881. Molecular and Biochemical Plant Pathology
Spring of odd-numbered years. 3(2-2)

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

885. Plant Diseases in the Field
Summer of odd-numbered years. 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.

891. Current Topics in Ecology and Evolution
Summer. 1 credit. 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 and Crop and Soil Sciences. Administered by Zoology. Presentation and critical evaluation of theoretical and empirical developments by visiting scientists.

897. Community and Ecosystem Ecology
Spring. 4(4-0) Interdepartmental with Zoology and Fisheries and Wildlife. Administered by Zoology. Structure and function of natural communities and ecosystems. Community analysis along environmental gradients. Succession, food web analysis, energy flow, nutrient cycling, and effects of human activities on ecosystems.

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.

999. Doctoral Dissertation Research
Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 90 credits in all enrollments for this course. R: Open only to doctoral students.

BUILDING CONSTRUCTION MANAGEMENT

BMC

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

124. Construction Materials
Fall, Spring. 3(3-0)
Properties of construction materials and their application in residential and light commercial construction. SA: BCM 126

125. Architectural Drafting
Fall, Spring. 3(3-0)
P: BCM 124 or concurrently. Architectural drafting including site plans, floor plans, foundation plans, elevations, sections, and details. Print reading including plan analysis of assemblies and details. Emphasizes residential construction.

227. Commercial Building Construction Methods
Fall, Spring. 3(3-0)
P: BCM 125 R: Open only to students in the Building Construction Management major. Methods, codes, and plans for constructing commercial buildings. Constructive system details; site preparation, foundations, floors, framing systems, and roof systems.

230. Utilities
Fall, Spring. 3(3-0)
P: BCM 227; MTH 116 or MTH 120 R: Open not to freshmen. Open only to students in the Building Construction Management major or to juniors or seniors in the Civil Engineering major. Heating, cooling, plumbing and electrical utilities in residential and light commercial construction utilizing applicable codes.

250. Construction Mechanics and Equipment Management
Fall, Spring. 3(3-0)
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.

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.

311. Construction Project Scheduling
Fall, Spring. 3(2-2)
P: BCM 230 or concurrently; BCM 322 C: BCM 324 concurrently. R: Open only to juniors or seniors in the Building Construction Management or Civil Engineering major. Basic construction project scheduling procedures. Work breakdown structure, critical path method and scheduling logic. Activity durations, status reports, resource allocation and control.

322. Structural Design
Fall, Spring. 4(3-0)
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.

324. Construction Estimation
Fall, Spring. 4(3-2)
P: BCM 230 or concurrently; BCM 322 C: BCM 311 concurrently. R: Open only to juniors or seniors in the Building Construction Management or Civil Engineer major. Estimating construction projects: labor, material, overhead, and profit in unit and detailed formats. Job cost accounting and control. Estimation software.

325. Construction and Real Estate Finance
Fall, Spring. 4(4-0)
P: BC 231, BC 242; 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.

340. Residential Design Evaluation
Fall, Spring. 3(3-0)

349. Construction Renovation
Spring. 3(0-0)
P: BCM 227. R: Open only to Building Construction Management or Human Environment and Design majors or to juniors and seniors in Historic Preservation Specialization. Preservation, rehabilitation, remodeling and restoration of existing buildings. Analysis of building adaptability and design. Economic feasibility and codes. Historical and social considerations.

342. Construction Contracts
Fall, Spring. 3(2-3)

349. Construction Project Management
Fall, Spring. 3(3-0)
P: BCM 311, BCM 324. R: Open only to seniors and graduate students in Building Construction Management and Civil Engineering. Construction management principles and practices. Site and project management.

451. Concepts of Fire Safe Construction
Fall. 3(3-0)

452. Commercial Utility Systems
Fall, Spring. 3(0-0)
P: BCM 250. R: Open only to Building Construction Management, Mechanical Engineering, Civil Engineering, and Human Environment and Design majors. Primary electrical, heating, ventilating, air conditioning, plumbing, elevator, and fire detection and suppression systems for commercial buildings.

453. Land Development
Spring. 3(0-0)
of existing research and development of preliminary

eering, and Natural Resources. Approval of department.

Advanced

and structural analysis.

application required.

Bidding, cost accounting, scheduling.

Dispute resolution and liability case studies.


integration management software, conceptual modeling and

costs and resources to the schedule. Effective commu-
nication of schedule information.

Critical path analysis for effective and logical schedul-
ing of construction projects. Identification of project ac-

The management of construction projects. Integration of construc-
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"CELL AND MOLECULAR BIOLOGY"

College of Natural Science

800. Cell and Molecular Biology Seminar
Fall, Spring, 1 credits. A student may earn a maximum of 4 credits in all enrollments for this course.
R: Open only to students in the Cell and Molecular Biology major.

801. Laboratory Rotation
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 students in the Cell and Molecular Biology major.

802. Research Forum
Fall, 1 credits. A student may earn a maximum of 8 credits in all enrollments for this course.
R: Open only to students in the Cell and Molecular Biology major.

CHEMICAL ENGINEERING CHE

Department of Chemical Engineering

College of Engineering

201. Material and Energy Balances
Fall, Spring, 3 credits. MTH 133, CEM 142 or CEM 152, CPS 101 or concurrently.
R: Open only to students in the College of Engineering.

Chemical engineering calculations. Synthesis of chemical process systems. Analysis of chemical processes using material and energy balances. Enthalpy calculations for changes in temperature, phase transitions, and chemical reactions.

311. Fluid Flow and Heat Transfer
Fall, 4 credits. CHE 201 or concurrently, MTH 239 or concurrently.
R: Open only to College of Engineering students.