

**808. Environmental Measurements**

Spring of odd-numbered years. 4(3-3) MTH 109 or MTH 111, STT 422; or approval of department. Interdepartmental with the Department of Geography.

Methods and techniques for accurate measurement and interpretation of environmental parameters. Temperature, humidity, wind and air flow characteristics, radiation, light intensity, gaseous and particulate concentrations in atmospheric microclimates will be discussed.

**820. Research Methods**

Fall. 1(1-0) Approval of department. Interdepartmental with Building Construction Management.

Procedures for initiating, developing, carrying out and completing research projects.

**822. Seminar**

Spring. 1(1-0) Approval of department.

**880. Special Problems**

Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 6 credits. Approval of department.

Individual study or research on selected topics.

**890. Advanced Topics in Agricultural Engineering Technology**

Fall, Winter, Spring. 3(3-0) May reenroll for a maximum of 12 credits if different topics are taken. Approval of department.

New developments in agricultural engineering technology.

**899. Master's Thesis Research**

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

**999. Doctoral Dissertation Research**

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

**Building Construction Management**

**BCM**

**200. American Housing and Building Industry**

(B C 200.) Fall, Spring. 3(3-0)

Residential and light commercial construction industry in America. Impacts of government, finance, zoning ordinances, codes, aesthetics, construction technology, demographics, energy and society.

**215. Architectural Drafting I**

(B C 215.) Fall, Summer. 4(2-4)

Residential design including site plans, floor plans, foundation plans, elevations, sections and details.

**216. Architectural Drafting II**

(B C 216.) Winter. 4(2-4) BCM 215.

Light commercial design including site plans, floor plans, foundation plans, elevations, sections and details, barrier free accessibility.

**239. Housing Conservation**

(B C 239.) Fall. 3(3-0) Interdepartmental with the Department of Human Environment and Design.

Skills and techniques in conserving, repairing and remodeling existing housing. Structural components of housing and evaluation of housing structure.

**301. Energy Conservation Systems for Buildings**

(B C 301.) Winter. 3(3-0) BCM 215, MTH 109 or MTH 111 or approval of department.

Solar energy, earth sheltered and energy conservation systems for buildings will be analyzed for operation, optimum size, construction, performance, climate, cost effectiveness and human comfort for northern climates.

**312. Structural Design**

(B C 312.) Winter. 4(5-0) PHY 237, BCM 215 or approval of department. Interdepartmental with Agricultural Engineering Technology.

Concepts of structural mechanics, material strengths and section properties are developed and applied to design using wood, steel and concrete.

**313. Construction Systems**

(B C 413.) Spring. 4(3-2) BCM 200, BCM 215, CPS 115.

Primary construction systems employed in the residential and light commercial construction industry. Interrelationships between planning, processes, costs and management.

**412. Utilities Design**

(B C 412.) Fall. 4(4-0) PHY 238, BCM 215 or approval of department.

Design and planning for mechanical and electrical utilities in residential and light commercial construction.

**415. Building Materials**

(B C 415.) Spring. 4(4-0) BCM 312 or approval of department.

Properties of building materials pertinent to their application and performance in service.

**416. Building Costs**

(B C 416.) Winter. 4(2-4) BCM 312 or concurrently.

Methods of cost estimating. Effects of codes and production practices on costs.

**417. Construction Management Finance**

(B C 417.) Winter. 4(4-0)

Financing methods for the construction, rehabilitation, and purchase of real estate.

**418. Special Problems**

(B C 418.) Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 11 credits. Written approval of department.

Special problems in the areas of acquisition and development of residential land, design, construction technology, building materials, finance, marketing, construction management and land use codes and regulations.

**419. Senior Seminar**

(B C 419.) Fall. 1(1-0) Senior majors.

Professional practices, business ethics, market trends, and structure of the construction industry.

**420. Construction Management**

(B C 420.) Spring. 4(4-0) Senior majors.

Systems management techniques for building organizations; development, operations, planning, scheduling and control, and administrative procedures.

**820. Research Methods**

(B C 820.) Fall. 1(1-0) Approval of department. Interdepartmental with and administered by Agricultural Engineering Technology.

Procedures for initiating, developing, carrying out and completing research projects.

**880. Special Problems**

(B C 880.) Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 6 credits. Approval of department.

Individual student research and study in land acquisition and development, design, construction, management, finance, marketing, and structural analysis.

**890. Advanced Topics**

Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 12 credits if different topics are taken. Approval of department.

Topics will be selected from: computer methods in construction management, advanced construction management, optimization techniques, solar energy buildings, advanced estimating, numerical structural analysis, new construction techniques and materials.

**899. Master's Thesis Research**

(B C 899.) Fall, Winter, Spring, Summer. Variable credit. Approval of department.

**AGRICULTURAL  
ENGINEERING TECHNOLOGY**

See Agricultural Engineering.

**AGRICULTURE AND NATURAL  
RESOURCES ANR**

**College of Agriculture and Natural  
Resources**

**220. Plants and Their Environment**

Winter. 3(3-0) Interdepartmental with and administered by the Department of Forestry.

Relationships between plants and fundamental climatic, edaphic, and biotic factors; structure and function of different ecosystems in relation to environmental factors.

**275. Exploring International Agriculture**

Spring. 3(3-0)

Exploration of overseas assignments with international agencies; potential world food actualities and potentialities; special problems of the tropics compared with those in temperate regions.

**280. Selected Topics**

Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 6 credits if different topics are taken. Approval of department.

**Description — Agriculture and Natural Resources  
of  
Courses**

- 350. Leadership Development for Agriculture and Natural Resources**  
Winter, Spring: 3(3-0) Given at W. K. Kellogg Biological Station Fall, Spring: 3 credits. May reenroll for a maximum of 6 credits. Approval of department.  
Leadership development. Preparation for community leadership. Firsthand look at social, economic, and political problems. Series of seminars, interviews, field trips. Emphasis on awareness, action, and involvement. Field trips required.
- 399. Professional Internships in Agriculture and Natural Resources**  
Fall, Winter, Spring, Summer. 6 to 12 credits. May reenroll for a maximum of 12 credits. Juniors and approval of department.  
Professionalized experiences in a student's major. Supervision and evaluation by faculty and cooperating agencies.
- 410. Environmental Toxicology**  
Winter. 4(4-0) B S 212, BCH 401. Interdepartmental with and administered by the College of Natural Science.  
Fate and effects of toxic chemicals in soil, plants, wildlife, and aquatic systems. Interactions between chemicals and the environment which influence their fate and ecological importance.
- 425. Agriculture and Natural Resources Seminar**  
Spring. 2(2-0)  
Current agricultural, natural resources, and environmental problems and solutions as presented by discussion leaders from various disciplines, arranged by undergraduate students.
- 445. Pest Management: Pesticide Chemistry and Application Systems for Plant Protection**  
Fall. 5(3-4) CEM 143, ENT 425, HRT 402 or CSS 402, BOT 405 or concurrently or approval of instructor. Interdepartmental with and administered by the College of Natural Science.  
A broad overview of pesticide chemistry, efficient usage, environmental fate, legislation and application techniques.
- 446. Pest Management: Biological Systems for Plant Protection**  
Fall. 3(3-0) ENT 425, HRT 402 or CSS 402, BOT 405 or concurrently or approval of instructor. Interdepartmental with and administered by the College of Natural Science.  
Management of plant pests utilizing host resistance, cultural practices, legislation, and biological systems.
- 447. Pest Management: Systems Management for Plant Protection**  
(ANR 444.) Winter. 4(3-2) NSC 445, NSC 446 or approval of instructor. Interdepartmental with and administered by the College of Natural Science.  
Designed to integrate knowledge and improve ability in arriving at pest management decisions of varying complexity involving the fields of agronomy, wildlife, horticulture, entomology, and plant pathology.
- 450. Natural Resource Administration**  
Spring. 4(4-0) Seniors. Interdepartmental with the departments of Fisheries and Wildlife, Forestry, Park and Recreation Resources and Resource Development. Administered by the Department of Forestry.  
Concepts and methods of administering wildland properties. The legal, economic and social environment. Benefit-cost analysis of management changes. Unit organization, personnel management and accounting. Presents a systems view of administration.
- 455. Natural Resource Economics**  
Fall. 4(3-2) EC 200 or EC 201. Interdepartmental with the departments of Fisheries and Wildlife, Forestry, Park and Recreation Resources and Resource Development. Administered by the Department of Forestry.  
Basic economic and institutional principles and techniques that govern the production and consumption of renewable natural resources. Natural resource evaluation, project analysis, and distributional considerations.
- 462. Agricultural and Rural Development in Developing Nations**  
Fall. 3(3-0) PAM 201 or EC 201; PAM 260 recommended. Interdepartmental with Public Affairs Management, and Food Systems Economics and Management. Administered by Food Systems Economics and Management.  
Traditional agricultural systems and the incentive environment for economic growth in rural areas. Adjustment to technological, institutional and human change. Strategies for rapid agricultural transformation.
- 475. International Studies in Agriculture and Natural Resources**  
Spring, Summer. 3 to 9 credits. Approval of college.  
Study-travel experience emphasizing contemporary problems affecting agriculture in the world, national, and local communities. Field trips, case studies, interviews with leading experts, government officials, community leaders. Supervised individual study.
- 480. Selected Topics**  
Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 9 credits if different topics are taken. Approval of department. Juniors.  
Exposition of special topics in agriculture and natural resources.
- 491. Natural Resources and Modern Society**  
Spring. 3(3-0) Juniors. Interdepartmental with the departments of Forestry, and Resource Development. Administered by the Department of Forestry.  
A survey of the social and economic significance of natural resources in modern industrial and urban society. Current problems of natural resources management and use are examined in terms of the society in which they exist.

**AMERICAN THOUGHT  
AND LANGUAGE ATL**

**College of Arts and Letters**

To satisfy the University General Education requirement, a student must take one course in each of the following groups. No courses may be taken for elective credit.

1. 1144, 121, 131, 141, 151, 161, 171, 181, 191H
2. 1154, 122, 132, 142, 152, 162, 172, 182, 192H
3. 1164, 123, 133, 143, 153, 163, 173, 183, 193H

**0142. Writing Laboratory I**

Fall, Winter, Spring. 0(0-2)[2(2-0) See page A-1 item 3.] ATL 0991 or admission by placement test; ATL 1144 concurrently.

An individualized program to develop composition skills by aiding students to discover how language functions in communication and by helping them to accept responsibility for learning to write correctly.

**0152. Writing Laboratory II**

Fall, Winter, Spring. 0(0-2)[2(2-0) See page A-1 item 3.] ATL 0142, ATL 1144 or approval of department; ATL 1164 concurrently.

Continuation of ATL 0142.

**0162. Writing Laboratory III**

Fall, Winter, Spring. 0(0-2)[2(2-0) See page A-1 item 3.] ATL 0152, ATL 1154 or approval of department; ATL 1164 concurrently.

Continuation of ATL 0152.

**0991. Preparatory Writing Skills**

Fall, Winter, Spring, Summer. 0(3-0)[3(3-0) See page A-1 item 3.] Admission by placement test.

Instruction and practice in writing. Emphasis on mastery of fundamental skills needed for a variety of writing assignments.

**104. Writing for Science Majors**

Fall. 3(3-0) Satisfactory grade in English proficiency exam; College of Natural Science majors. Interdepartmental with and administered by the Department of English.

Writing workshop for science students that develops and refines composition ability.

**AMERICAN STUDIES AMS**

**College of Arts and Letters**

**301. Issues in American Civilization**

Fall. 3(3-0) May reenroll for a maximum of 9 credits. Sophomores.

Selected issues in American life past and present, with materials drawn from such disciplines as history, social sciences, philosophy, literature and the arts. Topics vary.

**377. The Natural Environment: Perceptions and Practices**

Fall. 4(4-0) Sophomores. Interdepartmental with Lyman Briggs School. Administered by Lyman Briggs School.

Factors which have influenced U.S. environmental attitudes as reflected in art and literature. Ways in which changing attitudes have led to changes in legislation and practice.