

**601. Osteopathic Manipulative Medicine Clerkship**

Fall, Spring, Summer. 1 to 20 credits. A student may earn a maximum of 30 credits in all enrollments for this course.  
R: Open only to graduate-professional students in the College of Osteopathic Medicine upon completion of Units I and II.  
Advanced training in the diagnosis of musculoskeletal dysfunction and application of osteopathic manipulative techniques.  
QA: BIM 601

**620. Directed Studies**

Fall, Spring, Summer. 1 to 30 credits. A student may earn a maximum of 30 credits in all enrollments for this course.  
Individual or group work on special problems related primarily to the biomechanics of the musculoskeletal system.  
QA: BIM 620

**800. Special Topics**

Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 3 credits in all enrollments for this course.  
Directed study in topics of biomechanics.  
QA: BIM 800

**810. Tissue Biomechanics**

Fall. 3(2-2)  
Integrate concepts of tissue mechanics and microstructure, develop experimental methods to study connective tissue mechanics using engineering principles.  
QA: BIM 812, BIM 871

**811. Biomechanical Analysis**

Fall. 2(2-0)  
Methods for analysis of biokinematic and biokinetic data.  
QA: BIM 805

**812. Experimental and Analytical Biodynamics**

Spring. 3(2-2)  
P: BIM 811.  
Experimental and analytical methods to measure and interpret biodynamics of musculoskeletal system.  
QP: BIM 805 QA: BIM 811, BIM 873

**813. Kinanthropometry and Biomechanics**

Spring. 3(2-2)  
P: BIM 811.  
Size, position, and mobility of the human body as a mechanical linkage system. Detailed study of body joints and kinematic models.  
QP: BIM 805 QA: BIM 810, BIM 872

**840. Theory of Connective Tissue Mechanics**

Spring of odd-numbered years. 2(2-0)  
P: BIM 810.  
Mechanical properties, chemical content, and anatomical structure in connective tissues.  
QP: BIM 812 QA: BIM 812

**841. Theory of Neuromuscular Mechanics**

Fall of even-numbered years. 2(2-0)  
Neurological control of joint mechanics.  
QA: BIM 810, BIM 805

**842. Theory of Joint Mechanics**

Spring. 2(2-0)  
P: BIM 811.  
Motion and force transmission, and their relationship to anatomical structure and tissue function in joints.  
QP: BIM 810 QA: BIM 810, BIM 805

**860. Occupational Biomechanics**

Fall. 3(3-0)  
Applications of biomechanics in ergonomics with emphasis on the whole body.  
QP: BIM 810 QA: BIM 810

**861. Clinical Biomechanics**

Spring of even-numbered years. 3(3-0)  
Application of biomechanics to medicine.

**890. Independent Study**

Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 22 credits in all enrollments for this course.  
R: Approval of department.  
Individual or group work related to biomechanics and/or neuromuscular system.  
QA: BIM 890

**895. Experimental Research Methods**

Fall, Spring, Summer. 1(0-2)  
R: Open only to Biomechanics graduate students.  
Methods of experimental research in biomechanics.  
QA: BIM 871, BIM 872, BIM 873

**899. Master's Thesis Research**

Fall, Spring, Summer. 1 to 25 credits. A student may earn a maximum of 25 credits in all enrollments for this course.  
QA: BIM 899

**BIOMEDICAL  
ENGINEERING**

**BME**

**College of Engineering**

**311. Introduction to Biomedical Engineering**

Fall. 3(3-0) Interdepartmental with Materials Science and Mechanics, Mechanical Engineering, and Electrical Engineering.  
P: BS 111, MTH 235, PHY 184.  
Physical and mechanical properties of soft and hard tissues. Biomaterials. Biocompatibility. Biochemical processes, biological transport, and thermodynamics. Bioelectronics and instrumentation.  
QP: MTH 310, PHY 289, BS 210

**405. Biomedical Electronics**

Fall of even-numbered years. 3(3-0) Interdepartmental with Electrical Engineering.  
P: MTH 132, PHY 184.  
Electronic components and circuits. Physiological measurements, transduction of physiological events to electrical signals. Ultrasonic techniques, biomedical applications of lasers, x-ray and magnetic resonance imaging.  
QP: MTH 112, PHY 238 QA: BME 410

**424. Biomaterials and Biocompatibility**

Spring of odd-numbered years. 3(3-0) Interdepartmental with Materials Science and Mechanics.  
P: BME 311, PSL 250.  
Materials science of human implants. Design requirements imposed by the body's milieu and the need to protect the body.  
QP: PSL 240, PSL 430 QA: BME 424

**435. Biological Transport Mechanisms**

Fall of odd-numbered years. 3(3-0) Interdepartmental with Chemical Engineering and Mechanical Engineering.  
P: BME 311, MTH 235.  
Mechanisms of transport of momentum, heat and mass. Mathematical description of transport processes in biological systems. Solution of biomedical problems.  
QP: BS 210, MTH 310, PHY 289 QA: BME 431

**441. Tissue Mechanics**

Spring of even-numbered years. 3(3-0) Interdepartmental with Materials Science and Mechanics.  
P: BME 311.  
Application of solid mechanics to understanding mechanical responses of biological tissues. Microstructure and biological function for soft and hard connective tissues and muscle.  
QP: ANT 316 QA: BME 481

**491. Special Topics (MTC)**

Fall, Spring. 3 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.  
P: BME 311.  
Special topics in biomedical engineering or bioengineering such as biochemical design, occupational biomechanics, biological surface science, or low temperature biotechnology.  
QA: BME 499

**BOTANY AND PLANT  
PATHOLOGY**

**BOT**

**Department of Botany and  
Plant Pathology  
College of Natural Science**

**105. Plant Biology**

Fall, Spring. 3(3-0)  
Plant structure, function, development, genetics, diversity and ecology.  
QA: BOT 205

**106. Plant Biology Laboratory**

Fall, Spring. 1(0-3)  
P: BOT 105 or concurrently.  
Cell structure, anatomy, physiology, growth and development, and diversity of plants.  
QA: BOT 206

**202. The Form and Evolution of Plants**

Spring. 4(2-4)  
P: BS 110 or BOT 105.  
Divergent and convergent evolution throughout the plant kingdom. Basic principles underlying the structure, function, and reproduction of plants.  
QP: BS 212, BOT 205 QA: BOT 302

**218. Plants of Michigan**

Fall. 3(2-3)  
P: BS 110 or BOT 105.  
Plant taxa of Michigan and the Great Lakes region and the major habitats in which they occur. Principles and rationale of classification. Relationships between life histories, morphology and environment.  
QP: BOT 205, BS 212

**301. Introductory Plant Physiology**

Fall, Spring. 3(2-3)  
P: CEM 141 or CEM 151; CEM 161; BOT 105 or BS 111 or LBS 145.  
General principles of plant physiology relating plant structure to function. Cell physiology, water relations, effects of light and temperature, respiration, photosynthesis, mineral nutrition, and hormone action.  
QP: CEM 141, CEM 151, CEM 161, BOT 205, BS 210, LBS 141 QA: BOT 301

**335. Plants Through Time**

Spring of even-numbered years. 3(3-0) Interdepartmental with Geological Sciences.  
P: BS 110 or BOT 105 or GLG 201. R: Juniors and above.  
Evolutionary history of plants, the development of ecosystems, and the use of plant fossils in the reconstruction of ancient environments and climate.  
QP: BOT 205, BS 212, LBS 140 QA: GLG 335

**336. Useful Plants**

Spring. 3(3-0)  
P: CEM 142 or CEM 143 or CEM 152; BOT 105 or BS 110, BS 111 or LBS 144, LBS 145.  
Ways in which plants are used for myriad purposes from food and construction materials to medicines and perfumes. The potential for expanding the uses of plants through biotechnology will be explored.  
QP: BOT 205, BS 212 QA: BOT 336

**402. Biology of Fungi**

Fall. 3(2-3)  
P: BS 110, BS 111 or BOT 105 or LBS 140 or MPH 302.  
Major groups of fungi: characteristics, habitats and diversity. Significance of fungi in nature and their economic importance.  
QP: BOT 205, LBS 140, BS 212 QA: BOT 402, BOT 320

**405. Introductory Plant Pathology**

Spring. 4(2-4)  
P: BS 110, BS 111 or BOT 105 or LBS 140. R: Not open to students with credit in BOT 407.  
Important plant diseases and the organisms that cause them. Principles of disease management including application of chemicals, plant breeding, biological control, and genetic engineering.  
QP: BOT 302, BS 212, LBS 140 QA: BOT 405

**Descriptions—Botany and Plant Pathology  
of  
Courses**

- 406. Medical Mycology**  
Spring. 3(2-3) Interdepartmental with  
Medical Technology and Microbiology.  
P: BOT 402, MPH 302.  
Characteristics and laboratory identification of fungal  
diseases in humans and other animals. Laboratory  
techniques. Morphology of causative fungi.  
QP: BOT 320, MPH 302 QA: BOT 406
- 407. Diseases and Insects of Forest and  
Shade Trees**  
Spring. 4(3-3) Interdepartmental with  
Entomology.  
P: BOT 105 and BOT 106, or BS 110 and BS 111;  
BOT 218 or FOR 204, or HRT 210 and HRT 211. Not  
open to students with credit in BOT 405.  
Diseases, insects, and environmental problems affect-  
ing trees in forests, parks, suburbs, and nurseries.  
Methods of control.  
QP: BOT 301, BOT 302, BOT 318, FOR 204 QA:  
BOT 407, ENT 337, FOR 330
- 414. Plant Physiology: Metabolism**  
Fall. 3(3-0)  
P: CEM 251; BOT 105 or BS 110, BS 111 or LBS 144,  
LBS 145.  
General principles underlying metabolic processes of  
plants. Photosynthesis, translocation and water rela-  
tions, nitrogen metabolism, cell wall biosynthesis, and  
structures associated with those processes.  
QP: BOT 205, BS 210, BS 211, CEM 241 QA: BOT  
414
- 415. Plant Physiology: Growth,  
Development and the Environment**  
Spring. 3(3-0)  
P: CEM 251; BOT 105 or BS 110, BS 111 or LBS 140.  
Principles of plant growth and development with  
emphasis on environmental and hormonal factors that  
control progression of the plant through its life cycle.  
Tissue culture and genetic engineering in plants.  
QP: CEM 241, BOT 205, BS 210, BS 211, LBS 141  
QA: BOT 415
- 416. Experiments in Plant Physiology and  
Molecular Biology**  
Fall. 4(2-5)  
P: BOT 414 or BOT 415.  
Experiments illustrating principles of plant physiology  
and molecular biology. Advanced techniques such as  
agrobacterium mediated gene transfer, DNA cloning,  
enzyme linked immunoassays (ELISA), protein and  
DNA electrophoresis.  
QP: BOT 414, BOT 415 QA: BOT 416
- 418. Plant Systematics**  
Spring. 3(2-3) Summer: 3 credits. Given  
at W.K. Kellogg Biological Station.  
P: BOT 105 or BS 110, BS 111 or LBS 140.  
Classification and evolution of higher plants, with  
emphasis on identification, characteristics of plant  
families, and systematic theory and practice.  
QP: BOT 205, LBS 140, BS 212 QA: BOT 318
- 423. Aquatic Plant Biology**  
Fall. 4(2-4) Summer of even-numbered  
years: 4 credits. Given at W.K. Kellogg Biological  
Station.  
P: BS 110, BS 111 or BOT 105, BOT 106 or LBS 144,  
LBS 145.  
Identification, ecology and community relations of  
algae and aquatic vascular plants common to the  
Great Lakes area. Algae and Aquatic Plants as indica-  
tors of environmental change.  
QP: BOT 205, BOT 206, BS 210, BS 211, BS 212,  
LBS 140, LBS 141 QA: BOT 423, BOT 447
- 434. Plant Structure and Function**  
Fall of odd-numbered years. 4(2-4)  
P: BS 110, BS 111 or BOT 105, BOT 106 or LBS 144,  
LBS 145.  
Plant anatomy from a structure and function perspec-  
tive. The physiological, developmental, and ecological  
significance of cell types, tissue types, and meristems  
of vegetative and reproductive plant parts.  
QP: BS 210, BS 211, BS 212, BOT 205, BOT 206,  
LBS 140, LBS 141, LBS 242 QA: BOT 434
- 441. Plant Ecology**  
Fall. 3(3-0)  
P: BS 110 or BOT 105 or LBS 144.  
Ecology of plants and their communities. Effects of  
biotic and climatological factors influencing global  
distribution of plant communities. Community struc-  
ture and function, microclimatology, ecophysiology,  
and adaptation.  
QP: BS 212, BOT 205, LBS 140 QA: BOT 441
- 490. Directed Studies**  
Fall, Spring, Summer. 1 to 4 credits. A  
student may earn a maximum of 6 credits in all  
enrollments for this course.  
R: Approval of department.  
Directed study of published literature in an area of  
botany and plant pathology.  
QA: BOT 401
- 490H. Honors Directed Studies**  
Fall, Spring, Summer. 1 to 4 credits. A  
student may earn a maximum of 6 credits in all  
enrollments for this course.  
R: Approval of department.  
Directed study of published literature in an area of  
botany and plant pathology.  
QA: BOT 400H
- 498. Undergraduate Research**  
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 department.  
Laboratory and/or field research in an area of botany  
and plant pathology.
- 499. Senior Seminar**  
Spring. 2(2-0) A student may earn a maxi-  
mum of 4 credits in all enrollments for this course.  
A capstone experience that focuses on current develop-  
ments and issues in plant biology. Scientific writing and  
oral presentation.  
QA: BOT 499
- 800. Seminar in Plant Biology**  
Fall, Spring. 1(1-0) A student may earn a  
maximum of 4 credits in all enrollments for this  
course.  
R: Open only to graduate students.  
Current research and approaches in plant biology.
- 801. Seminar in Plant Pathology**  
Fall, Spring. 1(1-0) A student may earn a  
maximum of 4 credits in all enrollments for this  
course.  
R: Open only to graduate students.  
Current research and approaches in plant pathology.  
QA: BOT 846
- 802. Selected Topics in Botany**  
Fall, Spring, Summer. 1 to 4 credits. A  
student may earn a maximum of 12 credits in all  
enrollments for this course.  
R: Open only to graduate students in College of Natu-  
ral Science or College of Agriculture and Natural  
Resources.  
Recent developments in botany.  
QA: BOT 891
- 803. Selected Topics in Plant Pathology**  
Fall, Spring, Summer. 1 to 4 credits. A  
student may earn a maximum of 12 credits in all  
enrollments for this course.  
R: Open only to graduate students in College of Natu-  
ral Science or College of Agriculture and Natural  
Resources.  
Recent developments in plant pathology.  
QA: BOT 890
- 804. Special Problems in Plant Pathology**  
Fall, Spring, Summer. 1 to 4 credits. A  
student may earn a maximum of 12 credits in all  
enrollments for this course.  
R: Open only to graduate students in College of Natu-  
ral Science or College of Agriculture and Natural  
Resources.  
Faculty directed individualized study of a selected  
problem.  
QA: BOT 801
- 805. Special Problems in Physiology and  
Biochemistry**  
Fall, Spring, Summer. 1 to 4 credits. A  
student may earn a maximum of 12 credits in all  
enrollments for this course.  
R: Open only to graduate students in College of Natu-  
ral Science or College of Agriculture and Natural  
Resources.  
Faculty directed individualized study of a selected  
problem.  
QA: BOT 803
- 806. Special Problems in Genetics and  
Molecular Biology**  
Fall, Spring, Summer. 1 to 4 credits. A  
student may earn a maximum of 12 credits in all  
enrollments for this course.  
R: Open only to graduate students in College of Natu-  
ral Science or College of Agriculture and Natural  
Resources.  
Faculty directed individualized study of a selected  
problem.  
QA: BOT 801
- 807. Special Problems in Mycology**  
Fall, Spring, Summer. 1 to 4 credits. A  
student may earn a maximum of 12 credits in all  
enrollments for this course.  
R: Open only to graduate students in College of Natu-  
ral Science and College of Agriculture and Natural  
Resources.  
Faculty directed individualized study of a selected  
problem.  
QA: BOT 805
- 808. Special Problems in Anatomy and  
Morphology**  
Fall, Spring, Summer. 1 to 4 credits. A  
student may earn a maximum of 12 credits in all  
enrollments for this course.  
R: Open only to graduate students in College of Natu-  
ral Science or College of Agriculture and Natural  
Resources.  
Faculty directed individualized study of a selected  
problem.  
QA: BOT 801
- 809. Special Problems in Ecology,  
Systematics, and Evolution**  
Fall, Spring, Summer. 1 to 4 credits. A  
student may earn a maximum of 12 credits in all  
enrollments for this course.  
R: Open only to graduate students in College of Natu-  
ral Science or College of Agriculture and Natural  
Resources.  
Faculty directed individualized study of a selected  
problem.  
QA: BOT 809
- 810. Current Concepts in Plant Pathology**  
Spring. 3(3-0)  
P: BOT 405 or BOT 414 or BOT 415  
Recent findings in mycology, plant virology, bacteriol-  
ogy, nematology, disease physiology and epidemiology.  
QP: BOT 405, BOT 414, BOT 415
- 812. Epidemiology of Plant Diseases**  
Spring of odd-numbered years. 3(3-0)  
P: BOT 810  
Study of populations of plant pathogens within popu-  
lations of plant hosts as affected by the environment  
and human involvement.  
QP: BOT 405 QA: BOT 812
- 823. Flowering Plant Diversity**  
Fall of odd-numbered years. 4(2-4)  
P: BOT 418  
Evolutionary diversity of flowering plants. Family  
characteristics, patterns of distribution, systems of  
classification, evolutionary trends, economic impor-  
tance.  
QP: BOT 318 QA: BOT 823, BOT 824
- 824. Principles and Methods of Plant  
Systematics**  
Spring of odd-numbered years. 4(2-4)  
P: BOT 823  
Classification methods, quantification of evolutionary  
relationships, phenetic, phyletic molecular, and cladis-  
tic approaches.  
QP: BOT 823, BOT 824

**826. Tropical Biology: An Ecological Approach**  
Spring, Summer. 8 Credits. Interdepartmental with Zoology.  
R: Approval of department; application required. Principles of tropical ecology at the population, community, and ecosystem levels. Given at various sites in Costa Rica by the organization for Tropical Studies. QA: BOT 826

**827. Tropical Managed Ecosystems**  
Spring, Summer. 8(4-8)  
R: Approval of department; application required. The scientific and social dimensions of sustainable development in the tropics. Given at various sites in Costa Rica by the organization for Tropical Studies.

**830. Paleobotany**  
Fall of even-numbered years. 3(2-3) Interdepartmental with Geological Sciences.  
R: Open only to graduate students. Approval of department.  
Survey of fossil plants: preservation, occurrence, geological relations, taphonomy, whole plant reconstruction, evolutionary history, and paleoecology. QA: BOT 830, GLG 830

**842. Application of Ecological Principles**  
Spring: 2 credits. Given only at W.K. Kellogg Biological Station. A student may earn a maximum of 8 credits in all enrollments for this course. Interdepartmental with Zoology.  
R: Approval of department.  
Workshops and discussions with experts from industry, regulatory agencies, conservation groups, and academe on application of basic ecology and evolutionary biology to real-world problems.

**844. Organelle Genetics**  
Spring of even-numbered years. 3(3-0)  
Interdepartmental with Zoology.  
P: BCH 811 or BOT 856, ZOL 341.  
organization, structure, function, heredity, molecular biology and manipulation of chloroplasts and mitochondria. Biological interaction between nucleus and organelles. QP: BOT 856, ZOL 441 QA: BOT 844

**847. Advanced Mycology**  
Spring of even-numbered years. 5(2-6)  
P: BOT 402.  
Classification, morphology and relationships of fungi; physiology, genetics, and molecular biology of fungi; identification techniques within selected orders. QP: BOT 320 QA: BOT 847, BOT 848

**849. Evolutionary Biology**  
Spring. 3(3-0) Interdepartmental with Zoology.  
P: ZOL 341, STT 422 or concurrently. C: STT 422  
Major conceptual, theoretical and empirical questions in evolutionary biology. Readings and lectures are synthesized in student discussions and on paper. QP: ZOL 441, STT 423

**856. Plant Molecular Biology**  
Spring. 3(3-0) Interdepartmental with Biochemistry.  
P: ZOL 341.  
Recent advances in genetics and molecular biology of higher plants. QP: ZOL 441 QA: BOT 856

**860. Ecology and Evolution in Terrestrial Systems**  
Summer: 4 credits. Given only at W.K. Kellogg Biological Station. Interdepartmental with Zoology, and Crop and Soil Sciences.  
P: STT 422.  
Field experimental and quantitative approaches to ecological and evolutionary mechanisms. QP: STT 423 QA: BOT 839

**863. Environmental Plant Physiology**  
Spring of even-numbered years. 3(3-0)  
Interdepartmental with Horticulture.  
P: BOT 301 or BOT 414 or BOT 415.  
Interaction of plant and environment. Photobiology, thermophysiology, and plant-water relations. QP: BOT 301, BOT 413, BOT 414, BOT 415 QA: BOT 863

**865. Plant Growth and Development**  
Fall. 3(3-0)  
P: BOT 415.  
Physiology and biochemistry of growth and development as regulated by internal and external factors. Biosynthesis and action of plant hormones. Environmental factors: light and temperature. QP: BOT 415 QA: BOT 865

**880. Plant Virology**  
Fall of odd-numbered years. 4(2-4)  
P: BCH 462, BOT 810.  
Biology and molecular aspects of viruses causing plant disease. QP: BOT 405, BCH 453 QA: BOT 880

**881. Molecular and Biochemical Plant Pathology**  
Spring of even-numbered years. 3(2-2)  
P: BCH 462, ZOL 341, BOT 810; BOT 414 or BOT 415.  
Biochemical and molecular bases of host-pathogen interactions. Mechanisms of pathogenicity and the nature of disease resistance. QP: BCH 453, ZOL 441, BOT 415, BOT 405 QA: BOT 881

**884. Prokaryotic Diseases of Plants**  
Fall of even-numbered years. 4(2-4)  
P: BOT 810.  
Description of prokaryotic genera associated with plant diseases, identification, physiology, and genetics. Laboratory techniques. QP: BOT 405 QA: BOT 884

**885. Plant Diseases in the Field**  
Summer. 2(1-3)  
P: BOT 810. R: Open only to graduate students.  
Diagnosis of plant diseases and disorders in a field setting. Field trips and independent study are required. QP: BOT 405 QA: BOT 885

**899. Masters Thesis Research**  
Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Open only to graduate students.  
Research in anatomy, bryology cell biology, ecology, genetics, molecular biology, morphology, mycology, paleobotany, pathology, physiology and systematics. QA: BOT 899

**999. Doctoral Dissertation Research**  
Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 99 credits in all enrollments for this course.  
R: Open only to doctoral students.  
Research in anatomy, bryology cell biology, ecology, genetics, molecular biology, morphology, mycology, paleobotany, pathology, physiology and systematics. QA: BOT 999

## BUILDING CONSTRUCTION MANAGEMENT BCM

**Department of Agricultural  
Engineering  
College of Agriculture and Natural  
Resources  
College of Engineering**

**126. Residential Construction Materials, Methods and Drafting**  
Fall, Spring, Summer. 5(3-4)  
R: Open only to Building Construction Management students. Not open to students with credit in HED 150.  
Materials, methods, codes and drafting in residential construction. QA: BCM 214, BCM 215, BCM 415

**227. Commercial Building Construction Methods**  
Fall, Spring. 3(3-0)  
P: BCM 126. R: Open only to Building Construction Management students.  
Methods, codes, and plans for constructing commercial buildings. Construction system details: site preparation, foundations, floors, framing systems, and roof systems. QP: BCM 215, BCM 214 QA: BCM 217

**230. Utilities**  
Fall, Spring. 3(3-0)  
P: BCM 227. R: Not open to freshmen. Open only to Building Construction Management students and Civil Engineering majors.  
Heating, cooling, plumbing and electrical utilities in residential and light commercial construction utilizing applicable codes. QP: BCM 216, BCM 217 QA: BCM 412

**250. Construction Mechanics and Equipment Management**  
Fall. 3(2-3)  
R: Open only to Building Construction Management or Agricultural Technology and Systems Management students.  
Principles, applications, techniques, tools, materials and resources in building construction mechanics and light construction equipment management. QA: BCM 201, BCM 327

**252. Current Issues in the Building and Housing Industries**  
Fall. 3(3-0)  
Impacts of government policies and regulations on the building and housing industries. Land use, construction technology, energy. Economics, demographics, and lifestyle choices. QA: BCM 200

**311. Quantitative Methods in Technology Management**  
Fall, Spring. 3(3-0)  
P: MTH 116 or MTH 120; CPS 100 or CPS 130 or CPS 131. R: Not open to freshmen and sophomores.  
Technology management methods including linear programming, scheduling, decision theory, queuing and simulation. Applications in building construction management, agriculture and associated industries. QP: MTH 108, MTH 111, CPS 115, CPS 100 QA: ATM 311

**322. Structural Design**  
Fall, Spring. 4(5-0)  
P: BCM 227; PHY 231 or PHY 231B. R: Open only to Building Construction Management or Agricultural Technology and Systems Management majors.  
Mechanics, material strengths and section properties developed and applied to structural design using wood, steel and concrete. Beams, columns, footings, and foundation walls. QP: BCM 215, PHY 237 QA: BCM 312, BCM 313

**324. Construction Estimation**  
Fall, Spring. 4(3-2)  
P: BCM 230, BCM 322. R: Open only to Building Construction Management or Civil Engineering majors.  
Estimating construction projects: labor, material, overhead, and profit in unit and detailed formats. Job cost accounting and control. Estimation software. QP: BCM 217, BCM 412 QA: BCM 416

**325. Construction and Real Estate Finance**  
Fall, Spring. 4(4-0)  
P: EC 201 or EC 202; MTH 116 or MTH 120. R: Open only to Building Construction Management, Civil Engineering, and College of Business majors.  
Financial methods and instruments utilized in construction, rehabilitation, development, and purchase of real estate. Terms, contracts, valuation, brokerage, taxation, risk, and interest rate analysis. QP: MTH 109, MTH 110, MTH 111, EC 201, EC 202 QA: BCM 417, FI 395

**340. Residential Design Evaluation**  
Fall. 3(3-0)  
P: BCM 126 or HED 160. R: Not open to freshmen and sophomores. Open only to Building Construction Management and Human Environment and Design majors.  
Qualitative methods for evaluating residential building designs. Design impacts on building occupants: children, families, singles, handicappers, elderly. QP: BCM 215