

AGRICULTURAL ENGINEERING

891* **Advanced Topics in Agricultural Engineering(MTC)**
 Fall, Spring, Summer. 1 to 4 credits.
 May reenroll for a maximum of 9 credits.
 P: Approval of department R: Graduate students Undergraduate degree in Engineering
 Advanced topics in agricultural engineering.
 QA: AE 890

892A* **Research Methods in Agriculture Engineering**
 Spring. 1(1-0)
 R: Graduate Students Engineering or Agriculture
 Discussion of procedures and methods for designing and executing research projects.
 QA: AE 820

892B* **Agricultural Engineering Seminar**
 Fall. 1(1-0)
 R: Graduate Students Engineering or Agriculture
 Current topics in Agricultural Engineering

899* **Master's Thesis Research**
 Fall, Spring, Summer. 1 to 15 credits.
 P: Approval of department R: Graduate students AE
 QA: AE 899

999* **Doctoral Dissertation Research**
 Fall, Spring, Summer. 1 to 15 credits.
 P: Approval of department R: Graduate students AE
 QA: AE 999

AGRICULTURAL TECHNOLOGY AND SYSTEMS MANAGEMENT ATM

315. **Occupational and Personal Safety**
 Spring. 2(2-0)
 P: CSS 101 or ANS 110 or AEE 101 or HRT 201. R: Open only to College of Agriculture and Natural Resources majors.
 Principles of safety problem solving. Accident causation and prevention. Laws and regulations. Machinery, electrical, chemical and fire safety. Security. Safety program development.
 QA: ATM 415

326. **Principles of Animal Environments**
 Spring. 2(2-0)
 P: MTH 116 or MTH 120; CPS 100 or CPS 130 or CPS 131. R: Open only to College of Agriculture and Natural Resources majors.
 Heat and moisture balances for confined livestock. Interior environment and its control. Waste management.
 QA: MTH 110 CPS 100 QA: ATM 426

431. **Irrigation, Drainage and Erosion Control Systems**
 Fall. 3(2-2)
 P: MTH 116 or MTH 120; CSS 210. R: Not open to freshmen and sophomores.
 Principles of soil and water conservation engineering including: land and soil surveying, basic hydraulics, hydrology, soil moisture, and soil and water conservation practices with applications to irrigation, drainage and erosion control systems.
 QA: MTH 111 CSS 210 QA: ATM 231 ATM 431

440* **Agricultural Machinery Systems**
 Fall. 3(3-0)
 P: CSS 210; MTH 110 or MTH 116; CPS 100 or CPS 130 or CPS 131 R: Juniors and Above Agriculture and Natural Resources
 Principles, analysis, management, and economics of agricultural machinery systems considering weather conditions, cultural practices, crop rotation, labor and energy.
 QP: MTH 108 ORMTH 111CPS 100OR QA: ATM 440

490* **Independent Study**
 Fall, Spring, Summer. 1 to 4 credits.
 May reenroll for a maximum of 8 credits.
 P: ATM 231 or ATM 240 or BCM 311 R: Juniors and above ATM Approval of department; application required
 Supervised individual student research and study in Agricultural Technology and Systems Management.
 QP: ATM 231 ORATM 240ORATM 311 QA: ATM 480

491* **Special Topics in Agricultural Technology and Systems Management**
 Fall, Spring, Summer. 1 to 4 credits.
 May reenroll for a maximum of 8 credits.
 P: ATM 231 or ATM 240 or BCM 311 R: Juniors and above ATM
 Special Topics in Agricultural Technology and Systems Management.
 QP: ATM 231 ORATM 240ORATM 311 QA: ATM 490

804* **Appropriate Agricultural Mechanization in Developing Countries**
 Fall of odd-numbered years. 3(3-0)
 R: Seniors and Above
 Appropriate agricultural mechanization in developing countries including humane, animal and mechanical power for the smaller farms. Machine selection, local manufacturing, ownership patterns, increasing production and decreasing losses.
 QA: ATM 804

807* **Human Factors Engineering (Ergonomics)**
 Fall of even-numbered years. 3(3-0)
 R: Seniors and above
 Analysis of machine designs, operation and working environment in relation to human limitations and capabilities. Study of procedures to develop maximum human-machine compatibility and performance.
 QA: ATM 807

831* **Water, Technology and International Development**
 Spring of even-numbered years. 3(3-0)
 P: CSS 210 or ATM 431 or AE 481 or ANR 399 R: Seniors and above
 Water resources planning and development for irrigated agriculture. Technological, Agronomics, Environmental, Social and political constraints will be presented and discussed. Case studies from selected areas will be presented.
 QA: ATM 890

836* **Microclimate and Its Measurement**
 Spring. 4(3-3) Interdepartmental with the Department(s) of Geography.
 P: MTH 116 R: Juniors and Above
 Introductory course in microclimatology and the principles of instrumentation required to adequately quantify this environment. The primary study region will be: area-field scale & smaller; height-surface +10 to-1 m; and time-sec to hours.
 QP: MTH 109 MTH 111 QA: ATM 436 ATM 808

840* **Analysis of Physical Systems**
 Fall. 3(3-0)
 P: ATM 440 or BCM 311 or MGT 306 R: Seniors and above ANR
 Identification and definition of systems problems in the agriculture and construction industries. Model formulation and estimation. Consideration of current approaches and models.
 QA: ATM 806

845* **Process Network Theory Applied To Agroecosystems**
 Spring of odd-numbered years. 4(4-0)
 P: 1 Year of Calculus R: Seniors and above
 Process network theory providing a numerical framework for the technical, economic and environmental analysis of agricultural and biological systems.
 QA: ATM 890

890* **Special Problems**
 Fall, Spring, Summer. 1 to 4 credits.
 May reenroll for a maximum of 6 credits.
 P: Approval of department R: Graduate students
 Individual study or research on selected topics.
 QA: ATM 880

891* **Advanced Topics in Agricultural Technology and Systems Management**
 Fall, Spring, Summer. 2 to 4 credits.
 May reenroll for a maximum of 12 credits.
 R: Seniors and above
 New developments in agricultural technology and systems management.
 QA: ATM 890

899* **Master's Thesis Research**
 Fall, Spring, Summer. 1 to 8 credits.
 May reenroll for a maximum of 15 credits.
 P: Approval of department R: Graduate students ATM
 QA: ATM 899

999* **Doctoral Dissertation Research**
 Fall, Spring, Summer. 1 to 24 credits.
 May reenroll for a maximum of 48 credits.
 P: Approval of department R: Graduates ATM
 QA: ATM 999

AGRICULTURE AND NATURAL RESOURCES ANR

350* **Leadership Development for Agriculture and Natural Resources**
 Spring. 2(2-0)
 R: Not open to Freshmen and Sophomores
 Approval of college: application required
 Leadership development. Preparation for community leadership. Firsthand look at social, economic and political problems. Emphasis on awareness, action and involvement. Series of seminars and interviews. Field trips required.
 QA: ANR 350

392* **Agriculture and Natural Resources Seminar**
 Spring. 1(2-0)

Current agricultural, natural resources and environmental problems and solutions as presented by discussion leaders from various disciplines.
 QA: ANR 425

AGRICULTURE AND NATURAL RESOURCES

475*. International Studies in Agriculture and Natural Resources
 Fall, Spring, Summer. 2 to 6 credits.
 May reenroll for a maximum of 6 credits.
 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 the Department(s) of Agricultural Economics, Animal Science, 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 emphasizing an integrated, multidisciplinary team approach to case study problems.
 QP: MTH 109 ORMTH 110ORMTH 111

491*. Selected Topics
 Fall, Spring, Summer. 1 to 4 credits.
 May reenroll for a maximum of 6 credits.
 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(-) May reenroll for a maximum of 6 credits.
 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 student's major field of study.
 QA: ANR 399

AMERICAN STUDIES AMS

491*. Perspectives in American Studies
 Fall. 3(3-0) May reenroll for a maximum of 6 credits.
 R: juniors-seniors

Methods and significant works in American Studies for majors.
 QA: AMS 410

492*. Seminar in American Studies
 Spring. 3(3-0) May reenroll for a maximum of 6 credits.
 R: Juniors and seniors Arts and Letters,

James Madison
 Seminar approach to selected topics in American life emphasizing interdisciplinary approaches. Topics vary.
 QA: AMS411

881*. American Studies Theory, Methods, Bibliography
 Fall. 3(3-0)
 R: Graduate Arts & Letters American Studies

Methods and bibliographical sources of American Studies research. Interdisciplinary approaches to studying American culture.
 QA: AL 801

890*. Independent Study
 Fall, Spring, Summer. 1 to 4 credits.
 May reenroll for a maximum of 12 credits.
 R: Approval of the program director

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(04-00) May reenroll for a maximum of 12 credits.
 R: Approval of the program director

Special topics supplementing regular course offerings proposed by faculty on a group study basis for graduate students.
 QA: A L 802

899*. Master's Thesis Research-Plan A
 Fall, Spring, Summer. 1 to 6 credits.
 May reenroll for a maximum of 6 credits.
 R: Approval of the program director

Directed research leading to a master's thesis, used in partial fulfillment of plan A master's degree requirements.

AMERICAN THOUGHT AND LANGUAGE ATL

There will be 4 credit Tier One writing courses numbered ATL 110 and higher.

There will be a 4 credit Honors Tier One course numbered ATL 195H.

There will be a developmental Tier One writing course.

ANATOMY ANT

316*. General Human Anatomy
 Spring. 3(-)
 P: BS 211 or BS 212 R: Approval of Department

Designed to impart the basic concepts of the broad field of anatomy. Special requirements of the various disciplines will be met in their respective laboratories.
 QP: BS 211 BS 212 QA: ANT 316

515*. Comparative Veterinary Gross Anatomy
 Fall. 6(2-10)
 P: Admission to the College of Veterinary Medicine R: College of Veterinary Medicine Veterinary Medicine none

Essentials of canine anatomy with comparisons to ruminant, porcine and equine anatomy.

516*. Veterinary Histology and Cell Biology
 Fall. 4(3-2)
 P: Admission to the College of Veterinary Medicine. R: College of Veterinary Medicine

Introduction to the principles of developmental, cellular, and molecular biology relevant to future courses in the veterinary curriculum.

517*. Veterinary Neuroanatomy
 Spring. 1(1-0)
 P: Admission to the College of Veterinary Medicine. R: College of Veterinary Medicine Veterinary Medicine none

Introduction to the anatomy of the canine nervous system.

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 projections, medical imaging, clinical correlations, case studies, video tapes, and computer aided instruction.

552. Medical Neuroscience
 Spring. 4(3-2) Interdepartmental with the Department(s) of Physiology, 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.
 May reenroll for a maximum of 15 credits.
 P: ANT 551 R: Graduate-professional students in colleges of Human and Osteopathic Medicine.

Dissection of selected regions of the human body.

802*. Clinical Surgical Anatomy
 Spring. 6(04-04) Interdepartmental with the Department(s) of Surgery.
 P: Must be a surgery resident with MD or DO C: Must be in the MSU system

Review of surgical anatomy; the opportunity to obtain detailed anatomical information through lecture and dissection sessions; and the clinical interpretation of anatomy surgical approaches.

813*. Problems in Anatomy
 Fall, Spring, Summer. 1 to 5 credits.
 May reenroll for a maximum of 5 credits.
 P: Approval of department

Various anatomical fields such as gross anatomy, histology, tissue culture, cytology, neurology and embryology will be studied
 QA: ANT 813

814*. Graduate Student Seminar
 Spring of even-numbered years. 1 to 3 credits.
 R: Anatomy graduate program

Supervised practice in delivering and evaluating written abstracts and public oral presentations of anatomical sciences, techniques or organization, timing and effective illustrations
 QA: ANT 814

820*. Advanced Neuroanatomy
 Summer of odd-numbered years. 1 to 3 credits. May reenroll for a maximum of 99 credits.
 P: Permission of instructor

Current topics concerning anatomy and physiology of CNS cells and their processes
 QP: ANT 815 QA: ANT 820