

**Graduate Course Descriptions Effective Fall 2007**

[https://www.banweb.mtu.edu/pls/owa/stu\\_ctg\\_utils.p\\_online\\_all\\_courses\\_gr](https://www.banweb.mtu.edu/pls/owa/stu_ctg_utils.p_online_all_courses_gr)

**Chemical Engineering****CM 5100 - Appl Mathematics for CM**

The solution to basic equations for momentum, mass, and heat transfer by use of separation of variables, numerical methods, and other mathematical techniques.

**Credits:** 3.0

**Lec-Rec-Lab:** (3-0-0)

**Semesters Offered:** Fall

**Restrictions:** Must be enrolled in one of the following Level(s): Graduate

**CM 5200 - Advanced CM Thermodynamics**

Emphasis in phase equilibria and related concepts, such as molecular or statistical thermodynamics, nonideal fluids and solids.

**Credits:** 3.0

**Lec-Rec-Lab:** (3-0-0)

**Semesters Offered:** Fall

**Restrictions:** Must be enrolled in one of the following Level(s): Graduate

**CM 5300 - Advanced Transport Phenomena**

Single- and multi-component mass, energy, and momentum transport. Derivation and use of the general transport equations for Newtonian and non-Newtonian flows, convective flows, and mass transport in flowing systems. Applications to complex systems.

**Credits:** 3.0

**Lec-Rec-Lab:** (3-0-0)

**Semesters Offered:** Spring

**Restrictions:** Must be enrolled in one of the following Level(s): Graduate

**Pre-Requisite(s):** CM 5100

**CM 5310 - Laboratory Safety**

Provides the technical and cultural background necessary to operate and manage a safe Laboratory.

**Credits:** 1.0

**Lec-Rec-Lab:** (1-0-0)

**Semesters Offered:** Fall

**CM 5400 - Adv Reactive Systems Analysis**

An analytical study of various aspects of chemical reactor behavior, such as multiple steady-states, dynamics, stability, and control. Also covers transport phenomena in packed beds of solids and mathematical modeling of packed-bed reactors.

**Credits:** 3.0

**Lec-Rec-Lab:** (3-0-0)

**Semesters Offered:** Spring

**Restrictions:** Must be enrolled in one of the following Level(s): Graduate

### **CM 5500 - Theory and Methods of Research**

Discusses modern methods of research. Topics could include statistical analysis, presentation of data, modern experimental methods, or oral presentation skills.

**Credits:** 2.0

**Lec-Rec-Lab:** (1-0-2)

**Semesters Offered:** Fall

**Restrictions:** Must be enrolled in one of the following Level(s): Graduate

### **CM 5650 - Heterogeneous Catalysis**

A survey of theories of catalytic activity of solids with examples drawn from reactions of industrial importance.

**Credits:** 3.0

**Lec-Rec-Lab:** (3-0-0)

**Semesters Offered:** On Demand

**Restrictions:** Must be enrolled in one of the following Level(s): Graduate

### **CM 5670 - Advanced Process Design**

Problems and lectures in plant design. Course content will vary according to particular needs of the students involved.

**Credits:** 3.0

**Lec-Rec-Lab:** (3-0-0)

**Semesters Offered:** On Demand

**Restrictions:** Must be enrolled in one of the following Level(s): Graduate

### **CM 5680 - Adv Chemical Process Control**

Analysis and design of digital and sampled control systems; use of z-transform and time-domain methods. Study of nonlinear feedback systems, stability criteria, and state-space methods. Design using optimal control. Multivariable and adaptive control system concepts as applied to chemical processes.

**Credits:** 3.0

**Lec-Rec-Lab:** (3-0-0)

**Semesters Offered:** On Demand

**Restrictions:** Must be enrolled in one of the following Level(s): Graduate

### **CM 5710 - Coal Preparation**

Geology, petrography, mining, and preparation of coal. Covers topics such as coal-water-fuels, transportation, economics, and environmental considerations.

**Credits:** 2.0

**Lec-Rec-Lab:** (2-0-0)

**Semesters Offered:** On Demand

### **CM 5720 - Advanced Mineral Processing**

Topics in mineral processing of current interest. Will cover grinding, flotation, agglomeration, pollution prevention, surface chemistry, and other areas where rapid advancement is occurring.

**Credits:** variable to 3.0; Repeatable to a Max of 12

**Semesters Offered:** On Demand

**Restrictions:** Permission of instructor required; Must be enrolled in one of the following Level(s): Graduate

**CM 5730 - Control of Process Streams**

Sampling statistics, on-line sensors, serial and parallel interfacing, artificial intelligence, and fuzzy logic applied to minerals and materials processing operation.

**Credits:** 2.0

**Lec-Rec-Lab:** (2-0-0)

**Semesters Offered:** On Demand

**CM 5900 - Special Topics in CM**

A discussion of chemical engineering topics of current interest not included in regular graduate courses.

**Credits:** variable to 3.0

**Semesters Offered:** On Demand

**Restrictions:** Permission of instructor required; Must be enrolled in one of the following Level(s):  
Graduate

**CM 5950 - Advanced Special Projects**

This is a course for graduate students who wish to do extensive work on projects or topics not directly related to their thesis topic and not covered in one of the graduate courses.

**Credits:** 3.0; Repeatable to a Max of 9

**Lec-Rec-Lab:** (0-3-0)

**Semesters Offered:** On Demand

**Restrictions:** Permission of instructor required; Must be enrolled in one of the following Level(s):  
Graduate

**CM 5990 - MS Research**

An original investigation of a chemical engineering problem.

**Credits:** variable to 15.0; May be repeated; Graded Pass/Fail Only

**Semesters Offered:** Fall, Spring, Summer

**CM 6990 - Doctoral Research**

An original investigation in theoretical or applied chemical engineering or both, and submission of a dissertation in partial fulfillment of the requirements for the PhD degree.

**Credits:** variable to 12.0; May be repeated; Graded Pass/Fail Only

**Semesters Offered:** Fall, Spring, Summer

**Graduate Course Descriptions Effective Fall 2007**

[https://www.banweb.mtu.edu/pls/owa/stu\\_ctg\\_utils.p\\_online\\_all\\_courses\\_gr](https://www.banweb.mtu.edu/pls/owa/stu_ctg_utils.p_online_all_courses_gr)

For more information, contact

Office of Student Records and Registration

Michigan Technological University

1400 Townsend Drive

Houghton, Michigan 49931-1295

906/487-2319

Fax: 906/487-3343

Email: [stuosrr@mtu.edu](mailto:stuosrr@mtu.edu)