

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.
QA: ATM 890

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. Approval of department.
QA: ATM 899

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. Approval of department.
QA: ATM 999

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.
QA: ANR 350

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.
QA: ANR 425

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.
QA: ANR 475

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.
QA: ANR 480

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.
QP: MTH 109, MTH 110, MTH 111, EC 201, EC 202

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.
QA: ANR 480

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.
QA: ANR 399

AMERICAN STUDIES AMS

College of Arts and Letters

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.
QA: AMS 410

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.
QA: AMS 411

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.
QA: A L 801

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.
QA: A L 803

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.
QA: A L 802

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.

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(1-2) 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.
QA: ATL 0991

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.
QA: ATL 1144, ATL 1154

101. Library Resources
Fall, Spring, Summer. 1(1-0)
Use of libraries for researching college assignments and papers. Emphasis on bibliographic and reference tools.
QA: ATL 117

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, MC 112, LBS 133, ATL 120, ATL 125, ATL 130, ATL 140, ATL 145, ATL 150, ATL 195H.
Drafting, revising, and editing compositions derived from readings on American science and technology to develop skills in narration, persuasion, analysis, and documentation.
QA: ATL 1154, ATL 1164, ATL XY2, ATL XY3

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, MC 112, LBS 133, ATL 110, ATL 120, ATL 130, ATL 140, ATL 145, ATL 150, 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.
QA: ATL 1154, ATL 1164, ATL XY2, ATL XY3

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, MC 112, LBS 133, ATL 110, ATL 120, ATL 130, ATL 140, ATL 145, ATL 150, 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.
QA: ATL 1154, ATL 1164, ATL XY2, ATL XY3

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, MC 112, LBS 133, ATL 110, ATL 120, ATL 125, ATL 140, ATL 145, ATL 150, ATL 195H.
Drafting, revising, and editing compositions derived from readings on American radical thought to develop skills in narration, persuasions, analysis, and documentation.
QA: ATL 1154, ATL 1164, ATL XY2, ATL XY3

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, MC 112, LBS 133, ATL 110, ATL 120, ATL 125, ATL 130, ATL 145, ATL 150, ATL 195H.
Drafting, revising, and editing compositions derived from readings on women in America to develop skills in narration, persuasion, analysis, and documentation.
QA: ATL 1154, ATL 1164, ATL XY2, ATL XY3

Descriptions—American Thought and Language of Courses

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, MC 112, LBS 133, ATL 110, ATL 120, ATL 125, ATL 130, ATL 140, ATL 150, ATL 195H.
 Drafting, revising, and editing compositions derived from readings on men in America to develop skills in narration, persuasion, and analysis, and documentation.
QP: MC 111, MC 112, LBS 133 QA: ATL 1154, ATL 1164, ATL XY2, ATL XY3

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, MC 112, LBS 133, ATL 110, ATL 120, ATL 125, ATL 130, ATL 140, ATL 145, ATL 195H, ATL 195H.
 Drafting, revising, and editing compositions derived from American historical, social, and cultural texts to develop skills in narration, persuasion, analysis, and documentation.
QA: ATL XY2, ATL XY3, ATL 1154, ATL 1164

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, MC 112, LBS 133, ATL 110, ATL 120, ATL 125, ATL 130, ATL 140, ATL 145, 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.
QA: ATL 192H, ATL 193H

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.
QP: BS 211, BS 212 QA: ANT 316

515. Comparative Veterinary Gross Anatomy
Fall. 6(2-0)
R: Open only to graduate-professional students in the College of Veterinary Medicine.
 Canine anatomy. Comparisons with ruminant, porcine, and equine anatomy.
QA: ANT 514

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.
QA: ANT 511

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.
QA: ANT 512

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.

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.
QA: ANT 813

814. Graduate Seminar
Spring of odd-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.
QA: ANT 814

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.
QA: ANT 820

839. Systems Neuroscience
Spring of even-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 even-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.
QA: ANT 885, ANT 886

899. Master's Thesis Research
Fall, Spring, Summer. 1 to 8 credits. A student may earn a maximum of 12 credits in all enrollments for this course.
R: Open only to graduate students in Anatomy.
QA: ANT 899

999. Doctoral Dissertation Research
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 36 credits in all enrollments for this course.
R: Open only to graduate students in Anatomy.
QA: ANT 999

ANIMAL SCIENCE ANS

**Department of Animal Science
 College of Agriculture and Natural Resources**

110. Introductory Animal Agriculture
Fall. 3(2-2)
 History of animal agriculture and its relationship to human needs, production systems, marketing, environmental considerations. Current goals of and limitations affecting U.S. animal production.
QP: ANS 211

112. Introductory Animal Management
Spring. 3(2-2)
P: ANS 110.
 Principles of managing beef and dairy cattle, horses, poultry, sheep and swine throughout their life cycles. Topics include genetics, nutrition, reproduction, health, care, and economically efficient production.

210. Animal Products
Fall. 4(3-3)
P: ANS 112. R: Not open to freshmen.
 Edible animal products. Processing, preservation, storage and distribution of dairy, meat, and egg products.
QP: ANS 110, ANS 211 QA: ANS 156, FSC 300

211. Animal and Product Evaluation
Spring. 3(1-6)
 Fundamentals of animal and product evaluation. Skeletal and muscular anatomy of animals and its relation to function. oral and written defense of decisions regarding evaluation.

212. Merchandising Purebred Livestock
Spring of even-numbered years. 2(1-2)
R: Open only to sophomores, juniors, and seniors.
 Purebred livestock industry. Private treaty and auction sales. Advertising, animal selection and budgeting of purebred livestock sales. Field trips required.
QA: ANS 318

262. Sheep Management
Spring. 3(2-2)
R: Open only to sophomores, juniors, and seniors.
 Principles of sheep management: genetics, reproduction, nutrition, marketing, and economics. Field trips required.
QA: ANS 472

300A. Livestock Judging
Fall of even-numbered years. 2 credits.
P: ANS 211. R: Not open to freshmen.
 Evaluation of conformation and performance records of beef cattle, swine and sheep. Represent MSU in intercollegiate competition. Field trips required.
QP: ANS 357A, ANS 357B QA: ANS 357C

300B. Meat Evaluation and Grading
Fall of odd-numbered years. 2 credits.
P: ANS 211. R: Not open to freshmen.
 Evaluation of beef, pork, and lamb carcasses and wholesale cuts according to industry standards. Federal grading standards. Field trips to meat packing operations required. Represent MSU in intercollegiate competition.
QP: ANS 257A QA: ANS 257B