

552. Systems Biology II
Spring. 3 to 6 credits. Admission to a professional medical program.

A multidisciplinary approach to the integumentary system providing a functional integration of basic science and clinical information.

553. Systems Biology III
(OM 551.) Summer. 5 to 15 credits. Admission to a professional medical program.

A multidisciplinary approach to the nervous system providing a functional integration of basic science and clinical information.

554. Systems Biology IV
(OM 552.) Fall. 5 to 15 credits. Admission to a professional medical program.

Continuation of 553 with emphasis on multidisciplinary approach to the cardiovascular system.

555. Systems Biology V
(OM 553.) Winter. 5 to 10 credits. Admission to a professional medical program.

Continuation of 554 with emphasis on multidisciplinary approach to the respiratory system.

556. Systems Biology VI
(OM 553.) Winter. 5 to 10 credits. Admission to a professional medical program.

Continuation of 555. This system will represent a multidisciplinary approach to the urinary system.

557. Systems Biology VII
(OM 554.) Spring. 5 to 15 credits. Admission to a professional medical program.

Continuation of 556 with emphasis on multidisciplinary approach to the gastrointestinal system and metabolism.

558. Systems Biology VIII
(OM 555.) Summer. 5 to 15 credits. Admission to a professional medical program.

Continuation of 557 with emphasis on multidisciplinary approach of the growth and development within (but not limited to) the field of pediatrics, obstetrics and gynecology.

620. Systems Biology — Directed Studies

Fall, Winter, Spring, Summer. 1 to 15 credits. Admission to a professional medical program or approval of coordinator.

A directed study in systems biology for the continuing advanced student or remediation of any systems biology: hemopoietic, integumentary, nervous, cardiovascular, respiratory, urinary, gastrointestinal, growth and development.

PACKAGING **PKG**

**College of Agriculture and
Natural Resources**

210. Principles of Packaging
Fall, Winter, Spring, Summer. 3(3-0)

A general course in packaging principles covering the growth and development of the field, and the technological and motivational problems involved in present day packaging. Consideration will be given to the basic functions of the package and their relation to the needs and wants of our society.

320. Packaging Materials
Fall, Spring. 3(3-0)

Common packaging materials including wood, paper, paperboard, plastics, metal foils and sheets, glass, adhesives cushioning media; their basic properties in relation to performance of package.

330. Graphics for the Packaging Industry
Winter. 3(3-0) 320 or approval of school.

Designing graphics for specific types of printing processes and for various packaging materials. Considerations in ink formulation, identification of the various printing processes used, and the advantages and disadvantages of various reproduction methods as used for packaging.

340. Packaging and the Environment
Winter. 4(4-0)

Broad study of the effects of packaging on environmental quality, including solid waste, air and water quality, laws, economics, energy considerations and resources conservation.

422. Packaging Systems
Fall, Winter. 3(3-0) 320 or approval of school.

Design, use and evaluation of packages and packaging systems. A one-day field trip is required.

423. Dynamics of Packaging
Spring. 4(3-3) 422, MTH 113, or approval of school.

A study of the protective function of the packaging systems in relation to their environment and shock and vibration isolation methods. A one-day field trip is required.

424. Packaging Problems
Fall, Winter, Spring, Summer. 1 to 3 credits. May re-enroll for a maximum of 9 credits. 422, 2.5 grade-point average and approval of school.

Development of solutions to specific packaging problems.

425. Packaging Process Analysis
Winter, Spring. 4(3-3) CPS 110.

The integrated study of the operation structure and control of the packaging and package-making process. A one-day field trip is required.

427. Packaging Materials and Systems Laboratory
Fall, Winter, Spring. 3(1-6) 320, 422 or approval of department.

Methods of measuring properties of packaging materials. Design, manufacture and performance testing of complete packages. Techniques for evaluating test results. Value of various test methods.

428. Packaging Development
Fall, Spring. 4(3-2) 422 or approval of school

A study of the functions of each area concerned with the development of packages to meet present-day requirements of protection and merchandising.

430. Packaging Machinery
Spring. 4(3-3) 422 or approval of school.

The components for automated packaging lines, and auxiliary materials handling equipment, including consideration of design, selection, specification and operation of machinery for the package-making and package-filling operations.

463. Seminar
Fall. 2(0-4) Must have job experience to enroll.

Detailed report on work performed in practical experience or outside packaging projects.

801. Package Design
Fall. 4(3-3)

Advanced work in the development of the graphic and structural design of packages.

834. Special Investigations in Packaging
Fall, Winter, Spring, Summer. Variable credit.

899. Research
Fall, Winter, Spring, Summer. Variable credit. Approval of school.

Building Construction **B C**

200. Dynamics of American Housing
Fall, Winter, Spring, Summer. 3(3-0)

Impact of housing on the economic and social welfare of America. Analysis of the residential building industry and its problems in providing adequate housing.

312. Structural Design
Fall. 4(4-0) 200 or approval of department.

Consideration of structural design systems as used in light construction.

412. Housing Utilities Design
Winter. 4(4-0)

Design of and planning for mechanical and electrical utilities in housing.

413. Residential Construction Systems
Spring. 4(3-2) 312 or approval of department.

Analysis of the primary construction systems employed in the residential building industry, especially the economic and social aspects in meeting the housing goals of the U. S.

415. Building Materials
Spring. 4(4-0) 312 or approval of department.

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

416. Building Costs
Winter. 4(2-4) Approval of department.

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

417. Residential Finance
Winter. 4(4-0) Juniors.

Analysis of financial programs for the construction, rehabilitation, remodeling and purchase of homes; especially meeting the nation's goals for low to moderate income housing.

418. Special Topics
Fall, Winter, Spring, Summer. 1 to 3 credits. Approval of department.

Selected topics in housing.

**Descriptions — Packaging
of
Courses**

420. Construction Management
(BC 314.) Spring. 4(2-2) 416 or approval of department.

Systems management techniques for residential building organizations inclusive of organization development, operations, planning, scheduling and control, and administrative systems and procedures.

835. Research in Building Construction
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

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

**PARK AND RECREATION
RESOURCES** PRR

**College of Agriculture and
Natural Resources**

IDC. Resource Ecology and Man
For course description, see Interdisciplinary Courses.

300. Wilderness Survival
Fall, Winter, Spring, Summer. 4(3-0)
Outdoor skills for utilization of plant and animal materials to provide shelter, fire, signals, water and food in the outdoors. Psychology and attitudes conducive to wilderness survival and appreciation. Field trip required.

301. Wilderness Survival (TV)
Fall, Winter, Spring, Summer. 3(3-0)
Credit may not be earned in both 300 and 301. A television lecture course dealing with the principles and attitudes necessary to promote survival in a wilderness setting.

302. Environmental Attitudes and Concepts
Fall. 3(3-0)
Beliefs and attitudes toward land by primitive man and ancient civilizations. Effects of Muir, Thoreau, and others on man/land relationships. Industrialism and environmental quality. Current environmental controversy. Field trip required.

304. Designs for Recreation: Nature and Man
Fall, Spring. 3(3-0) Approval of department.
Design strategies are used to demonstrate relationships between characteristics of the environment and man's use of it. Integration of work, leisure, and recreation uses within environmental potentials and limits is emphasized.

344. Leisure and Recreation Resources
Fall, Spring. 3(3-0)

Leisure in relation to park and recreation resources. History and philosophy, significance in modern society, and impact on urban and natural resource developments.

351. Environmental Interpretation I: Principles
Fall, Winter. 3(3-0)

Philosophy, needs, types, and uses of information services in private, municipal, county, state and federal park and recreation areas. The role of the park interpreter (naturalist).

440. Park and Recreation Administration
Fall, Winter. 4(4-0)

Park and recreation organization, administration and policy at municipal, county, and regional level. Field trip required.

442. State and Federal Recreation Resource Policy
Winter. 3(3-0)

Origin, development and significance of public policy in recreation resource development in the United States with emphasis at state and federal levels. Field trip required.

444. Park and Recreation Area Design
Fall, Winter, Spring. 4(2-4) 304; HRT 211 or 212, or BOT 318; approval of department.

Planning and design principles of space, scale, and circulation applied to the use of park and recreation areas and facilities. Field trip required.

446. Park Area Operations
Spring. 3(3-0) Approval of department.

Problems in operations and maintenance of park and recreation areas and facilities. Personnel practices, budgeting, and maintenance schedules. Selection and adaptability of maintenance equipment. Field trip required.

448. Field Studies in Park Administration
Fall. 3 credits. Approval of department.

Investigation and analysis of outstanding park and recreation programs. Visits to areas under local, state, and federal jurisdiction. Evaluation of administrative practices, area management, and operation policies. Conducted as a traveling class with agency assistance.

449. Recreation Land Management
Fall, Spring. 3(3-0) Not open to majors.

Fundamentals of outdoor recreation resource management. Planning, development, and administration of programs and facilities.

450. Natural Resource Administration
Fall, Spring. 4(4-0) Seniors. Interdepartmental with the departments of Fisheries and Wildlife, Forestry, and Resource Development and Natural Resources. Administered by the Department of Forestry.

Concepts and methods of administering wild-land 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.

451. Environmental Interpretation II: Methods and Devices
Spring. 4(3-1) 351.

Methodology and equipment used in information transmission in natural, historic, and scenic areas. Site selection and development criteria for natural resource interpretation.

480. Supervised Study
Fall, Winter, Spring, Summer. 1 to 4 credits. May re-enroll for a maximum of 10 credits. Approval of department.

Seminars on current problems. Supervised readings. Individual undergraduate research on selected topics.

484. Senior Proseminar
Winter. 1(1-0) Senior majors.
Seminars on current professional problems and literature.

801. Dimensions of Recreation and Leisure
Fall. 3(3-0) 344 or approval of department.

Concepts of recreation and leisure in the United States and their implications for professional development. Extensive reading into concepts, definitions, values, educational components and historic roots of recreation and leisure.

840. Recreation Economics
Spring. 4(4-0) FOR 809 or approval of instructor. Interdepartmental with the departments of Forestry and Resource Development.

Applications of economic analysis to recreation resource problems including measurement of demand and supply, valuation of recreation resources, determination of economic impact, economic decision making and policy considerations.

842. Park and Recreation Policy
Winter. 3(3-0) Interdepartmental with the Department of Resource Development.
Recreation, leisure and work concepts. Determination of needs for recreation facilities. Factors affecting public and private allocation of resources for provision of needed facilities.

844. Recreation Research Methods
Fall. 4(4-0) SOC 312 or approval of department.
Relate recreation research to broader context of social scientific investigation and to the nature and philosophy of social scientific research. Examine the theoretical and methodological approaches in recreation research.

846. Urban Recreation Area and Program Analysis
Spring. 4(4-0) Approval of department.
Analysis of urban public, private and commercial recreation areas, facilities, and programs. Construction of a typology of urban communities. Course is conducted in selected urban communities in Michigan.

848. Recreation Resource Law
Spring. 3(3-0)
Legal basis for public recreation. Methods of acquiring recreational resources, including contracts and condemnation procedures. Administrative problems, including zoning, liability, civil rights and law enforcement. Study of cases and statutes.

850. Development of Water Recreation Resources
Spring. 3(3-0) Approval of department.
Administration, research, design, and construction of water recreation facilities. Policy issues, use conflict, and fiscal planning reviewed in light of interagency relationship and legislative mandate.