Michigan Technological University

Chemical Engineering

Undergraduate Academic Advising

For chemical engineering students starting at Michigan Tech during the 2021-22 Academic Year

Catalog Years: 202108, 202201, and 202205

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This document is available with active hyperlinks on the department's advising webpage, under Degree Requirements.

Accreditation and Educational Objectives

The chemical engineering undergraduate program is accredited by the Engineering Accreditation Commission of ABET. ABET is the recognized accreditor for college and university programs in applied science, computing, engineering, engineering technology and is the most respected accreditation organizations in the United States. ABET is recognized by the Council for Higher Education Accreditation.

Program Criteria for the Department of Chemical Engineering

The curriculum includes:

- Applications of mathematics, including differential equations and statistics, to engineering problems.
- College-level chemistry and physics courses with some at an advanced level.
- Engineering application of these sciences to the design, analysis and control of processes, including hazards associated with these processes.

Student Outcomes for the Department of Chemical Engineering

Michigan Tech Chemical Engineering graduates will have an ability to:

- Identify, formulate, and solve complex engineering problems by applying principles of engineering, science and mathematics.
- Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety and welfare, as well as global, cultural, social, environmental and economic factors.
- Communicate effectively with a range of audiences.
- Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental and societal contexts.
- Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions.
- Acquire and apply new knowledge as needed, using appropriate learning strategies.

Educational Objectives for the Department of Chemical Engineering

Michigan Tech Chemical Engineering Alumni:

- Are successful early and have sustained success in their professional careers
- Are valued for their hands-on engineering ability and safety culture
- Have effectively communicated their technical knowledge via publications, reports, the internet, and other media
- Are providing service to society
- Are earning or have earned advanced degrees or have participated in continuing education
- Have achieved leadership positions in their chosen professions

Faculty and Staff Directory

Dr. Pradeep K. Agrawal
Professor & Dept. Chair

Mr. Joe Azzarello
AEE Advisor

Ms. Taana Blom,
Administrative Aide

Ms. Kathleen Burke
Office Assistant

Dr. Gerard T. Caneba,
Professor

Dr. Tomas B. Co
Associate Professor

Dr. Jeana L. Collins
Senior Lecturer

Dr. Timothy C. Eisele,
Associate Professor

Dr. Robert M. Handler
Operations Manager,
Sustainable Futures Institute

Dr.Caryn Heldt,
Professor

Dr. Praktik Joshi,
Postdoctoral Scholar

Ms. Supreet Kaur
Research Scientist

Dr. S. Komar Kawatra,
Professor

Dr. Julie King
Research Professor

Dr. Yixin Liu,
Assistant Professor

Mr. Jerry A. Norkol,
Master Machinist

Dr. Adrienne Minerick,
Professor

Dr. Faith A. Morrison,
Professor

Dr. Michael E. Mullins,
Professor

Dr. Rebecca G. Ong
Assistant Professor

Dr. Lei Pan, Assistant Professor

Dr. Kurt A. Rickard Adjunct Assistant Professor

Dr. Tony Rogers, Associate Professor

Dr. John F. Sandell, Associate Professor

Dr. David R. Shonnard, Professor

Ms. Katie S. Torrey, Academic Advisor

Mr. Steve Wisniewski, Research associate

Dr. Ali Zolghadr, Research Assistant Professor, SFI

Department Office

Fall & Spring Semester Hours
Monday - Friday
8:00 AM - 5:00 PM
Closed: 12:00 PM - 1:00 PM

Summer Hours
Monday - Friday
8:00 AM - 4:00 PM

Location: Chem Sci (Bldg 19), Room 203
Phone: 906-487-3132
Webpage: https://www.mtu.edu/chemical/
Email: ChemEng@mtu.edu

Department of Chemical Engineering
Michigan Technological University
1400 Townsend Drive
Houghton, MI. 49931-1295

Career Advising

For help with career guidance and information on graduate school.

Dr. John Sandell
Office: Chem Sci, Room 202C
Phone: 906-487-2557
Email: jfsandel@mtu.edu

Dr. Pradeep Agrawal
Office: Chem Sci, Room 203B
Phone: 906-487-3132
Email: pkagrawa@mtu.edu

Dr. Faith Morrison
Office: Chem Sci, Room 304A
Phone: 906-487-2050
Email: fmorriso@mtu.edu

Dr. Becky Ong
Office: Chem Sci, Room 202I
Phone: 906-487-2662
Email: rgong1@mtu.edu

Chemical Engineering Webpage

ACADEMIC ADVISING

For help with schedule planning and degree audits.

Ms. Katie Torrey, Academic Advisor
Office: Chem Sci, Room 310A
Phone: 906-487-4327
Email: cmadvise@mtu.edu (for fastest response)
Calendar: kt@mtu.edu

Webpage: (Scan QR Code or visit link below)
https://www.mtu.edu/chemical/undergraduate/advising/

Meetings, Virtual Meetings & Walk-In Hours

During busy times of the fall and spring semesters (Orientation week, start of semester, and registration times) the academic advisor and peer mentors host walk-in advising, which is on a first-come, first-served basis. No appointments are needed. Walk-in hours are viewable on Katie's Google calendar (kt@mtu.edu).

During less-busy times, the academic advisor and peer mentors are available for one-on-one meetings. Virtual meetings can be held using Zoom, Google Meet, or a phone conference. For an academic advising meeting, use your Google calendar to view Katie's available time and request a meeting (kt@mtu.edu). Instructions on how to do this are on the advising webpage. Go to the peer mentoring webpage for peer mentoring contact info.

PEER MENTORING

For perspectives from your peers about Michigan Tech experiences, such as how to plan classes for future semesters, courses, co-ops, internships, research, resumes and student organizations

Ms. Lina Espejo Ramirez
Ms. Sarah Foyer
Mr. Matt Harris
Mr. Quinn Miller
Ms. Becca Williams

Webpage: (Scan QR Code or visit link below)
https://www/mtu.edu/chemical/undergraduate/advising/peer-mentors/

Student Responsibilities:

Your advisors and peer mentors are here to help you, but there are certain things you need to do in order to make this work. You are expected to:

- *Take responsibility for your academic planning*
- *Be open to revising your plans as interests, circumstances, and opportunities change.*
- *Understand degree requirements and learning goals.*
- *Follow academic procedures and policies.*
- *Read advising correspondences and communicate with your advisors and peer mentors.*
- *Be prepared when attending advising and peer mentoring meetings.*
- *Seek assistance from instructors, learning centers and other university services.*
- *Contact your advisor promptly when you have questions or concerns. When faced with a difficult question or challenging situation, your academic advisor is always a good place to start.*

MISSION

The Department of Chemical Engineering's academic advising services exist to support students in developing an individualized plan to accomplish their career goals.

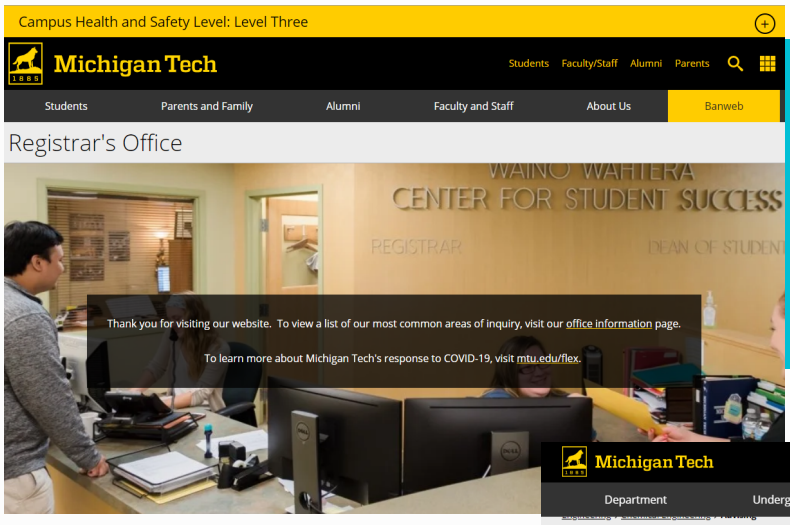
Degree Requirements and Online Degree Audits

The official list of requirement for graduation, including degree requirements and lists of approved general education courses are maintained by the Registrar's Office. Degree audits which are the official list of degree requirements, are posted on the Registrar's Office webpage, under the Students menu, then Degree Services. Approved general education courses are posted under the Students menu, then General Education Requirements.

Lists, suggested schedules and flowcharts in this book and on the Department webpage are not official lists of degree requirements (alas!) and are provided for your convenience.

Online degree audits are used to check your progress toward graduation. You can access your online audit on Banweb and should run it every time you change your schedule. Be sure to run the audit labeled "Latest" because this will use your correct catalog year. New students will be able to run audits 30 days before the semester starts.

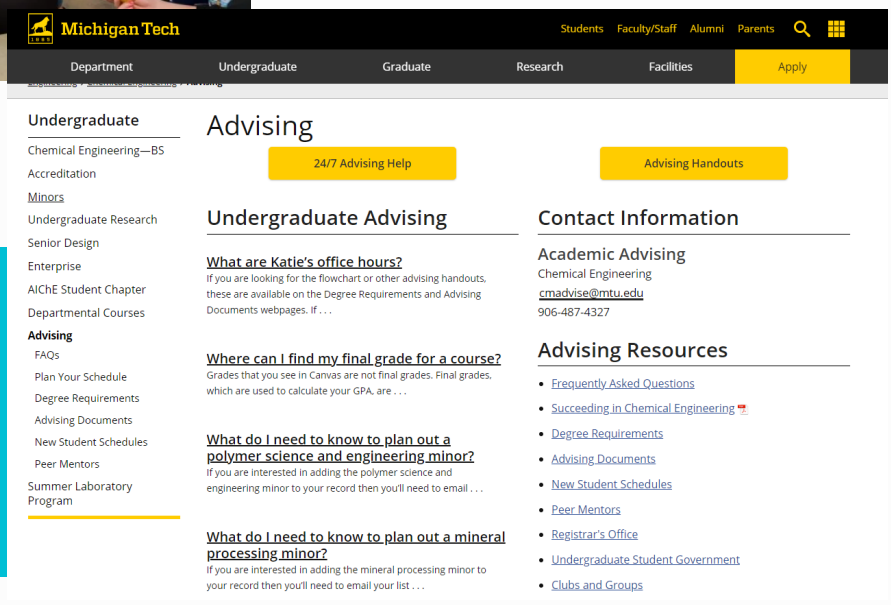
Unfortunately, the online audit is not perfect, which is why it's important for you to know where your classes should be counting. Are you taking a class as a technical elective? If so, does it show up in the technical elective area of your degree audit? If a class isn't counting where you think it should, then contact your academic advisor to investigate.



mtu.edu/registrar

Be Sure to Bookmark These Pages!!!

mtu.edu/chemical/undergraduate/advising



- [ ] *Review your transcript on Banweb. Are all of your AP Credit and transfer credit in place? Is anything missing? AP and transfer credit should be in place by mid-July for students starting fall semester.*
- [ ] *Review your class schedule. You will finalize your schedule during Orientation week.*
- [ ] *Meet your academic advisor. You will have an opportunity to meet your academic advisor during Orientation Week.*
- [ ] *Explore Campus Resources*
  - *Chemical Engineering Advising Webpage*
  - *Registrar's Office*
  - *Undergraduate Catalog*
  - *Dean of Students Office*
  - *Library*
  - *Center for Student Mental Health and Well-being*

Year 1- Adjusting to college life

- [ ] *Attend the first-year advising meeting with your academic advisor. If you are unsure about your major, meet with:*
  - *The academic advisor for other majors you are considering, or*
  - *The general sciences/arts undeclared advisor, or*
  - *The general/undecided engineering advisor, or*
  - *A career advisor in Career Services.*
- [ ] *Review your degree requirements.*
- [ ] *Run your degree audit each time you make changes to your schedule or register for classes.*
- [ ] *Review your major's learning goals and the University's student learning goals.*
- [ ] *Visit Career Services, create a resume and attend career fairs.*
- [ ] *Begin to explore and learn about career building opportunities, such as internships and co-ops, undergraduate research, study abroad, minors, Enterprise program, and honors program.*
- [ ] *Get involved in campus activities and student organizations. Try a mix of professional and social organizations.*

Year 2- Career exploration and personal development

- [ ] *Plan out your classes and review it with your advisor.*
- [ ] *Run your degree audit each time you make changes to your schedule or register for classes.*
- [ ] *Talk to people who can help you explore your interests, strengths, and careers. This includes instructors for all your classes, faculty in your major, students in their junior and senior year in your major and company recruiters, many of whom are Michigan Tech Alumni.*
- [ ] *Visit Career Services (again), update your resume, attend career fairs (again), and expand your job search by using Handshake, LinkedIn and reaching out directly to companies or people you know.*
- [ ] *Get involved in career building opportunities, such as internships and co-ops, undergraduate research, study abroad, minors, Enterprise Program, and honors program.*
- [ ] *Take on a leadership role in the campus activities and student organizations in which you are involved.*

Academic and Career Planning Checklist

Year 3 - Continued career exploration and personal development

- [ ] *Repeat all year 2 activities, plus:*
- [ ] *Consider graduate school. Talk to faculty in your major to learn more. If you will be going to graduate school at Michigan tech, there are two programs that allow you to start earning graduate credit while still an undergraduate:*
  - *Accelerated Master's Program*
  - *Senior Rule*
- [ ] *Challenge yourself to take on a larger leadership role within your favorite student organization.*
- [ ] *Challenge yourself to write down three career goals. They may or may not be related to your major and it's ok if you are unsure because your goals should change with time. You just need to start somewhere! Share with your academic advisor if you'd like help finding ways to work toward these goals.*

Final Year - Transitioning into career or graduate school

- [ ] *Apply for graduation by week 10 of the semester prior to graduation*
- [ ] *Finalize career and/or graduate school plans. Career Services usually holds a "Senior Meeting" to help you with this.*
- [ ] *Complete the First Destination survey on Handshake*
- [ ] *Complete loan exit counseling with Financial Services, if needed.*
- [ ] *Check that your name is on the commencement graduates listing.*
- [ ] *Participate in department and University events to celebrate your graduation. Congratulations!!*

TYPICAL MICHIGAN TECH SEMESTER

Below are some of the most requested dates during the semester. Since these events typically happen at the same time each semester, it is helpful to track the weeks of the semester so you can plan ahead.

BEFORE CLASSES START

PART OF THE SEMESTER	EVENT
Week before classes start - Wednesday	*Tuition bills and enrollment confirmation are due, late fee begins at 5pm*

FIRST HALF OF TERM (WEEKS 1-7)

Week 1 - Friday	*Last day to add full semester course without instructor permission.*
Week 2 - Wednesday	*Last day to add full semester courses or change a section, and Financial Aid full-time status established, and last day to change majors or add minor effective for this semester.*
Week 3 - Friday	*Last day to drop fall semester courses without a grade.*
Week 4 - 6	
Week 7 - Monday	*Mid-term grades available on Banweb after 4pm (first-year only).*

SECOND HALF OF TERM (WEEKS 8-14)

Week 8	
Week 9 - All Week	*First week of the initial registration period for the following semester. Registration time is based on earned credits. During fall, register for spring and summer semesters. During Spring, register for fall semester.*
Week 10 - All Week	*Second week of the initial registration period for the following semester. Registration time is based on earned credits. During fall, register for spring and summer. During Spring register for fall semester.*
Week 11 - 14	
FINALS WEEK	**FINALS WEEK**

Academic calendars for each semester are available on the Registrar's Office webpage, located under the Students menu, select Calendars, then Academic.

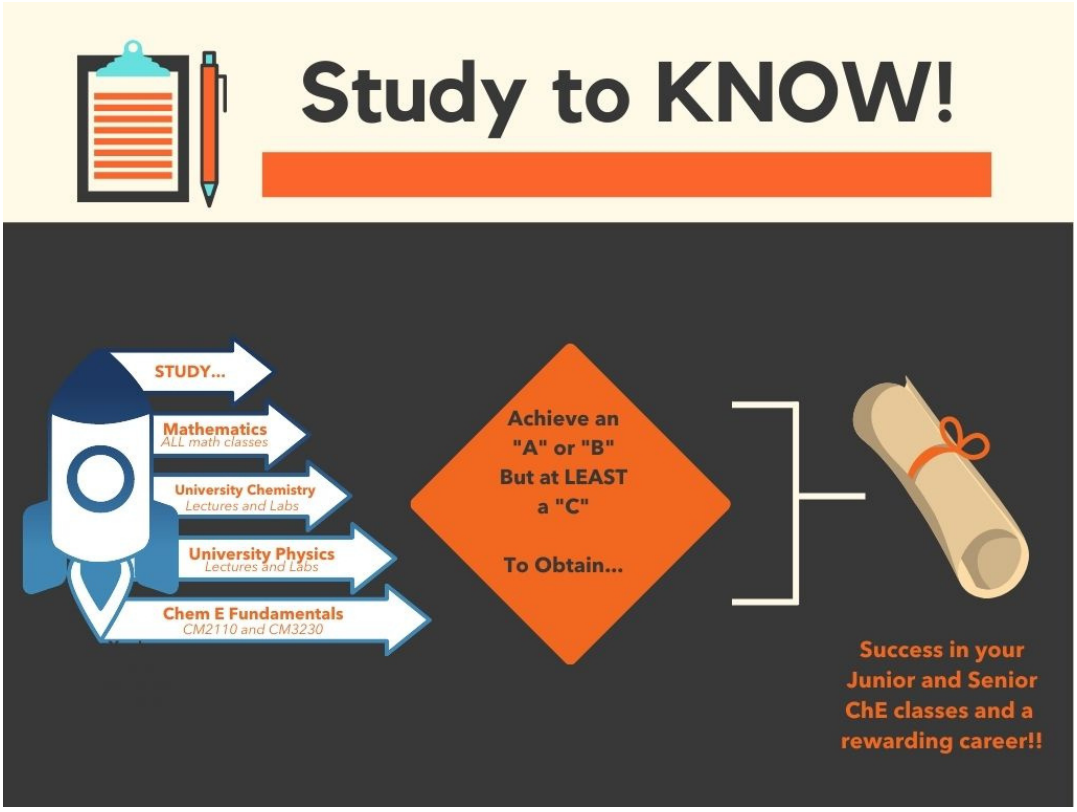
The information for adding/dropping/withdrawing from courses given above is for full-semester courses only. Dates for adding/dropping/withdrawing from half-semester courses can be found on the academic calendar of the Registrar's webpage.

Information for withdrawing from the university (withdrawing from all of your classes) can be found on the Dean of Students webpage. Go to the Academic Policies menu, then Withdrawing from School.

SUCCEEDING IN CHEMICAL ENGINEERING

Michigan Tech's Chemical Engineering program is known to be a tough program. So, what can you do to best prepare yourself to succeed?

Knowledge, problem-solving skills , and critical thinking skills gained in your early classes are vitally important to your continued success in the chemical engineering program and in your career.



If you receive a "CD" or "D" in any of the classes listed above, we strongly recommend that you retake the class BEFORE continuing on in the next class in the curriculum.

It can be really tempting to just "get through" a difficult class and celebrate the victory!
However, without foundational classes it may take a while to realize how all the pieces fit together.
For Chemical Engineering students, that moment of realization is often the junior year, especially in Transport/Unit Operations One, which builds on all the math, physics and chemical engineering fundamentals that you've put such effort into learning. So, when studying foundational subjects, remember that you will see this information again and are working to prepare yourself for the junior and senior classes.

Repeating Classes

If you retake a class, there is an important rule that you must consider:

The second grade <u>ALWAYS</u> replaces the first.

For better or worse. You may only take a class three times and you need special permission for that third attempt. For the details, visit the <u>Registrars Office</u> Webpage and search for "repeating"

Retaking classes you have previously passed may also impact your financial aid. Contact the <u>Student Financial Services</u> Center for an evaluation of your situation.

PLANNING YOUR SCHEDULE

Making sure you are enrolled in the correct classes for your first semester is very important. First-year students and transfer students with less than 30 credits will be enrolled in their first semester of classes by the Registrar's Office. Transfer students with over 30 credits will enroll themselves in their first semester of classes and should contact the academic advisor to review their transfer credit and come up with a list of recommended courses.

The most important step in making sure your first-semester classes are correct is to determine if all of your AP/dual enrollment/transfer credits are in place on your transcript because your schedule can not be finalized without this information.

Answers to many common questions are on the Department's advising webpage

For students starting in the fall semester, this credit is usually in place by mid-July. Check your Michigan Tech transcript on Banweb to see if everything you expect to be there is in place. If not, contact your Admissions representative to determine what you will need to do to receive your credit. It is important to track down all of your classes even if you think a class doesn't matter, because many of these "extra" classes can be used towards general education or technical electives and you 'll want to know this.

FUTURE SEMESTERS

Plan your future semesters based on your interests. Things to consider: co ops, undergraduate research, enterprise program, minors, study abroad, graduate school. The more credit you came in with the more flexibility you'll have and the sooner you can start doing some of these things.
Remember that your plan is a draft and subject to change as you explore your interests.

The general process for planning out future semesters is as follows:

1. *Find your degree requirements on the advising webpage or the Registrar's webpage. This is based on your catalog year, which is generally the year that you start at Michigan Tech. Print out either the flowchart, 4 or 5 year schedule, or degree audit to use as a checklist.*
2. *Cross off requirements that are completed or in progress. Write down elective courses next to the corresponding requirement to keep track of them.*
3. *Run your online degree audit on Baneweb to make sure classes are counting where you expect them to. If they are not, then contact your academic advisor to find out why. Online degree audits for new students will be available 30 days before the semester starts.*
4. *Print out a blank academic plan sheet from the advising webpage or set up a spreadsheet and start writing down the classes you plan to take for each future semester. It usually makes the most sense to start with the major required classes, then minor classes if applicable and then finally any remaining elective classes.*

There is a great deal that goes into step #4, and there's lots of information available on the Department's advising webpage to help you find you way through the process. Once you have a rough plan, you may want to make an appointment with your academic advisor to make sure you 've got all of the details right. Your academic advisor is available to review long term plans during less busy times (usually week 3 through week 7 and week 11 through week 14 of fall and spring semesters.

PREREQUISITES FOR REQUIRED CHEMICAL ENGINEERING CLASSES

The table below shows which courses are required Chemical Engineering courses.
This information is critical for planning out future semesters.

A "(C)" indicates a prerequisite that you can take concurrently, at the same time, with the course.

YEAR	COURSE	TITLE	Gen Ed Preq Courses	Math Preq Courses	Chemistry Preq Courses	Physics Preq Courses	ChE Prereq Courses
2	CM 2110	Material & Energy Balances		MA1160	CH1150 CH1151		
2	CM 3230	Thermodynamics for ChE		MA2160		PH2100	CM2210
3	CM 3110	Transport & Unit Operations I		MA3160 Diff Eqns		PH2100	CM2210
3	CM 3120	Transport & Unit Operations II					CM3110 CM3230
3	CM 3215	Transport Lab	UN1015	Diff Eqns			CM3110(C)
3	CM 3240	Stagewise Separation		MA2160			CM3230
3	CM 3310	Process Control		Math Preq Courses		PH2200	CM2110 CM3230
3	CM 3510	Chemical Reaction Engineering		Diff Eqns	CH2410		CM2110 CM3110 CM3230(C)
4	CM 3980	Sustainable ChemE		Diff Eqns			CM2210
4	CM 4110	Unit Operations Lab		Diff Eqns			CM3120, CM3215 CM3230, CM3510 CM4320(C)
4	CM 4120	Chemical Plant Operations Lab					CM3215, CM3110 CM4110
4	CM 4320	Chemical Process Safety					CM3120 CM3230 CM3510
4	CM 4110	Unit Operations Lab			CH2410		CM3120, CM3215 CM3230, CM3510
4	CM 4860	ChemE Process Analysis & Design II					CM4855
4	CM 4861	ChemE Process Analysis & Design II					CM4860(C)

DESCRIPTION OF ELECTIVE COURSES

There are five types of electives course in our degree program: **Technical Electives** *are set by the department;* **General Education Core Courses, General Education HASS Courses and General Education Co-curricular Courses** *are set by the University and are the same for all Michigan Tech Tech students; and* **Free Electives.**

*Courses marked with a * on the 4 and 5 year schedules or shaded on the flowchart are elective courses. They fit into the categories above as follows:*

CM 1000

This is a technical elective course. If you decide to take this course then we recommend taking it in your first fall semester as a chemical engineering student. See the Technical Elective Courses section for more details.

Co-Curricular

These are a part of the University's general education requirements and are active courses. They are primarily physical education, ROTC physical conditioning, and music performance courses. We recommend taking these as early as you can because they are fun, help you meet other people with similar interests, and can be a challenge to schedule around the senior chemical engineering labs. See the General Education Co-curricular section for more details.

UN 1025 or mod language

This is a part of the University's general education core requirements. All students must take either UN 1025 Global Issues or a 3000-level or higher modern language course. Michigan Tech offers Spanish, French, and German. The language option is recommended if would like to take language courses at Michigan Tech. See the General Education Core Courses section for more details.

Critical & Creative Think course and Social Resp & Eth Reas course

These are a part of the University's general education core requirements. You'll choose a class from a list of approved courses. See the General Education Core Courses section for more details.

HASS courses

These are a part of the University's general education HASS requirements. HASS stands for Humanities, Arts, and Social Sciences, but only approved Humanities, Arts and Social Science classes can be used towards this requirement. You'll choose classes from several different lists of approved courses and at least two of the classes will need to be upper-division. See the General Education HASS Courses section for more details.

If you're looking for a recommendation, we suggest EC 3400 Economic Design Analysis prior or during fall senior year because it helps with ChE design senior year. It counts as a 3000-level Social and Behavioral Science HASS course.

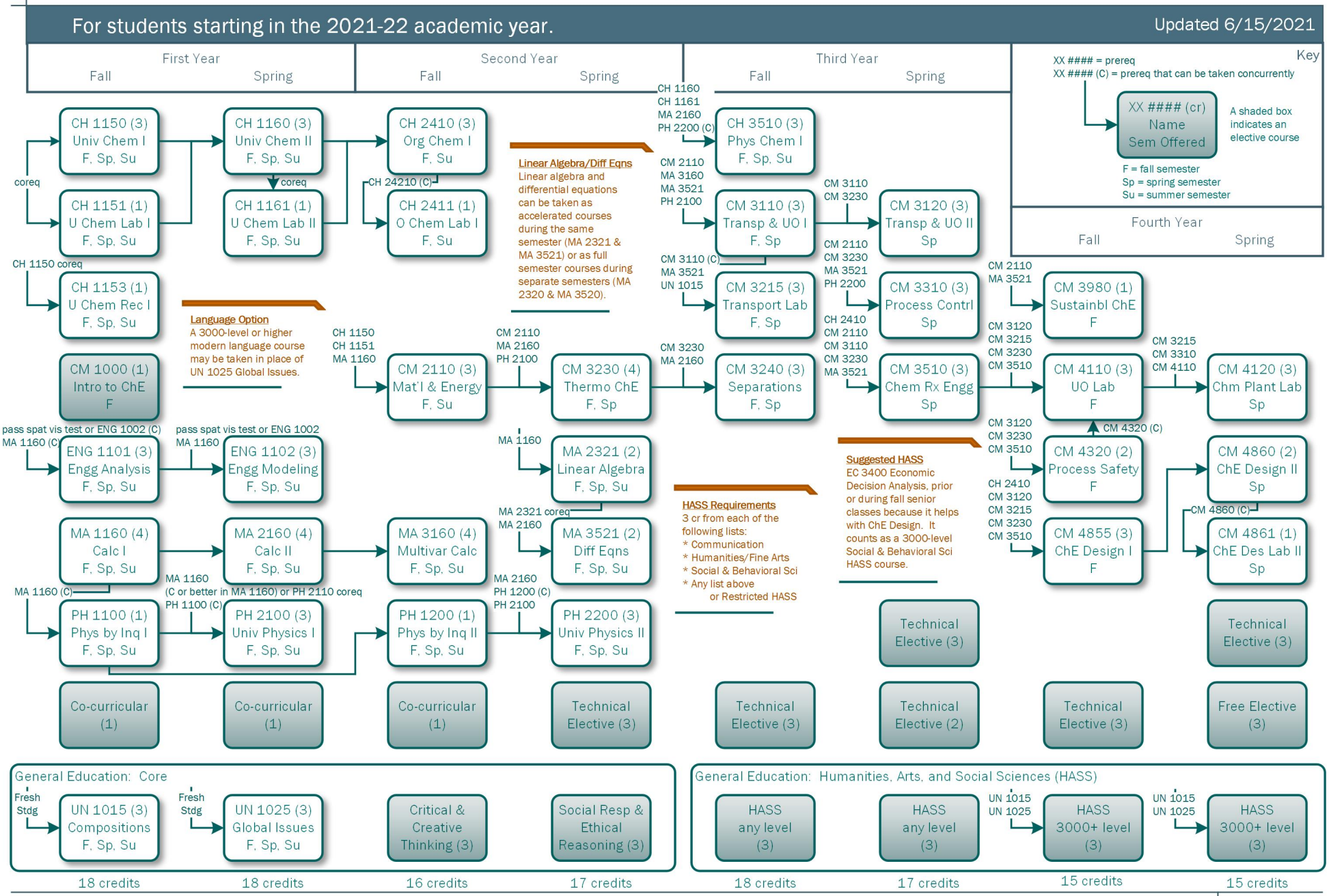
Technical Elective

These are a part of the department's degree requirements. You'll choose courses from an approved list of technical electives. See the Technical Elective Courses section for more details.

Free Electives

These are a part of the department's degree requirements. Free electives are any course 1000-level or higher that are not co-curricular courses. If you have extra credits in another area of your degree audit then you can use those extra credits towards free electives. Students starting out in precalculus can use precalculus for their free elective requirement.

Bachelor of Science in Chemical Engineering



This is not an official list of degree requirements. For an official list of degree requirements go to the Registrar's Office, Degree Services webpage to view the degree audit.
For the most current and complete list of course prerequisites and restrictions go to the Registrar's Office, Registration webpage to view the course descriptions.

Four-year Schedule for Students Starting in Calculus

This is our recommended schedule for students starting in calculus.

Fall semester, First year

Course	Title	Cr
CH 1150	University Chemistry I	3
CH 1151	University Chemistry Lab I	1
CH 1153	University Chemistry Rec I	1
CM 1000	Intro to Chemical Engg*	1
ENG 1101	Engg Analysis and Prob Solv	3
MA 1160	Calculus with Technology I	4
PH 1100	Physics by Inquiry I	1
UN 1015	Compositions	3
	Co-curricular*	1
	Total	*18*

Spring semester, First year

Course	Title	Cr
CH 1160	University Chemistry II	3
CH 1161	University Chemistry Lab II	1
ENG 1102	Engg Modeling and Design	3
MA 2160	Calculus with Technology II	4
PH 2100	University Physics I	3
UN 1025	Global Issues or mod language*	3
	Co-Curricular*	1
	Total	*18*

Fall semester, Second year

Course	Title	Cr
CH 2410	Organic Chemistry I	3
CH 2411	Organic Chemistry Lab I	1
CM 2110	Material and Energy Balances	3
MA 3160	Multivariable Calc with Techn	4
PH 1200	Physics by Inquiry II	1
	Critical & Creative Think course*	3
	Co-Curricular*	1
	Total	*16*

Spring semester, Second year

Course	Title	Cr
CM 3230	Thermodynamics for ChE	4
MA 2321	Elementary Linear Algebra	2
MA 3521	Elem Differential Equations	2
PH 2200	University Physics II	3
	Technical Elective*	3
	Social Resp & Eth Reas course*	3
	Total	*17*

Fall semester, Third year

Course	Title	Cr
CH 3510	Physical Chemistry I	3
CM 3110	Transport & Unit Operations I	3
CM 3215	Transport Laboratory	3
CM 3240	Stagewise Separations	3
	Technical Elective*	3
	HASS Course (any level)*	3
	Total	*18*

Spring semester, Third year

Course	Title	Cr
CM 3120	Transport & Unit Operations II	3
CM 3310	Process Control	3
CM 3510	Chemical Reaction Engg	3
	Technical Elective*	3
	Technical Elective*	2
	HASS Course (any level)*	3
	Total	*17*

Fall semester, Fourth year

Course	Title	Cr
CM 3980	Sustainable Chemical Engg	1
CM 4110	Unit Operations Lab	3
CM 4310	Chemical Process Safety	2
CM 4855	ChE Proc Analysis & Design I	3
	Technical Elective*	3
	HASS Course (3000+ level)*	3
	Total	*15*

Spring semester, Fourth year

Course	Title	Cr
CM 4120	Chemical Plant Operations Lab	3
CM 4860	ChE Proc Analysis & Design II	2
CM 4861	ChE Design Laboratory II	1
	Technical Elective*	3
	HASS Course (3000+ level)*	3
	Free Elective*	3
	Total	*15*

*Elective course. You have some degree of choice with these courses. See the Description of Elective Courses section.

Five-Year Schedule for Students Starting in Precalculus

This is our recommended schedule for students starting in precalculus. Students who would like to graduate in less than five years should see their academic advisor and plan to take summer classes.

Fall semester, First year

Course	Title	Cr
CH 1150	University Chemistry I	3
CH 1151	University Chemistry I Lab	1
CH 1153	University Chemistry I Rec	1
CM 1000	Intro to Chemical Engg*	1
ENG 1001	Engineering Problem Solving	2
MA 1032	Precalculus (or MA 1120)	4
UN 1015	Compositions	3
	Co-Curricular*	1
	Total	*16*

Spring semester, First year

Course	Title	Cr
CH 1160	University Chemistry II	3
CH 1161	University Chemistry II Lab	1
CH 1163	Univ Chem II Rec (recommended)	1
ENG 1100	Engineering Analysis	2
MA 1161	Calculus with Techn I (or MA 1121)	5
UN 1025	Global Issues or mod language*	3
	Co-Curricular*	1
	Total	*16*

Fall semester, Second year

Course	Title	Cr
CH 2410	Organic Chemistry I	3
CH 2411	Organic Chemistry Lab I	1
ENG 1102	Eng Modeling and Design	3
MA 2160	Calculus with Technology II	4
PH 1100	Physics by Inquiry I	1
	Critical & Creative Think course*	3
	Co-Curricular*	1
	Total	*16*

Spring semester, Second year

Course	Title	Cr
MA 3160	Multivariable Calc with Techn	4
PH 2100	University Physics I	3
	Technical Elective*	3
	Social Resp & Eth Reas course*	3
	Total	*13*

Fall semester, Third year

Course	Title	Cr
CH 3510	Physical Chemistry I	3
CM 2110	Material and Energy Balances	3
PH 1200	Physics by Inquiry II	1
PH 2200	University Physics II	3
	HASS Course (any level)*	3
	Total	*12*

Spring semester, Third year

Course	Title	Cr
CM 3230	Thermodynamics for ChE	4
MA 2321	Elementary Linear Algebra	2
MA 3521	Elem Differential Equations	2
	Technical Elective*	3
	HASS Course (any level)*	3
	Total	*14*

Fall semester, Fourth year

Course	Title	Cr
CM 3110	Transport & Unit Operations I	3
CM 3215	Transport Lab	3
CM 3240	Stagewise Separations	3
	Technical Elective*	3
	Total	*13*

Spring semester, Fourth year

Course	Title	Cr
CM 3120	Transport & Unit Operations II	3
CM 3310	Process Control	3
CM 3510	Chemical Reaction Engg	3
	Technical Elective*	2
	HASS Course (3000+ level)*	3
	Total	*14*

Fall semester, Fifth year

Course	Title	Cr
CM 3980	Sustainable Chemical Engg	1
CM 4110	Unit Operations Lab	3
CM 4310	Chemical Process Safety	2
CM 4855	ChE Proc Anal & Design I	3
	Technical Elective*	3
	Total	*12*

Spring semester, Fifth year

Course	Title	Cr
CM 4120	Chemical Plant Operations Lab	3
CM 4860	ChE Proc Anal & Design II	2
CM 4861	ChE Design Lab II	1
	Technical Elective*	3
	HASS Course (3000+ level)*	3
	Total	*12*

*Elective course. You have some degree of choice with these courses. See the Description of Elective Courses section.

Technical Elective Courses

Students must take a minimum of 18 credits of technical electives from the list below.

- Plan ahead. Some electives are offered once every other year and most have prerequisites.
- Additional higher-level engineering, mathematics, science or applied business course may be approved on a case-by-case basis.
- Courses on the general education HASS lists are not approved for technical electives.

Technical Elective List

Minimum of 18 credits required

BE 2110	Statistical Methods for Biomed Engg	3
BE 2400	Cellular and Molecular Biology	3
BE 4300	Polymeric Biomaterials	3
BL 1100	Gen Bio I: Intro to Organismal Biology	3
or BL 1200	Gen Bio II: Intro to Cellular Biology	3
or BL 1400	Principles of Biology	3
BL 1110	Gen Bio I Lab: Intro to Organismal Bio	1
or BL 1210	Gen Bio II Lab: Intro to Cellular Bio	1
or BL 1410	Principles of Biology Lab	1
BL 2010	Anatomy & Physiology I	3
BL 2011	Anatomy & Physiology I Lab	1
BL 2020	Anatomy & Physiology II	3
BL 2021	Anatomy & Physiology II Lab	1
BL 2200	Genetics	3
BL 2210	Genetics Laboratory	1
BL 3020	Biochemistry I	3
BL 3210	General Microbiology	4
BL 3310	Environmental Microbiology	3
BL 3640	General Immunology	3
BL 3820	Biochem Lab Techniques I	2
BL 4020	Biochemistry II	3
BL 4030	Molecular Biology	3
BL 4380	Cardiopulmonary Physiology	3
BL 4840	Molecular Biology Techniques	3
CEE 3502	Envir Monitoring and Meas Analysis	3
CEE 3503	Environmental Engineering	3
CEE 4501	Envir Eng Chemical Processes	4
CEE 4502	Wastewater Treatment Princ & Des	3
CEE 4503	Drinking Water Treatment Princ & Des	3
CEE 4504	Air Quality Engineering & Science	3
CEE 4505	Surface Water Quality Engineering	3
CH 2212	Quantitative Analysis	5
CH 2420	Organic Chemistry II	3
CH 2421	Organic Chemistry Lab II	2
CH 3511	Physical Chemistry Lab I	2
CH 3520	Physical Chemistry II – Mol Structure	3
CH 3521	Physical Chemistry Lab II	2
CH 4110	Pharm Chem: Drug Action	3
CH 4120	Pharm Chem: Drug Design	3
CH 4140	Intro to Pharmaceutical Analysis	3
CH 4212	Instrumental Analysis	5
CH 4222	Bioanalytical Chemistry	5
CH 4310	Inorganic Chemistry I	3
CH 4311	Inorganic Chemistry Lab	2
CH 4320	Inorganic Chemistry II	3
CH 4412	Spectroscopy of Organic Chem.	3
CH 4430	Intermediate Organic Chemistry	3
CH 4710	Biomolecular Chemistry I	3
CH 4720	Biomolecular Chemistry II	3
CM 1000	Intro to Chemical Engineering	1
CM 2200	Intro Minerals and Materials	3

Technical Elective List continued

CM 3025	Bioprocessing Lab	1
CM 3450	Computer-Aided Problem Solv in ChE	3
CM 3825	Sampling, Stats, and Instrumentation	2
CM 3830	Mineral Processing and Extraction Lab	1
CM/ENT 3979	Alternative Energy Tech & Processes	1
CM 3XXE	CM Elective (transfer credit only)	var
CM 4505	Particle Technology	3
CM 4510	Interfacial Engineering	3
CM/CH 4610	Introduction to Polymer Science	3
CM/CH 4620	Polymer Chemistry	3
CM 4650	Polymer Rheology	3
CM 4710	Biochemical Processes	3
CM/MSE 4740	Hydrometallurgy/Pyrometallurgy	4
CM 4780	Biomanufacturing and Biosafety	3
CM 4XXE	CM Elective (transfer credit only)	var
CM 5100	Applied Mathematics for CM	3
CM 5200	Advanced CM Thermodynamics	3
CM 5300	Advanced Transport Phenomena	3
CM 5400	Advanced Reactive Systems Analysis	3
CS 1111	Intro to Programming in C/C++	3
CS 1121	Intro to Programming I	3
CS 1131	Accelerated Intro to Programming	5
EE 2174	Digital Logic and Lab	4
EE 2230	Printed Circuit Seminar Series	3
EE 2231	Printed Circuit Fabrication	1
EE 3010	Circuits and Instrumentation for CPS	3
EE 3120	Electric Energy Systems	3
EE 3140	Electromagnetics	3
EET 3373	Intro to Programmable Controllers	3
ENG 2120	Statics-Strength of Materials	4
ENG/OSM 4300	Project Management	3
ENG 4510	Intro to Sustainability and Resilience	3
ENG 5520	Systems Analysis for Sustain and Res	3
ENT 2950	Enterprise Project Work I	1
ENT 2960	Enterprise Project Work II	1
ENT 3950	Enterprise Project Work III	1
ENT 3953	Ignite: Ideate, Innovate, Create!	1
ENT 3954	Enterprise Market Principles	1
ENT 3958	Ethics in Eng Des & Impl	1
ENT 3959	Fundamentals of Six Sigma I	1
ENT 3960	Enterprise Project Work IV	1
ENT 3961	Building & Leading Teams	1
ENT 3963	Deliver: Explore, Develop, Execute!	1
ENT 3964	Fundamentals of Project Management	1
ENT 3966	Design for Manufacturing	1
ENT 3967	Design for Six Sigma	1
ENT 3971	Seven Habits of Highly Effective Peop	1
ENT 3980	Pre-Capstone Enterprise Project Work	1
ENT 3982	Contin Improv Using Lean Principles	1
ENT 3983	Culture of Continuous Improvement	1
ENT 4950	Enterprise Project Work V Capstone	2
ENT 4960	Enterprise Project Work VI Capstone	2

Technical Elective List continued

ENT 4961	Enterprise Project Work VII	1
FW 1035	Wood Anatomy and Properties	4
FW 3098	Adding Value to Forest Biomaterials	2
GE 2020	Intro to Mining Eng and Mining Meth	2
GE 2300	Mineral Science	3
GE 2310	Introduction to Petrology	3
GE 2640	Atmos Observations and Meteorology	3
GE 3400	Drilling and Blasting	3
GE 4360	Bulk Materials Dynamics & Engg	4
GE 4610	Formation Eval and Petroleum Engr	3
MA 2600	Scientific Computing	3
MA 3210	Introduction to Combinatorics	3
MA 3310	Introduction to Abstract Algebra	3
MA 3450	Introduction to Real Analysis	3
MA 3710	Engineering Statistics	3
or MA 2710	Introduction to Statistical Analysis	3
or MA 2720	Statistical Methods	4
or MA 3715	Biostatistics	3
MA 3740	Statistical Programming & Analysis	3
MA 3924	College Geometry with Technology	3
MA 4330	Linear Algebra	3
MA 4515	Intro to Partial Differential Eqns	3
MA 4525	Applied Vector and Tensor Math	3
MA 4620	Numerical Methods for PDEs	3
MA 4760	Mathematical Statistics I	3
MA 4770	Mathematical Statistics II	3
MA 4908	Theory of Numbers with Technology	3
MEEM 2110	Statics	3
MEEM 2150	Mechanics of Materials	3
MEEM 2700	Dynamics	3
MEEM 4170	Failure of Materials in Mechanics	3
MEEM 4200	Principles of Energy Conversion	3
MEEM 4220	Internal Combustion Engines I	3
MEEM 4240	Combustion and Air Pollution	3
MEEM 4260	Fuel Cell Technology	3
MEEM 4405	Intro to the Finite Element Method	3
MEEM 4635	Design with Plastics	3

Technical Elective List continued

MEEM 4650	Quality Engineering	3
MEEM 5170	Finite Elem and Var Meth in Engg	3
MEEM 5240	Comp Fluid Dynamics for Engg	3
MIS 2100	Introduction to Business Programming	3
MSE 2100	Intro to Materials Sci and Engg	3
MSE 2110	Intro to Materials Sci and Engg II	3
MSE 3100	Materials Processing I	4
MSE 3121	Materials Characterization I	3
MSE 3122	Materials Characterization I Lab	1
MSE 4110	Introduction to Polymer Engg	3
MSE 4310	Principles of Metal Casting	3
MSE 4320	Corrosion and Environmental Effects	3
MSE 4325	Fundamentals of Corrosion	1
MSE 4430	Composite Materials	3
OSM 4650	Six Sigma Fundamentals	3
PH 2230	Electronics for Scientists	4
PH 2300	Univ Physics III – Fluids and Thermo	2
PH 2400	Univ Physics IV – Waves and Mod Phy	3
UN 2600	Fund of Nanoscale Sci and Eng	2
UN 3002	Undergrad Cooperative Ed I	1-2
UN 3003	Undergrad Cooperative Ed II	1-2
UN 3004	Undergrad Cooperative Ed III	1-2
UN 3005	Undergrad Cooperative Ed IV	1-2

Undergraduate Research

Optional – Undergraduate Research Courses (repeatable)
No more than 6 credits from the following:

CM 4000	Chemical Engineering Research	1-3
CM 4020	UG Research in Mineral Proc Engg	1-3
CM 4040	UG Research in Biological Engg	1-3
CM 4060	UG Research in Polymer Engg	1-3
CM 4080	UG Research in Biofuels Engg	1-3

Research Credits from other departments allowed by approval, subject to the same limit of no more than 6 credits of research total, with no more than 3 credits earned per semester.

Need help choosing electives? What Interests you?

Don't know: Try…CH 2420, CM 3450, CS 1121, EE 3010, MA 3710, MEEM 2110, MSE 2100, UN 3002, undergraduate research, or any of the CM electives. These are broadly applicable electives that are useful for all ChE's to take.

Polymers & Plastics: Try…CH 2420, CH 4620, CM 4060 (research), CM 4610, CM 4620, or CM 4650. Also, check out the Minor in Polymer Science and Engineering.

Mineral processing: Try… CM 2200, CM 3830, CM 3820, CM 4505, CM 4740, or GE 2300. Also, check out the Minor in Mineral Processing.

Biochemical Engineering: Try…BL 1200 or BL 1400 and labs, BL 3020, CM 3025, CM 4040 (research), CM 4080 (research), or CM 4710. Also, check out the Minor in Bioprocess Engineering

Energy: Try…CM 3979, CM 4080 (research), EE 3010, GE 4610, MEEM 4620, or the AEE Enterprise. Also, check out the Minor in Alternative Energy Technology or Minor in Bioprocess Engineering or Minor in Sustainable Biomaterials.

Pharmaceuticals: Try…CH 2420, CH 4710, CH 4110, CH 4120, or CH 4140. Also, check out the Minor in Pharmaceutical Chemistry or Minor in Bioprocess Engineering.

Going to Graduate School: Try…MA 3710, MA 4515, any undergraduate research, and electives in a topic area that interests you. Also, check out the Minor in Mathematics or the Minor in Statistics.

General Education Core Courses

Students must take a minimum of 12 credits of core courses meeting these requirements:

- Three credits from UN 1015 Compositions
- Three credits from UN 1025 Global Issues or 3000-level or higher modern language course
- Three credits from the Critical and Creative Thinking list
- Three credits from the Social Responsibility and Ethical Reasoning list

Courses on more than one list can only satisfy one requirement.
The official and most current list of approved core courses is on the Registrar's Office, General Education webpage.

Critical and Creative Thinking List

Minimum of 3 credits required

ART 1000	Art Appreciation	3
HU 2130	Introduction to Rhetoric	3
HU 2324	Introduction to Film	3
HU 2501	American Experience in Literature	3
HU 2503	Introduction to Literature	3
HU 2538	British Experience in Literature	3
HU 2700	Introduction to Philosophy	3
HU 2820	Communication and Culture	3
HU 2910	Language and Mind	3
MUS 1000	Music Appreciation	3
SND 1000	Sound in Art and Science	3
SS 2300	Environment and Society	3
THEA 1000	Theatre Appreciation	3
TA2XX4	Critical & Creative Thinking core (transfer agreement credit only)	3

Social Resp and Ethical Reasoning List

Minimum 3 credits required

EC 2001	Principles of Economics	3
PSY 2000	Introduction to Psychology	3
SS 2100	Introduction to Cultural Anthropology	3
SS 2200	Introduction to Archaeology	3
SS 2400	Introduction to Human Geography	3
SS 2500	United States History to 1877	3
SS 2501	US History Since 1877	3
SS 2502	European History to 1650	3
SS 2503	European History Since 1650	3
SS 2504	World History to 1500	3
SS 2505	World History Since 1500	3
SS 2600	American Government and Politics	3
SS 2610	Introduction to Law and Society	3
SS 2700	Introduction to Sociology	3
TA 2XX8	Social Resp & Ethical Reasoning Core (transfer agreement credit only)	var

General Education HASS Courses

Students must take a minimum of 12 credits in HASS courses meeting these requirements:

- Three credits from the Communication and Composition list
- Three credits from the Humanities and Fine Arts list
- Three credits from the Social and Behavioral Science list
- Three credits from any list above or the Restricted HASS list
- Of the credits taken above, at least 6 credits must be taken at the 3000-level or higher.

All 3000-level or higher non-language HASS courses have prerequisites of UN1015 and (UN1025 or modern language – 3000 level or higher).
The official and most current list of approved HASS courses is on the Registrar's Office, General Education webpage.

Communication and Composition List

Minimum of 3 credits required

HU 2810	Research & Writing in Communication	3
HU 2830	Public Speaking & Multimedia	3
HU 3015	Advanced Composition	3
HU 3120	Technical and Professional Comm	3
HU 3130	Rhetoric of Science and Technology	3
HU 3151	The Rhetoric of Everyday Texts	3
HU 3606	Editing	3
HU 3621	Introduction to Journalism	3
HU 3693	Science Writing	3
HU 3694	Grant Writing	3
HU 3832	Advanced Digital Presentation	3
HU 4625	Risk Communication	3
TA 1XX5	Communication Elective (transfer agreement credit only)	var
TA 3XX5	Communication Elective (transfer agreement credit only)	var

Humanities and Fine Arts List

Minimum of 3 credits required

ART 1000	Art Appreciation	3
ART 1100	Drawing I	3
ART 1110	Art + Design Studio	3
ART 2110	Outdoor Sculpture	3
ART 2130	Creative Drawing Processes	3
ART 2140	Ceramics I	3
ART 2145	Beginning Wheel Throwing	3
ART 2160	Creative Practices	3
ART 2190	Art & Nature	3
ART 2201	Art History I	3
ART 2202	Art History II	3
ART 3140	Creative Ceramics	3
ART 3410	Contemporary Sculpture Studio	3
ART 3420	Traditional Sculpture Studio	3
HU 2130	Introduction to Rhetoric	3
HU 2241	Level I-A Less Commonly Taught Lang (transfer or study abroad credit only)	var

Humanities and Fine Arts List continued

HU 2242	Level I-B Less Commonly Taught Lang (transfer or study abroad credit only)	var
HU 2271	Level I-A French Language & Culture	3
HU 2272	Level I-B French Language & Culture	3
HU 2273	Transitional Level I French Lang…	3
HU 2281	Level I-A German Language & Culture	3
HU 2282	Level I-B German Language & Culture	3
HU 2291	Level I-A Spanish Language & Culture	3
HU 2292	Level I-B Spanish Language & Culture	3
HU 2293	Transitional Level I Spanish Language	3
HU 2324	Introduction to Film	3
HU 2500	Ways of Reading	3
HU 2501	American Experience in Literature	3
HU 2503	Introduction to Literature	3
HU 2510	Intro to Creative Writing	3
HU 2538	British Experience in Literature	3
HU 2548	Young Adult Literature	3
HU 2633	Fundamentals of Digital Imaging	3
HU 2700	Introduction to Philosophy	3
HU 2702	Ethical Theory and Moral Problems	3
HU 2810	Research & Writing in Communication	3
HU 2820	Communication and Culture	3
HU 2830	Public Speaking & Multimedia	3
HU 2840	Interpersonal Communication	3
HU 2910	Language and Mind	3
HU 2920	Language and Society	3
HU 3015	Advanced Composition	3
HU 3120	Technical and Professional Comm	3
HU 3130	Rhetoric of Science and Technology	3
HU 3150	Topics in Literacy Studies	3
HU 3151	The Rhetoric of Everyday Texts	3
HU 3241	Level II-A Less Commonly Taught Lang (transfer or study abroad credit only)	var
HU 3242	Level II-B Less Commonly Taught Lang (transfer or study abroad credit only)	var
HU 3261	Communicating Across Cultures	3
HU 3262	Topics in Francophone Cultures	3
HU 3263	Topics in German-Speaking Culture	3
HU 3264	Topics in Spanish-Speaking Culture	3
HU 3271	Level II-A French Language & Culture	3
HU 3272	Level II-B French Language & Culture	3
HU 3274	Level III French Literature & Culture	3
HU 3275	French for Special Purposes	3
HU 3280	Level I-C German Language & Culture	3
HU 3281	Level II-A German Language & Culture	3
HU 3282	Level II-B German Language & Culture	3
HU 3283	Level II German for Special Purposes	3
HU 3284	Level III German Literature & Culture	3
HU 3285	Level III German Film & Media	3
HU 3291	Level II-A Spanish Language & Culture	3
HU 3292	Level II-B Spanish Language & Culture	3
HU 3293	Level II-C Spanish Comp & Conv	3
HU 3294	Hispanic Literatures and Culture	3
HU 3295	Level III Advanced Spanish for Liter…	3
HU 3296	Intro to Hispanic Literatures & Cultures	3
HU 3326	Topics in World Cinema	3
HU 3327	Film Style and Genre	3
HU 3400	Topics in Diversity Studies	3
HU 3401	Gender and Culture	3
HU 3410	Introduction to Diversity Studies	3
HU 3502	Mythology	3

Humanities and Fine Arts List continued

HU 3503	Special Topics in Literature & Culture	3
HU 3504	Studies in the Novel	3
HU 3505	Literary Forms, Genres, and Modes	3
HU 3506	Major Authors	3
HU 3507	Cultural Traditions in Literature	3
HU 3508	Literature and the Environment	3
HU 3513	Shakespeare	3
HU 3514	Workshop Creative Nonfiction	3
HU 3515	Workshop in Poetry	3
HU 3516	Workshop in Fiction	3
HU 3517	Literary Theory and Criticism	3
HU 3518	Workshop in Sci Fi Writing	3
HU 3519	Workshop in Nature Writing	3
HU 3545	Literature across Borders	3
HU 3554	Science Fiction	3
HU 3557	Literature and Science	3
HU 3606	Editing	3
HU 3621	Introduction to Journalism	3
HU 3693	Science Writing	3
HU 3694	Grant Writing	3
HU 3700	Philosophy of Science	3
HU 3701	Philosophy of Technology	3
HU 3702	Philosophy of Religion	3
HU 3703	Environmental Philosophy	3
HU 3710	Engineering Ethics	3
HU 3711	Biomedical Ethics	3
HU 3800	Media and Society	3
HU 3802	Media and Globalization	3
HU 3810	Technology and Culture	3
HU 3825	Environmental Communication	3
HU 3830	Creativity, Culture, & Change	3
HU 3832	Advanced Digital Presentation	3
HU 3840	Organizational Communication	3
HU 3850	Cultural Studies	3
HU 3852	Surveillance, Media, and Film	3
HU 3860	Popular Culture	3
HU 3871	New Media Theory	3
HU 3872	Color, Visuality, and Culture	3
HU 3882	Media Industries	3
HU 3890	Documentary	3
HU 3910	Language and Globalization	3
HU 3940	Language and Identity	3
HU 4271	Modern Language Seminar I-French	3
HU 4272	Modern Language Seminar II-French	3
HU 4273	Modern Language Seminar III-French	3
HU 4281	Modern Language Seminar I-German	3
HU 4282	Modern Language Seminar II-German	3
HU 4283	Modern Language Seminar III-German	3
HU 4291	Modern Language Seminar I-Spanish	3
HU 4292	Modern Language Seminar II-Spanish	3
HU 4293	Modern Language Seminar III-Spanish	3
HU 4625	Risk Communication	3
HU 4701	Political Philosophy	3
HU 4725	Existentialism and Phenomenology	3
HU 4890	Topics in Communication	3
MUS 1000	Music Appreciation	3
MUS 2000	History of Classical Music	3
MUS 2001	Film Music	3
MUS 2020	History of Rock	3
MUS 2030	History of Jazz	3
MUS 2040	Music & Tradition	3

Humanities and Fine Arts List continued

MUS 3020	Beatles & Beach Boys	3
MUS 3200	Contemporary Music	3
SND 1000	Sound in Art & Science	3
THEA 1000	Theatre Appreciation	3
THEA 1400	Beginning Acting	3
THEA 3201	Theatre History I	3
THEA 3202	Theatre History II	3
THEA 3230	Costume History	3
THEA 3330	Costume Design	3
THEA 3400	Advanced Acting	3
THEA 3490	Puppetry	3
THEA 4402	Musical Theatre Performance	
IS 2001	International Studies in situ-HU/FA (study abroad credit only)	var
IS 3001	International Studies in situ-HU/FA (study abroad credit only)	var

Social and Behavioral Science List

Minimum of 3 credits required

EC 2001	Principles of Economics	3
EC 3002	Microeconomic Theory	3
EC 3003	Macroeconomic Theory	3
EC 3100	International Economics	3
EC 3300	Industrial Organization	3
EC 3400	Economic Decision Analysis	3
EC 4050	Game Theory/Strategic Behavior	3
EC 4400	Banking and Financial Institutions	3
EC 4500	Public Sector Economics	3
EC 4620	Energy Economics	3
EC 4630	Mineral Industry Economics	3
EC 4640	Natural Resource Economics	3
EC 4650	Environmental Economics	3
EC 4710	Labor/Human Resource Economics	3
FW 3313	Sustainable Science	3
FW 3760	Human Dimensions of Natural Res…	3
GE 4630	Mineral Industry Economics	3
IS 2002	International Studies in situ-EC/PSY/SS (study abroad credit only)	var
IS 3002	International Studies in situ-EC/PSY/SS (study abroad credit only)	var
MGT 3650	Intellectual Property Management	3
PSY 2000	Introduction to Psychology	3
PSY 2080	Special Topics in Psychology	3
PSY 2110	Educational Psychology	3
PSY 2300	Developmental Psychology	3
PSY 2400	Health Psychology	3
PSY 2600	Death and Dying	3
PSY 2900	Introduction to Restorative Practices	3
PSY 3010	Theories of Personality	3
PSY 3030	Abnormal Psychology	3
PSY 3070	Cross-Cultural Psychology	3
PSY 3340	Psychology of Race	3
PSY 3720	Social Psychology	3
PSY 4080	Topics in Psychology	3
PSY 4340	Culture & Cognition	3
SS 2100	Introduction to Cultural Anthropology	3
SS 2200	Introduction to Archaeology	3
SS 2210	Evolution of Cities	3
SS 2300	Environment and Society	3
SS 2400	Introduction to Human Geography	3

Social and Behavioral Sci List continued

SS 2500	United States History to 1877	3
SS 2501	United States History since 1877	3
SS 2502	European History to 1650	3
SS 2503	European History since 1650	3
SS 2504	World History to 1500	3
SS 2505	World History since 1500	3
SS 2510	Gender and the Past	3
SS 2600	American Government & Politics	3
SS 2610	Introduction to Law and Society	3
SS 2635	Comparative Politics	3
SS 2700	Introduction to Sociology	3
SS 3105	Native Amer and Indig Communities	3
SS 3110	Food Systems and Sustainability	3
SS 3200	Archaeology of the Modern World	3
SS 3210	Field Archaeology	var
SS 3225	Capitalism and the Modern World	3
SS 3230	Archaeology of Industry	3
SS 3240	Reading the Landscape	3
SS 3250	Biological Anthropology	3
SS 3260	Latin American Cultural History	3
SS 3270	Archaeology of the African Diaspora	3
SS 3280	Anthropology of Energy	3
SS 3313	Sustainability Science	3
SS 3315	Population and Environment	3
SS 3400	Contemporary Europe	3
SS 3420	Imaginary Worlds: Geog of Sci Fi &…	3
SS 3505	Military History of the U.S.	3
SS 3510	History of American Technology	3
SS 3511	History of Science in America	3
SS 3513	History of Making Things: Craft…	3
SS 3515	History of American Architecture	3
SS 3520	U.S. Environmental History	3
SS 3530	The Automobile in America	3
SS 3540	History of Michigan	3
SS 3541	The Copper Country	3
SS 3552	Renaissance & Reformation	3
SS 3553	Empires in World History	3
SS 3560	History of England I	3
SS 3561	History of England II	3
SS 3570	History of Canada	3
SS 3580	Technology and Western Civilization	3
SS 3581	History of Science	3
SS 3600	American Foreign Policy	3
SS 3612	International Relations	3
SS 3621	Intro to Public Policy & Public Man…	3
SS 3630	Environmental Policy & Politics	3
SS 3636	Perceptions of Modern State and Gov	3
SS 3640	Selected Topics in Cyber-Law	3
SS 3650	Intellectual Property Management	3
SS 3660	Constitutional Law	3
SS 3661	Civil Rights & Civil Liberties	3
SS 3665	Crime, Incarceration, and Policy	3
SS 3760	Human Dimensions of Natural Resour	3
SS 3800	Energy Policy and Technology	3
SS 3801	Science, Technology, & Society	3
SS 3805	Environmental Justice	3
SS 3811	Energy Security and Justice	3
SS 3815	Energy and Society	3
SS 3910	Histories and Cultures	3
SS 3920	Topics in Anthropology/Archaeology	3
SS 3950	Topics in American History	3

Social and Behavioral Sci List continued

SS 3951	Topics in European History	3
SS 3952	Topics in World History	3
SS 3960	Cultural Immersion	var
SS 3961	Prep for Cross-Cultural Immersion Exp	3
SS 3990	Topics in the Social Science	3
SS 4001	History of Social Thought	3
SS 4120	Anthropology of International Develop	3
SS 4200	Environmental Anthropology	3
SS 4220	Archaeological Thought in Society	3
SS 4390	Seminar in Sustainability	3
SS 4530	Deindustrialization and the Urban Env	3
SS 4700	Communities and Research	3
SS 4921	Washington Experience Seminar	var

Restricted HASS List

Optional - No more than 3 credits maximum

BL 2001	Valuing the Great Lakes	3
BL 3970	Current Health Issues	3
ED 3510	Communicating Science I	3
ENT 2961	Teaming in the Enterprise	2
ENT 2962	Communication Contexts	1
FIN 2400	Financial Literacy	3
FW 3113	Alberta: Place, People, History	3
FW 3116	Ethnobotany	3
FW 3765	Maple Syrup Management and Culture	1
FW 4111	Indigenous Natural Resources Manag	3
GE 2100	Environmental Geology	3
HON 3150	Pavlis Seminar II	1
HON 3410	Culture, Language, and Project Dev…	3
HON 4150	Pavlis Seminar III	1
KIP 2600	Introduction to Public Health	2
MA 4945	History of Mathematics	3

Approved Transfer Courses Communication and Composition List

The following courses are available ONLY by transfer.

HU 1XX5	Approved Transfer HASS Comm/Comp	3
HU 2XX5	Approved Transfer HASS Comm/Comp	3
HU 3XX5	Approved Transfer HASS Comm/Comp	3
HU 4XX5	Approved Transfer HASS Comm/Comp	3

Approved Transfer Courses Humanities and Fine Arts List

The following courses are available ONLY by transfer.

ART 1XXX	Approved Transfer HASS Elective	3
ART 2XXX	Approved Transfer HASS Elective	3
ART 3XXX	Approved Transfer HASS Elective	3
ART 4XXX	Approved Transfer HASS Elective	3
HU 1XXX	Approved Transfer HASS Elective	3
HU 2XXX	Approved Transfer HASS Elective	3
HU 3XXX	Approved Transfer HASS Elective	3
HU 4XXX	Approved Transfer HASS Elective	3
HU 1XX5	Approved Transfer HASS Comm/Comp	3
HU 2XX5	Approved Transfer HASS Comm/Comp	3
HU 3XX5	Approved Transfer HASS Comm/Comp	3
HU 4XX5	Approved Transfer HASS Comm/Comp	3
MUS 1XXX	Approved Transfer HAAS Elective	3
MUS 2XXX	Approved Transfer HAAS Elective	3
MUS 3XXX	Approved Transfer HAAS Elective	3
MUS 4XXX	Approved Transfer HAAS Elective	3
SND 1XXX	Approved Transfer HAAS Elective	3
SND 2XXX	Approved Transfer HAAS Elective	3
SND 3XXX	Approved Transfer HAAS Elective	3
SND 4XXX	Approved Transfer HAAS Elective	3
THEA 1XXX	Approved Transfer HAAS Elective	3
THEA 2XXX	Approved Transfer HAAS Elective	3
THEA 3XXX	Approved Transfer HAAS Elective	3
THEA 4XXX	Approved Transfer HAAS Elective	3

Approved Transfer Courses Social and Behavioral Sciences List

The following courses are available ONLY by transfer.

EC 1XXX	Approved Transfer HASS Elective	var
EC 2XXX	Approved Transfer HASS Elective	var
EC 3XXX	Approved Transfer HASS Elective	var
EC 4XXX	Approved Transfer HASS Elective	var
PSY 1XXX	Approved Transfer HASS Elective	var
PSY 2XXX	Approved Transfer HASS Elective	var
PSY 3XXX	Approved Transfer HASS Elective	var
PSY 4XXX	Approved Transfer HASS Elective	var
SS 1XXX	Approved Transfer HASS Elective	var
SS 2XXX	Approved Transfer HASS Elective	var
SS 3XXX	Approved Transfer HASS Elective	var
SS 4XXX	Approved Transfer HASS Elective	var

General Education Co-Curricular Courses

Students must take 3 units of co-curricular courses.
Co-curricular units:

- Count toward full-time status and satisfactory progress for financial aid purposes
- Appear on the transcript with a Pass/Fail grade
- Are not included in the GPA calculation
- Are not included in the total credits required for a degree
- Do not count towards the 12 credits of gradable courses required for recognition on the dean's list or other university honors.

Repeatability for general education:

- 0.5 unit co-curricular courses may be repeated once for the general education co-curricular requirement.
- 1 unit co-curricular courses may not be repeated for the general education co-curricular requirement.

The official and most current list of approved co-curricular courses is on the Registrar's Office, General Education webpage.

Co-curricular List

AF 0120	Physical Conditioning	0.5
AF 0130	Air Force Elite Forces Workout	1
AF 0230	Precision Drill Team	0.5
AF 0340	Field Training	1
AR 0340	Internship in Adv Military Leadership	3
AR 2068	Fall Military Physical Conditioning	1
AR 2069	Spring Military Physical Conditioning	1
AR 3068	Physical Training Leadership I	1
AR 3069	Physical Training Leadership II	1
MUS 1510	Huskies Pep Band	1
MUS 1511	Campus Concert Band	1
MUS 1570	Private Music Instruction	0.5
PE 0101	Flag Football	0.5
PE 0103	Bait and Fly Casting	0.5
PE 0104	Ultimate Frisbee	0.5
PE 0105	Beginning Bowling I	0.5
PE 0106	Beginning Golf	0.5
PE 0107	Floor Hockey	0.5
PE 0108	Broomball	0.5
PE 0109	Aikido	0.5
PE 0113	Disc Golf	0.5
PE 0115	Beginning Swimming	0.5
PE 0116	Beginning Basketball	0.5
PE 0117	Beginning Hockey	0.5
PE 0118	Beginning Weight Training	0.5
PE 0119	Beginning Fitness Training	0.5
PE 0120	Beginning Alpine Skiing (Downhill)	0.5
PE 0121	Beginning Snowboarding	0.5
PE 0122	Softball	0.5
PE 0123	Telemark Skiing	0.5
PE 0125	Sand Volleyball	0.5
PE 0126	Beginning Volleyball	0.5
PE 0130	Water Aerobics	0.5
PE 0132	Beginning Soccer	0.5
PE 0135	Beginning Cross Country Skiing	0.5
PE 0137	Table Tennis	0.5
PE 0138	Beginning Racquetball/Squash	0.5
PE 0139	Beginning Badminton	0.5
PE 0140	Beginning Tennis	0.5
PE 0142	Introduction to Brazilian Jiu Jitsu	0.5
PE 0145	Beginning Rifle	0.5
PE 0146	Beginning Billiards	0.5
PE 0148	Beginning Skating	0.5
PE 0150	Outdoor Lifetime Activities	0.5
PE 0151	Indoor Lifetime Activities	0.5
PE 0152	Social Dance I	0.5

Co-curricular List continued

PE 0153	Aerobics I	0.5
PE 0155	Beginning Road Biking	0.5
PE 0156	Beginning Mountain Biking	0.5
PE 0165	Introduction to Rowing	0.5
PE 0166	Moving for Fitness	0.5
PE 0167	Beginning Yoga	0.5
PE 0169	Indoor Cycling	0.5
PE 0170	TaeKwonDo and Hapkido I	0.5
PE 0175	Hiking	0.5
PE 0177	Fundamentals of Laser Tag	0.5
PE 0205	Bowling II	0.5
PE 0206	Intermediate Golf	0.5
PE 0209	Intermediate Aikido	0.5
PE 0210	Special Topics in Physical Education	0.5
PE 0215	Intermediate Swimming	0.5
PE 0216	Intermediate Basketball	0.5
PE 0217	Intermediate Hockey	0.5
PE 0218	Intermediate Weight Training	0.5
PE 0219	Intermediate Fitness Training	0.5
PE 0220	Intermediate Alpine Ski (Downhill)	0.5
PE 0221	Intermediate Snowboarding	0.5
PE 0226	Intermediate Volleyball	0.5
PE 0230	Water Polo	0.5
PE 0232	Intermediate Soccer	0.5
PE 0235	Intermediate Cross-Country Ski	0.5
PE 0237	Intermediate Table Tennis	0.5
PE 0238	Intermediate Racquetball/Squash	0.5
PE 0239	Intermediate Badminton	0.5
PE 0240	Intermediate Tennis	0.5
PE 0242	Brazilian Jiu Jitsu II	0.5
PE 0245	Intermediate Rifle	0.5
PE 0246	Intermediate Billiards	0.5
PE 0248	Intermediate Skating	0.5
PE 0250	Paintball	0.5
PE 0252	Social Dance II	0.5
PE 0253	Aerobics II	0.5
PE 0256	Intermediate Mountain Biking	0.5
PE 0266	Running for Fitness	0.5
PE 0267	Intermediate Yoga	0.5
PE 0270	Cardio TaeKwonDo	0.5
PE 0277	Strategies of Laser Tag	0.5
PE 0315	Fitness Swimming	0.5
PE 0320	Advanced Skiing	0.5
PE 0321	Advanced Snowboarding	0.5
PE 0330	Club Sports	0.5
PE 0367	Mindful Yoga	0.5

Co-curricular List continued

PE 0420	Ski Instructor Training	0.5
PE 0421	Snowboard Instructor Training	0.5
PE 0425	Intramurals	0.5
PE 0430	Club Sports Leadership	0.5
PE 0450	Physical Education Fusion – Full	1
PE 0451	Mountain/Road Bike Fusion	0.5
PE 1000	Fitness Foundations	1
PE 1010	Active Michigan Tech	1
PE 1028	Ski Patrol (Hill)	1
PE 1101	Team Sports	1
PE 1105	Bowling	1
PE 1106	Golf	1
PE 1113	Disc Sports	1
PE 1118	Weight/Fitness Training	1
PE 1119	Conditioning	1
PE 1138	Racquet Sports	1
PE 1140	Tennis	1
PE 1169	Indoor Cycling	1
PE 1170	TaeKwonDo	1
PE 1210	Special Topics	1
PE 1215	Introduction to Backcountry Travel	1
PE 1220	Introduction to Canoeing	1
PE 1225	Indoor Rock Climbing	1
PE 1230	Introduction to Kayaking	1
PE 1235	Introduction to Log Rolling	1

Co-curricular List continued

PE 1240	Snowshoeing	1
PE 1245	Wilderness First Responder	1
PE 1435	Self-Defense for Women	1
PE 1436	Self-Defense for Men	1
PE 1450	Physical Education Fusion – Full	1
PE 1470	Lifeguard Swimming	1
PE 2010	Varsity Football	1
PE 2020	Varsity Basketball	1
PE 2030	Varsity Hockey	1
PE 2040	Varsity Nordic Skiing	1
PE 2050	Varsity Soccer	1
PE 2080	Varsity Track	1
PE 2090	Varsity Tennis	1
PE 2130	Varsity Volleyball	1
PE 2140	Varsity Cross Country	1
PE 2150	Cross Training	1
PE 2160	Varsity Esports	1
PSY 1100	Skills for Health & Resilience	1

Approved Transfer Courses
Co-curricular List

The following courses are available ONLY by transfer

PE 0XXX	Co-Curricular Activities	0.5
PE 1XXX	Co-Curricular Activities	1

ACADEMIC PLANNING WORKSHEET

Semester ____________ | Semester ____________ | Semester ____________

Course	Credits	Course	Credits	Course	Credits
	Total ____		Total ____		Total ____

Semester ____________ | Semester ____________ | Semester ____________

Course	Credits	Course	Credits	Course	Credits
	Total ____		Total ____		Total ____

Semester ____________ | Semester ____________ | Semester ____________

Course	Credits	Course	Credits	Course	Credits
	Total ____		Total ____		Total ____

ACADEMIC PLANNING WORKSHEET

Semester ______		Semester ______		Semester ______	
Course	Credits	Course	Credits	Course	Credits
Total		Total		Total	

Semester ______		Semester ______		Semester ______	
Course	Credits	Course	Credits	Course	Credits
Total		Total		Total	

Semester ______		Semester ______		Semester ______	
Course	Credits	Course	Credits	Course	Credits
Total		Total		Total	