

**831. Water, Technology and International Development**

Spring of even-numbered years. 3(3-0)

P: AE 481 or ANR 489 or ATM 431 or CSS 210. R: Open only to graduate students in College of Agriculture and Natural Resources or College of Engineering.

Water resources planning and development for irrigated agriculture. Technological, agronomic, environmental, social and political constraints. Case studies.

**836. Microclimate and Its Measurement**

Spring. 4(3-3) Interdepartmental with Geography.

The climate near the Earth's surface. Energy balance, thermal radiation exchange, heat fluxes, temperature sensors, wind speed and direction, humidity and evapotranspiration and their measurement.

**840. Analysis of Physical Systems**

Fall. 3(3-0)

P: ATM 440 or BCM 311 or MGT 306. R: Open only to graduate students in College of Agriculture and Natural Resources.

Identification and definition of systems problems in agricultural and construction industries. Model formulation and estimation.

**845. Process Network Theory Applied to Agroecosystems**

Spring of odd-numbered years. 4(4-0)

R: Open only to graduate students in College of Agriculture and Natural Resources or College of Engineering. Numerical framework for the technical, economic and environmental analysis of agricultural and biological systems.

**890. Special Problems**

Fall, Spring, Summer. 1 to 4 credits. A student

may earn a maximum of 4 credits in all enrollments for this course.

R: Approval of department.

Individual study of selected topics.

**891. Advanced Topics in Agricultural Technology and Systems Management**

Fall, Spring, Summer. 1 to 4 credits. A student

may earn a maximum of 8 credits in all enrollments for this course.

R: Open only to graduate students in College of Agriculture and Natural Resources or College of Engineering. New developments in agricultural technology and systems management.

**899. Master's Thesis Research**

Fall, Spring, Summer. 1 to 10 credits. A student

may earn a maximum of 99 credits in all enrollments for this course.

R: Open only to graduate students in Agricultural Technology and Systems Management.

**999. Doctoral Dissertation Research**

Fall, Spring, Summer. 1 to 24 credits. A student

may earn a maximum of 99 credits in all enrollments for this course.

R: Open only to Ph.D. students in Agricultural Technology and Systems Management.

**AGRICULTURE AND NATURAL RESOURCES ANR**

**College of Agriculture and Natural Resources**

**350. Leadership Development for Agriculture and Natural Resources**

Spring. 2(2-0)

R: Not open to freshmen and sophomores. Approval of college; application required.

Preparation for community leadership. Field observation of social, economic and political problems. Emphasis on awareness, action and involvement. Seminars and interviews.

**392. Agriculture and Natural Resources Seminar**

Spring. 1(2-0)

R: Not open to freshmen and sophomores.

Current agricultural, natural resources and environmental problems and solutions. Discussion leaders from various disciplines.

**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**

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.

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. P: LBS 133. R: Not open to freshmen and sophomores. 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. P: LBS 133 or another Tier I writing course. R: Not open to freshmen. Open only to students in American Studies and in Lyman Briggs School.

American attitudes toward the natural environment and related public and private institutions.

**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.

**Descriptions — American Studies  
of  
Courses**

**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(0-2)[1(0-2) See page A-2, item 3.]

C: ATL 1004. 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. 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 ATL 110 or ATL 120 or ATL 125 or ATL 130 or ATL 140 or ATL 145 or ATL 150 or ATL 195H. Drafting, revising, and editing compositions derived from readings on American science and technology 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 125 or ATL 130 or ATL 140 or ATL 145 or ATL 150 or ATL 195H. Drafting, revising, and editing compositions derived from readings on American philosophy, literature, and the arts to develop skills in narration, persuasion, analysis, and documentation.

**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 120 or ATL 130 or ATL 140 or ATL 145 or ATL 150 or ATL 195H. 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 120 or ATL 125 or ATL 140 or ATL 145 or ATL 150 or ATL 195H. Drafting, revising, and editing compositions derived from readings on American radical thought to develop skills in narration, persuasions, 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 120 or ATL 125 or ATL 130 or ATL 145 or ATL 150 or ATL 195H. 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 120 or ATL 125 or ATL 130 or ATL 140 or ATL 150 or ATL 195H. 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 120 or ATL 125 or ATL 130 or ATL 140 or ATL 145 or ATL 195H or ATL 195H. 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 120 or ATL 125 or ATL 130 or ATL 140 or ATL 145 or ATL 150. 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 ANT**

**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. 7(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.