

- 852 Systems Modeling and Simulation**
Fall of even years. 3(3-0) Interdepartmental with Fisheries and Wildlife; Forestry; Resource Development. Administered by Department of Fisheries and Wildlife. RB: (STT 422 or STT 442 or STT 464 or GEO 463)

General systems theory and concepts. Modeling and simulation methods. Applications of systems approach and techniques to natural resource management, and to ecological and agricultural research.

- 853 Applied Systems Modeling and Simulation for Natural Resource Management**

Spring of odd years. 3(2-2) Interdepartmental with Fisheries and Wildlife; Forestry; Resource Development; Zoology. Administered by Department of Fisheries and Wildlife. RB: (FW 820 or BE 486 or ZOL 851) or approval of department. R: Open only to seniors and graduate students

Mathematical models for evaluating resource management strategies. Stochastic and deterministic simulation for optimization. System control structures. Team modelling approach.

- 882 Irrigation and Water Management Engineering**

Spring of even years. 3(3-0) RB: (BE 481 and CE 321) SA: AE 882

Design and management of systems for supplemental irrigation. Water supply and transport. Economic and engineering optimization of irrigation design.

- 890 Special Problems**

Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Approval of department; application required. SA: AE 890

Individual study in biosystems engineering.

- 891 Advanced Topics in Biosystems Engineering**

Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to graduate students in the College of Engineering. Approval of department. SA: AE 891

Biosystems engineering topics not covered in regular courses.

- 892 Biosystems Engineering Seminar**

Spring. 1(1-0) R: Open only to graduate students in the College of Agriculture and Natural Resources or College of Engineering. SA: AE 892

Current topics in biosystems engineering.

- 899 Master's Thesis Research**

Fall, Spring, Summer. 1 to 10 credits. A student may earn a maximum of 99 credits in all enrollments for this course. R: Open only to master's students in the Biosystems Engineering major. SA: AE 899

Master's thesis research.

- 999 Doctoral Dissertation Research**

Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 99 credits in all enrollments for this course. R: Open only to doctoral students in the Biosystems Engineering major. SA: AE 999

Doctoral dissertation research.

BUILDING CONSTRUCTION MANAGEMENT BCM

Department of Agricultural Engineering College of Agriculture and Natural Resources

- 810 Construction Systems**

Fall, Spring. 1(0-2) R: Open only to graduate students in Building Construction Management, Civil Engineering, and Interior Design and Facilities Management majors. Not open to students with credit in BCM 124 or BCM 210.

Construction materials and methods in the U.S. Steel and wood construction.

- 811 Advanced Project Scheduling**

Fall. 3(2-2)

Critical path analysis for effective and logical scheduling of construction projects. Identification of project activities and their relationships. Schedule development, analysis, and updating. Relationship of project costs and resources to the schedule. Effective communication of schedule information.

- 817 Construction Management Information Systems**

Spring. 3(2-2) R: Open only to graduate students in Building Construction Management, Civil Engineering, and Interior Design and Facilities Management majors.

Information generation and utilization for the management of construction projects. Integration of construction management software, conceptual modeling and knowledge-based models.

- 822 Legal Issues in Construction**

Spring. 3(3-0) RB: A degree or experience in construction management, civil engineering, human environment and design, interior design, architecture, urban planning, landscape architecture or law.

Application of Michigan and Federal case law to construction and development claims and litigation.

- 823 Advanced Construction Project Management**

Fall, Spring. 3(3-0) RB: (BCM 411 and BCM 415) R: Open only to graduate students in Building Construction Management.

Project management issues, services and documentation. Bidding, cost accounting, scheduling. Project planning and controlling.

- 890 Special Problems**

Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 4 credits in all enrollments for this course. R: Open only to graduate students in College of Agriculture and Natural Resources. Approval of department; application required.

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

- 891 Advanced Topics in Building Construction Management**

Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Open only to graduate students in College of Agriculture and Natural Resources. Approval of department.

Advanced topics in building construction management.

- 892 Construction Management Research Seminar**

Fall. 2(2-0) R: Open only to graduate students in the College of Agriculture and Natural Resources or College of Engineering, or College of Human Ecology.

Current areas and topics of research in construction management. Resources of research results, analysis of existing research and development of preliminary proposal.

- 898 Master's Research**

Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to master's students in the Building Construction Management major.

Master's degree research paper.

- 899 Master's Thesis Research**

Fall, Spring, Summer. 1 to 10 credits. A student may earn a maximum of 99 credits in all enrollments for this course. R: Open only to master's students in Building Construction Management.

Master's thesis research.

CELL AND MOLECULAR BIOLOGY CMB

College of Natural Science

- 800 Cell and Molecular Biology Seminar**

Fall, Spring. 1(1-0) A student may earn a maximum of 5 credits in all enrollments for this course. R: Open only to students in the Cell and Molecular Biology major.

Current literature in such areas of cell and molecular biology as gene expression, intracellular transport, cell signalling, regulation of cell growth and cell structure.

- 880 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.

Participation in research projects in laboratories of Cell and Molecular Biology faculty.

- 890 Independent Study**

Fall, Spring, Summer. 1 to 8 credits. A student may earn a maximum of 8 credits in all enrollments for this course.

Non-thesis research for Plan B master's students.