensory, motor, autonomic, and chemo-regulatory systems in vertebrate brains.

**885. Vertebrate Neural Systems**

Spring of odd-numbered years, 3(2-2) Interdepartmental with Physiology.

Comparative analysis of major component systems of vertebrate brains. Evolution, ontogeny, structure, and function in fish, amphibians, reptiles, birds and mammals.

**ANT**