MTUengineering

Michigan Tech Department of Mechanical & Aerospace Engineering

Orientation 2025

MAE Academic Advisors

meadvise@mtu.edu

Ryan Towles

- Michigan Tech grad (1999)
- MAE advisor since 2010
- Copper Country Track Club & Keweenaw Ultra-Marathon Club Advisor

Sarah Sohlden

- Michigan Tech grad (2000)
- MAE advisor since Fall 2022
- Extensive CAD experience

Mark Provoast

- Michigan Tech grad (1987)
- MAE advisor since Fall 2022
- Long-time Admissions staff member


3M
Ford
CAT
HUSCO
BEMIS
TESLA
BWI
ACM
BLATTNER ENERGY
bretting
Est. 1890
BROKEN SPOKE
BIKE STUDIO
CAPTIVEAIRE
AVL
BRUNSWICK
Kimberly-Clark
ANDRONACO INDUSTRIES
CLIFFS
Alithya
AO
AMERICAN ORTHODONTICS
CENTURY A&E
Facilities Design
ARCTIC CAT
BLACK & VEATCH
ArtiFlex
amcor
Pfizer
AccelerateWind
Associated Spring
A business of BARNES
BOEING
Consumers Energy
P&A GROUP
EST. 1975
KOHLER
BW Papersystems
Calumet
Electronics Corporation
Collins Aerospace
AXIOM SPACE
DAKKOTA
Cummins
Milwaukee


DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA
Eck INDUSTRIES
KBR
KOPPERS
GS ENGINEERING
GD GENERAL DYNAMICS Land Systems
FORTNA
GENTEX CORPORATION
James Hardie
HSC
GP Georgia-Pacific
JR AUTOMATION
JERVIS B. WEBB COMPANY WORLDWIDE MATERIAL HANDLING SOLUTIONS
WEBB
Halla Mechatronics
E&E Manufacturing
GE Aerospace
Flexfab Engineering trust. Around the world.
ENSTROM HELICOPTER CORPORATION
Foth
Epic
KILN TECHNOLOGY LLC
A&B LAKEWOOD
Hussey SINCE 1836
husseyseating YOUR PARTNER FOR SEATING SOLUTIONS
GERDAU Shape the future
HS Inc.
EQI
DOUGLAS
Hanon SYSTEMS
EDAG
Bobcat
MOTOR HARLEY-DAVIDSON COMPANY
DEVCOM GROUND VEHICLE SYSTEMS CENTER
DEMATIC
Ranger Tugs
CUTWATER
HYDRA-FLEX FLUID INNOVATION
INNOTEC
EXCEL


NUCOR
NUCOR STEEL BERKELEY
McMAHON GROUP
Michigan Tool Technology
Custom Tooling, Die Design, CAD/CAM/CNC Solutions
NAVAL NUCLEAR LABORATORY
MERCURY
Miller
LINCOLN LABORATORY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
McNeilus
ORBION
SPACE TECHNOLOGY
NORTHROP GRUMMAN
OSHKOSH
PCA
MAP
MICHIGAN AIR PRODUCTS
leidos
NAVISTAR
Michael Best 175 years
EST. 1848
MARION
LAKE SUPERIOR CONSULTING
OSHKOSH
1885
APS LABS
Omni Metalcraft corp.
Michigan Tech
MATERIALS SCIENCE AND ENGINEERING
OHM
LDRA
NEUVOKAS
LINAMAR
Power to Perform
LECO
EMPOWERING RESULTS
Kyoba
MARATHON
nexteer
AUTOMOTIVE
MERITOR
RUN WITH THE BULL
MODINE
Engineering a Cleaner, Healthier World

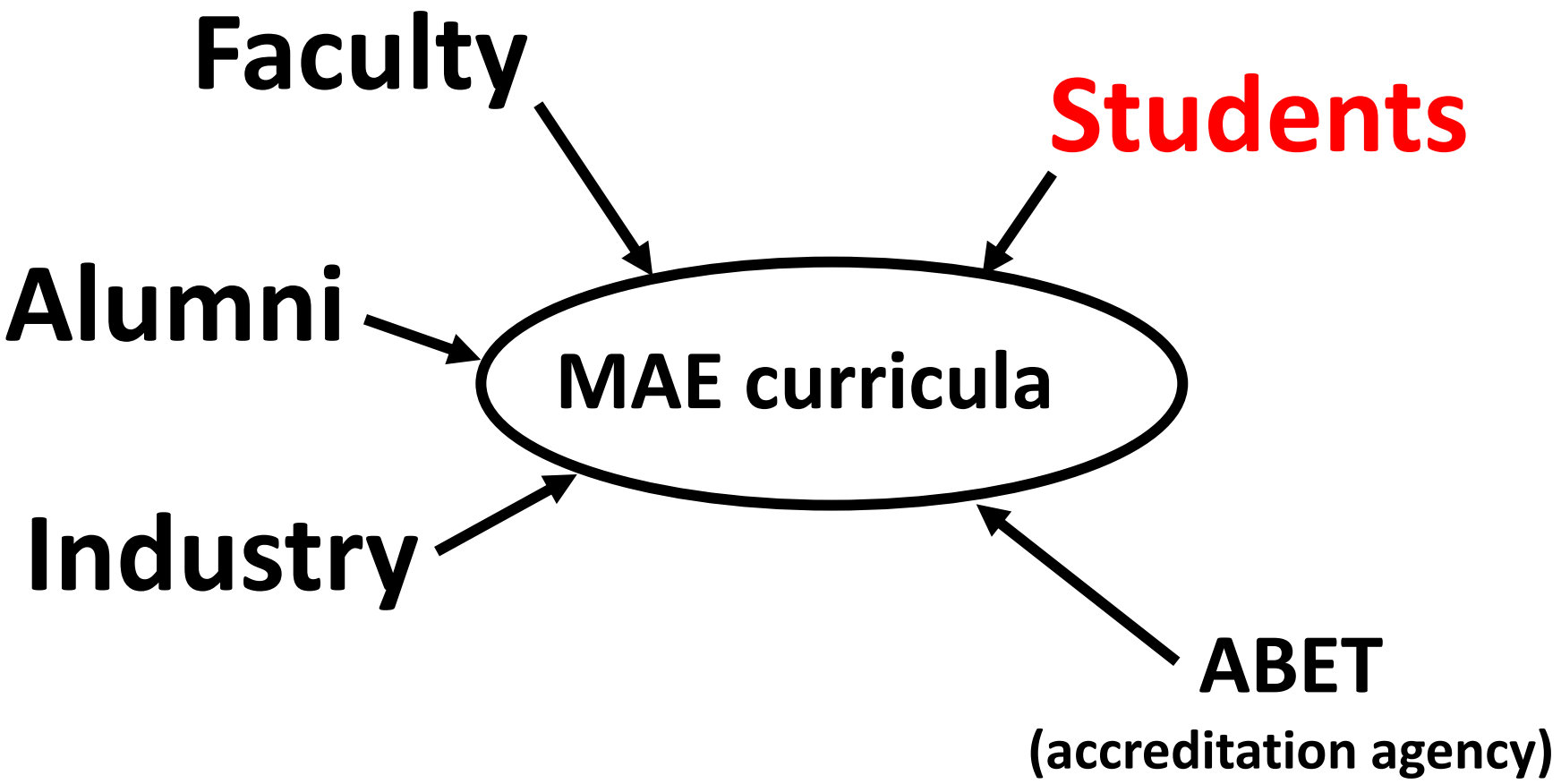

UNIVERSAL Creative
World's Leading Manufacturer
SEBRIGHT PRODUCTS INC.
Compactors and Recycling Equipment
UNITED STATES NAVY
umc
TEL
PROFIL
a PennEngineering Company
VOITH
POLARIS
Williams INTERNATIONAL
ZF
Webasto
Feel the Drive
TEMPLE CONTROL SYSTEMS
PIPELINE DESIGN & ENGINEERING
WestRock
VISTA OUTDOOR
PLEXUS
Snap-on
Winchester Interconnect
UL Solutions
tiara YACHTS
shape corp
smi
Pierce
PERFORM. LIKE NO OTHER.
Wold
SIERRA SPACE
Seagrave Since 1881
Whirlpool
VERSO
Steelcase
TTI
PEM
TOWER SOLUTIONS

MAE Program Objectives

Your Mechanical and/or Aerospace Engineering Program will prepare you to attain recognition as engineers who:

- **Make innovative contributions that positively impact society and the world**
- **Foster work environments that value diverse viewpoints and enable everyone to work at their highest potential**
- **Make good engineering, ethical, and financial decisions**
- **Pursue advanced studies in engineering or other fields**
- **Take on increasing responsibilities such as managing projects and leading teams**

Many stakeholders help ensure the quality of your MAE education



Your role in your MAE program

Talk to us!
Faculty & Staff

Talk to your Peers!
MAE Student Advisory Committee (MAESAC)

Course Evaluations and Surveys

MAE Practice Courses

Unique to Michigan Tech

- Discovery & Experiential Learning
- Other universities looking to adopt our program

Mechanical & Aerospace Engineering Practice (MAEP) Courses

- Hands-on application of engineering science
- Computer simulations and hardware testing
- Emphasize teamwork, technical communication, critical thinking, open-ended problem solving, systems engineering, and leadership

Two options for “capstone” experience

Senior Capstone Design:

Provides you with your “first job” to solve real-world problems sponsored by industry. The entire process flows from concept to development and fabrication to demonstration of a working prototype

- 2 semester requirement
- Teams of 4-6 students
- Direct interaction with industry

Enterprise:

Student-led organizations that work in a industry-like setting to solve real-world engineering problems. The projects can last for several semesters and may be industry sponsored.

- 4 semester (minimum) requirement
- Large teams of students (depending on Enterprise)
- Direct interaction with sponsors
- Current MAE-hosted or advised enterprises: Aeronautics and Rocketry, Aerospace, Blizzard Baja, BoardSport Technologies, Clean Snowmobile, Formula SAE, Multiplanetary Innovation, Robotic Systems, Strategic Education through Naval Systems Experiences (SENSE), Supermileage Systems, Velovations

Credit Distributions - ME

Senior Capstone Design Option		Δcr.	Enterprise Option	
24	Essential Education	0	24	Essential Education
31	Math and Science	0	31	Math and Science
6	1st Year Engineering	0	6	1st Year Engineering
3	Free Elective	0	3	Free Elective
4	Senior Capstone Design	+3	7	Enterprise Modules
12	MAE Practice Courses	0	12	MAE Practice
27	ME Core Courses	0	27	ME Core Courses
3 3	Electrical Engineering Materials Science	0	3 3	Electrical Engineering Materials Science
15	Technical Electives	-3	12	Tech Electives

128 total

128 total

Credit Distributions - AE

Senior Capstone Design Option		Δcr.	Enterprise Option	
24	General Education	0	24	General Education
31	Math and Science	0	31	Math and Science
6	1st Year Engineering	0	6	1st Year Engineering
0	Free Elective	0	0	Free Elective
4	Senior Capstone Design	+3	7	Enterprise Modules
12	MAE Practice Courses	0	12	MAE Practice
45	MAE Core Courses	0	45	MAE Core Courses
6	Technical Electives	-3	3	Tech Electives

128 total

128 total

Bachelors of Science in Aerospace Engineering

- **Program begins Fall 2025**
- **1st Year Courses are largely the same as BS Mechanical Engineering**
- **Developing new courses and first offerings through Spring 2027**

AE2500 Principles of Aerospace Engineering

AE2550 Space Environment & Operations

AE3501 Aerospace Systems Eng. Practice

AE3511 Spacecraft Engineering Practice

AE3520 Aerodynamics (w/ Lab)

AE4570 (AE3570) Space Mechanics

AE4530 Compressible Flow

AE4540 Aerospace Propulsion

AE4550 Spacecraft Thermal Engineering

AE4560 Aerospace Materials & Structures

AE4580 Spacecraft Dynamics & Controls

Undergraduate Research

- Faculty hire undergraduate research assistants to help with projects funded by NASA, DoD, DoE, National Science Foundation, and industry, etc.
- Faculty interests/expertise, research projects, and new grants can be found on the MAE advising webpage
- Experience can include lab experiments, computational experiments, modeling, build and test, data analysis, authorship on professional publications, etc.
- Can be volunteer time, upper level students can count towards technical electives, or paid positions.
- Can give you a running start towards a graduate degree

Too early to think about Grad School?

- Masters degree is 30 credits beyond Bachelors.
- PhD is 30 credits beyond Masters degree.
- Why advanced degrees (MS,PhD) ?
  - Give you specialized knowledge and skills.
  - Opens up job markets and positions not available for Bachelors.
  - Expect ~+20% salary for MS vs BS.

You can complete your BSME **and** MSME

- Normally a MSME takes ~2 years to complete.
  4 for BS + 2 for MS = 6 years

- Two programs can speed this up
  1. *Accelerated Masters Program*
  2. *Sr Rule*

Agenda

- MAE Advising Center
- BSME curriculum
- BSAE curriculum
- Scheduling/ Registration

MAE Advising Center

8:00 am – 5:00 pm (4pm Summer)

Monday – Friday

2nd Floor R.L. Smith (MEEM)

(Building 20)

within Engineering Learning Center

(Room 205, inside MEEM 203)

906.487.2564

https://www.mtu.edu/mechanical-aerospace/undergraduate/advising/

Walk-in or by email/phone

Academic advisor's role

- Advising Syllabus – use as a guide/checklist for advising
- Assist students with:
  - Developing an academic/educational plan
  - Course scheduling/registration
  - Interpreting University policies and procedures
  - Seeking out services/resources as needed
  - Opportunities: internships, co-op, curricula, honors, study abroad, etc.
  - Refer to faculty as needed for specific professional interests
  - Clarification of career and life goals

We are your primary contacts for questions and concerns and can refer you to the specialists you need if we are not the right resource.

Plan to meet with us at least before registration each semester, but anytime you need to also.

When faced with a difficult question or challenging situation, your academic advisor is always a good place to begin

Be prepared to meet with academic advisors…

- Know your M number which is not your social security number. It's 8 digits after an 'M'. It is on your Tech ID.
- Bring any previously marked-up flow charts, notes, forms, etc. when you meet with us
  - Create and maintain a personal academic records folder
  - Take notes during advising meetings
- Do not email advisors separately
  - Use meadvise@mtu.edu
  - Use your Michigan Tech email account.
- Michigan Tech has an online directory and A2Z for looking up contact information:

  https://www.mtu.edu/directory/
  http://www.mtu.edu/a2z/

  - This will save you time if you are just contacting us to find a location, phone number, or email address.

MAE Advising Web Page

https://www.mtu.edu/mechanical-aerospace/undergraduate/advising/

Lot's of FAQs, links, forms...

A good first stop for advising information, see an advisor with questions.

I heard that…

- If you hear things regarding curricular issues and/or academic policies from a friend, there is a good chance that you have incorrect information. Even though what they are saying may be correct **for them**.

- Verify with an MAE Academic Advisor or department responsible for the policy

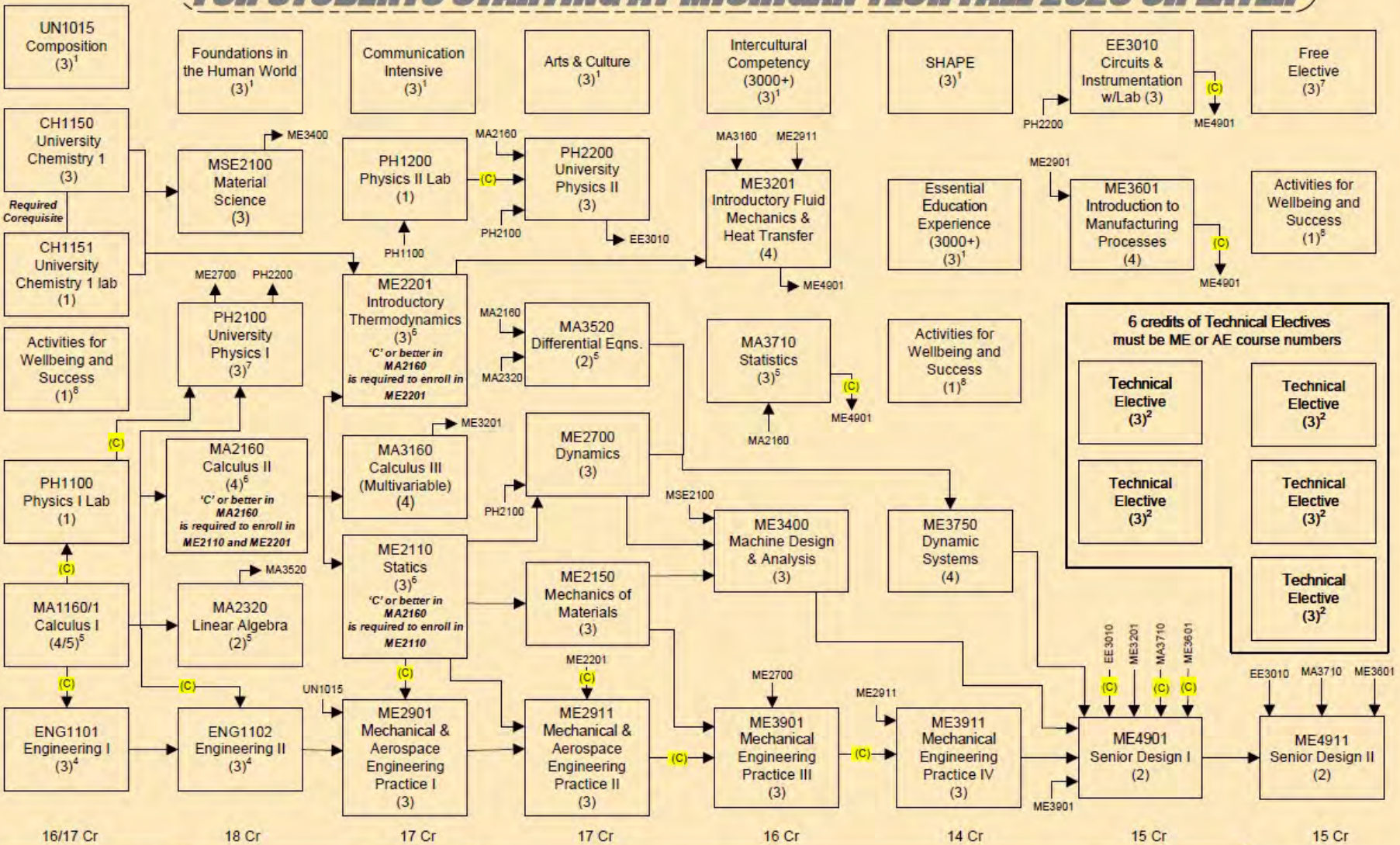
Michigan Tech

Bachelor of Science-Mechanical Engineering

Sample Course Plan: All required courses are offered each fall and spring semester.

Students may take courses in any semester as long as prerequisites are met.

FOR STUDENTS STARTING AT MICHIGAN TECH FALL 2025 OR LATER



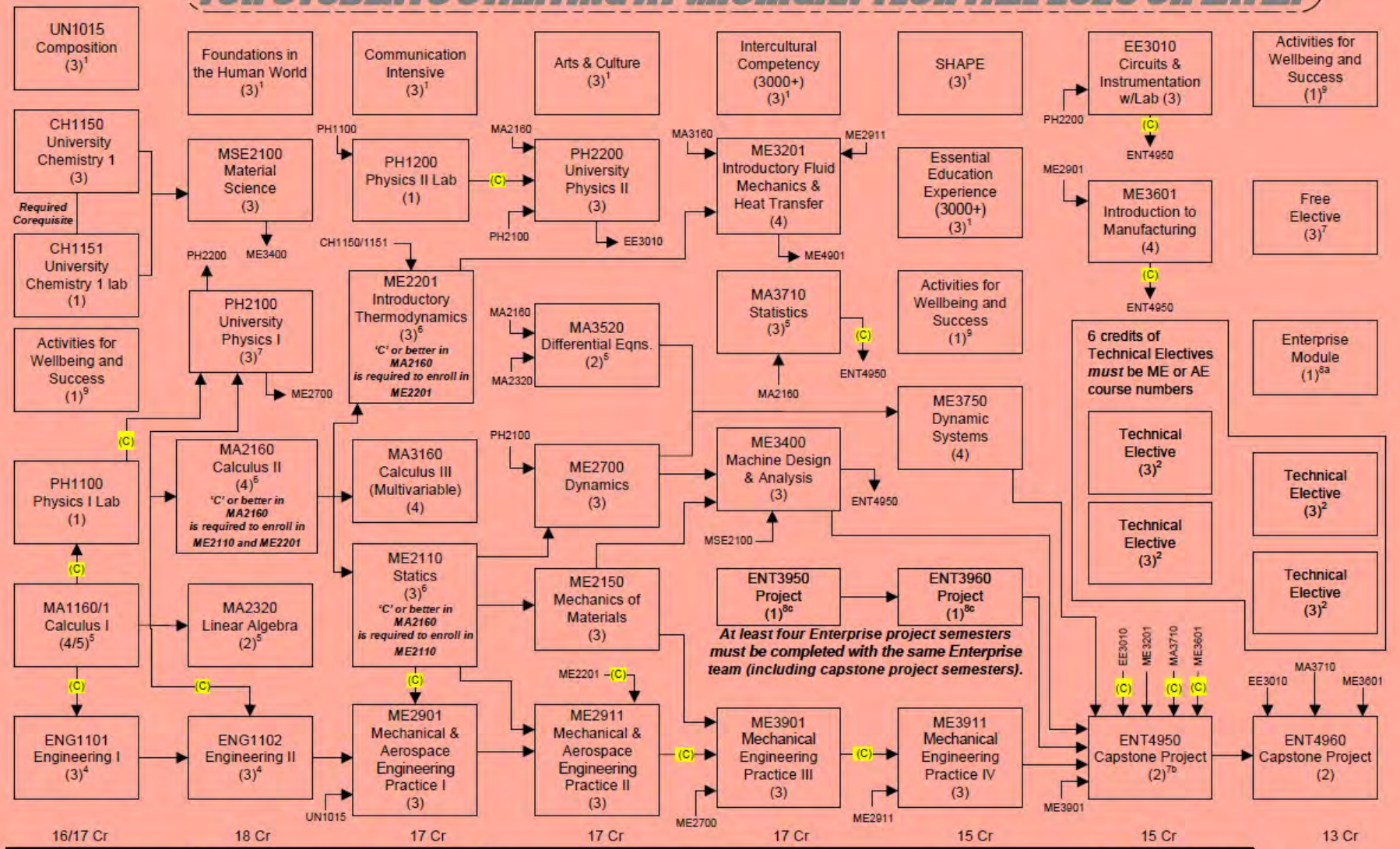
Michigan Tech

Bachelor of Science-Mechanical Engineering

Enterprise Concentration

Sample Course Plan: All required courses are offered each fall and spring semester. Students may take courses in any semester as long as prerequisites are met.

FOR STUDENTS STARTING AT MICHIGAN TECH FALL 2025 OR LATER



Prerequisite [3] (Course must be completed prior to enrollment)

(C) Concurrent Prerequisite [3] (A prerequisite course that may be taken concurrently)

Required Corequisite [3] (Courses must be taken together)

(#) Course Credits

See cited notes on back

128 Total Credits
December 2024

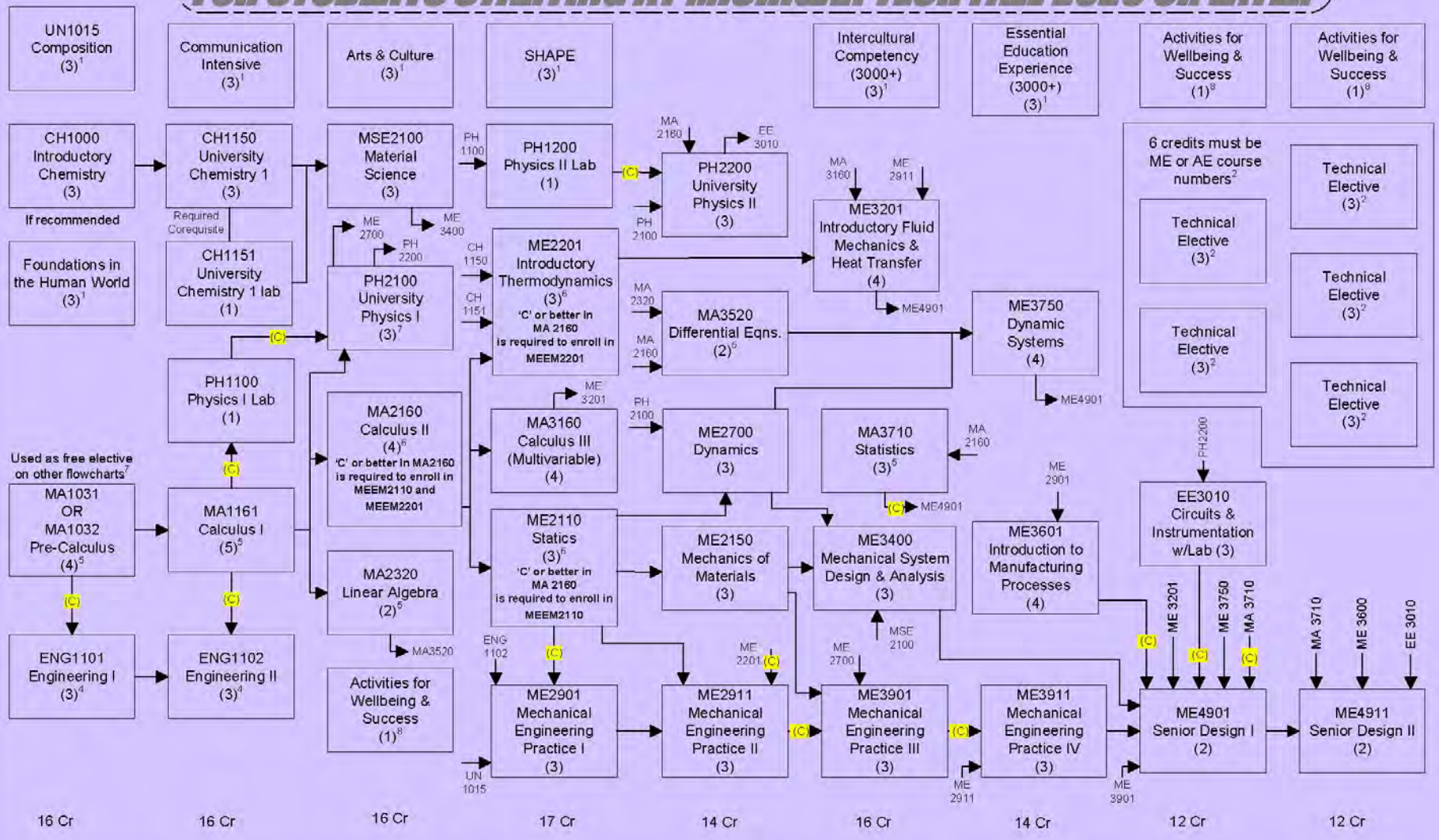
Michigan Tech

For students with math placement below calculus.

Bachelor of Science-Mechanical Engineering

Sample Course Plan: All required courses are offered each fall and spring semester. Students may take courses in any semester as long as prerequisites are met.

FOR STUDENTS STARTING AT MICHIGAN TECH FALL 2025 OR LATER



Prerequisite [3] (Course must be completed prior to enrollment)

(C) Concurrent Prerequisite [3] (A prerequisite course that may be taken concurrently)

Required Corequisite [3] (Courses must be taken together)

(#) Course Credits

See cited notes on back

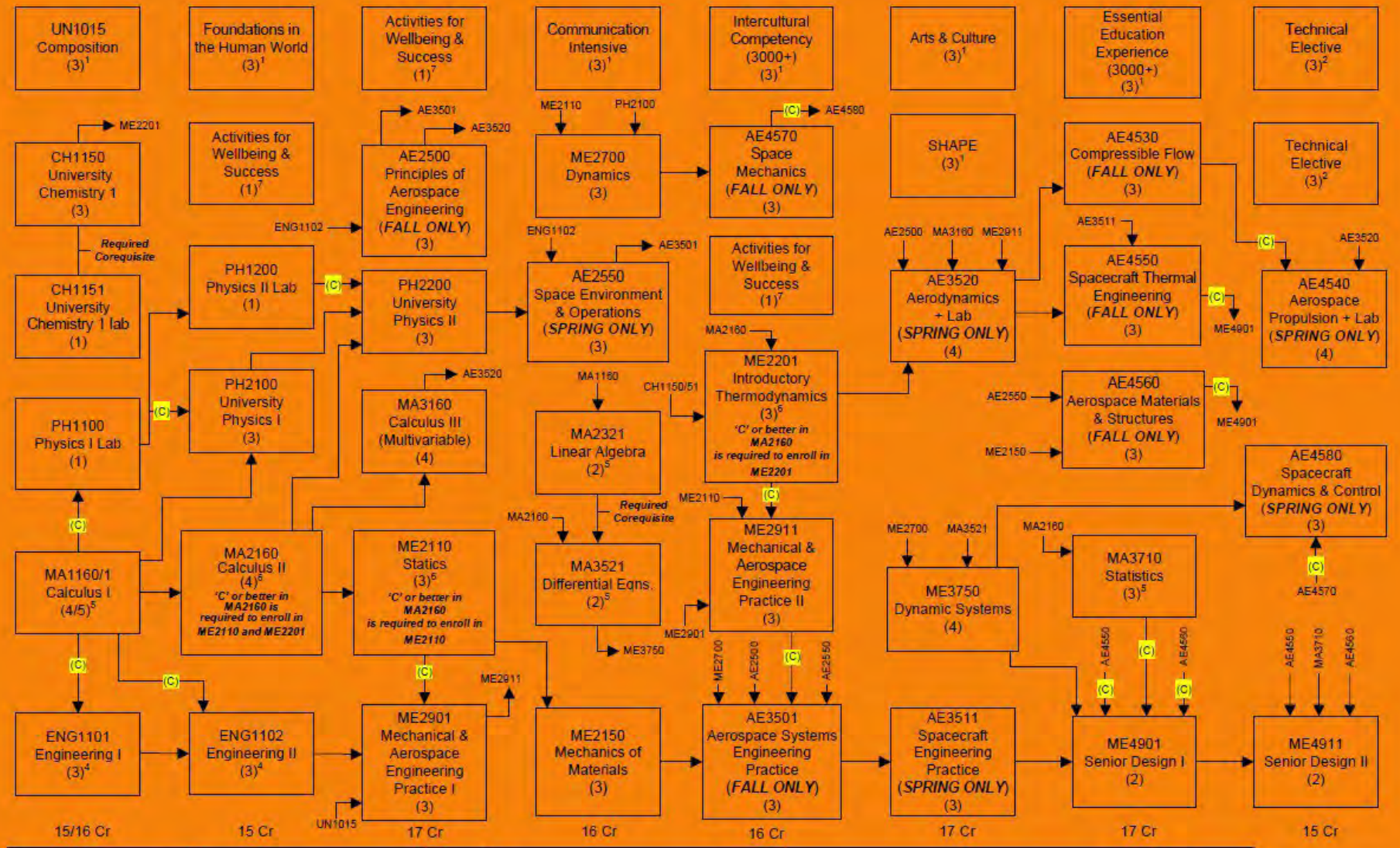
133 Total Credits (including CH 1000)

December 2024

Michigan Tech

Bachelor of Science-Aerospace Engineering

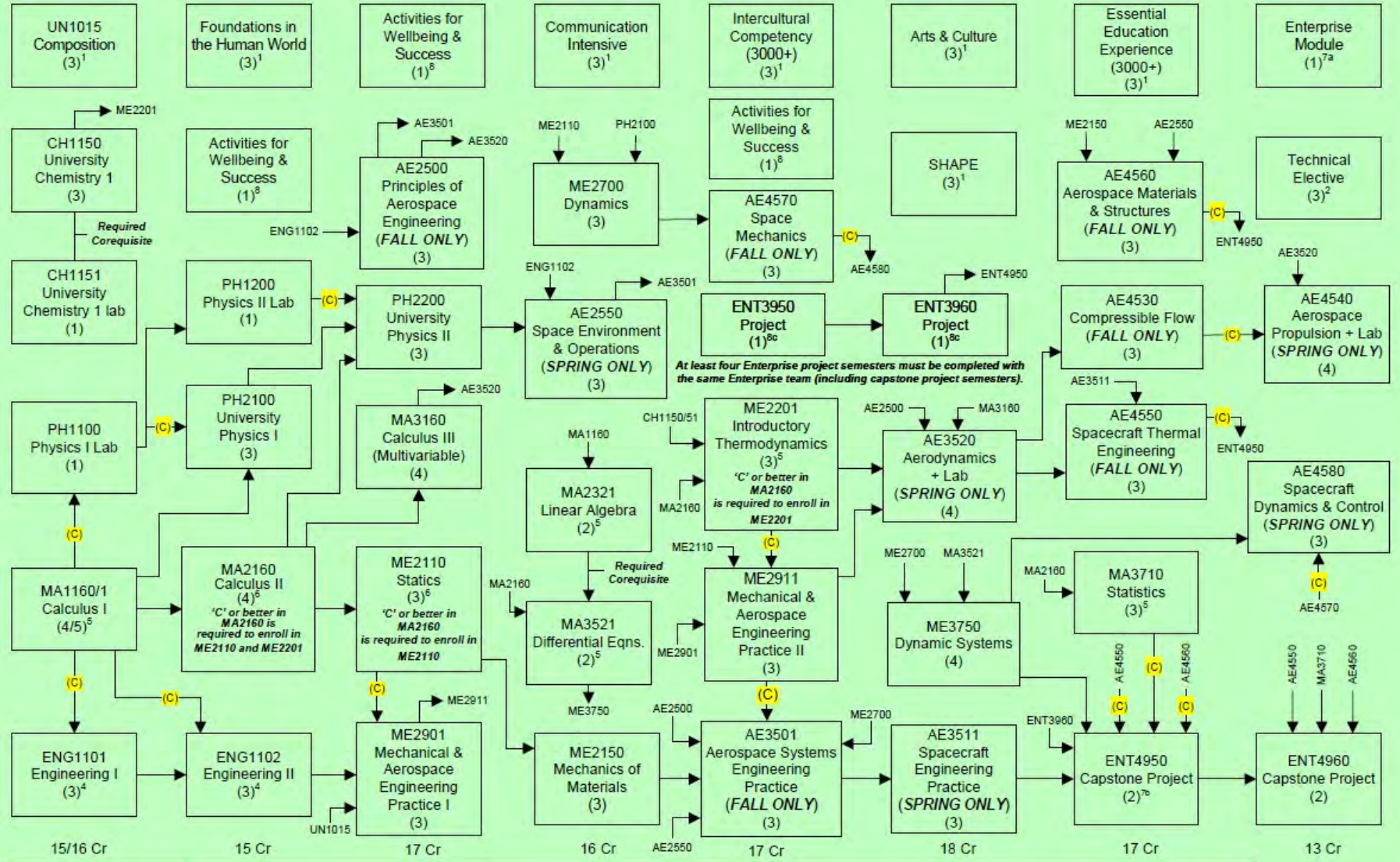
Sample Course Plan.



Michigan Tech

Bachelor of Science-Aerospace Engineering
Enterprise Concentration

Sample Course Plan



Michigan Tech

Bachelor of Science-Aerospace Engineering

Sample Course Plan.

ME FREE ELECTIVE

Prerequisite [3] (Course must be completed prior to enrollment)

(C) Concurrent Prerequisite [3] (A prerequisite course that may be taken concurrently)

Required Corequisite [3] (Courses must be taken together)

(#) Course Credits

See cited notes on back

128 Total Credits
December 2024

Scheduling

If you need to take the ALEKS math placement assessment and have not yet, then you may have no class schedule generated.

Math Placement:

- **AP (min score 2 on Calc AB exam)**
- **ACT/SAT Math**
- **Transfers**
- **ALEKS**

If this is the case for you, please be sure to take ALEKS as soon as possible.

Scheduling

Generated schedule may not be complete if you are not in at least 4 courses (plus labs and PE, etc) and at least 12 credits

If needed, add:

UN 1015 (email schedule@mtu.edu)

or, Essential Education (email schedule@mtu.edu)

and/or, Activity Course (recommended)

and/or, contact meadvise@mtu.edu

If you are in University Chemistry (CH 1150 & 1151):

You are encouraged to add optional recitation:

CH 1153 – 1 credit (email schedule@mtu.edu)

Foundations in the Human World List

- Over 50 classes on the Foundations list
- Common AP Courses (3 or higher mostly)
  - Economics – Macro & Micro (both at 4+) EC2001
  - English Literature & Composition HU2503
  - European History SS2502
  - Government and Politics - US SS2600
  - Government and Politics - Comp. SS2635
  - Human Geography SS2400
  - Psychology PSY2000
  - US History SS2500
  - World History SS2504

Typical Fall Schedule
MA1030 - College Algebra I

Course	Credits
MA1030 College Algebra 1	3
CH1000 Intro to Chem	3
UN1015 Composition	3

May Need to Add:

Essential Ed (Foundations, etc)	3
Activity Course	1

Total: 12-13

** No ENG 1101/1102 based on Math Placement*

Typical Fall Schedule

MA1031 - College Alg 2 w/ Trig or MA1032 - PreCalc

Course	Credits
MA1031 or MA1032	3-4
ENG1101 Eng Analysis & Problem Solving	3
CH1000 (scheduled) or CH1150/1151	3-4
UN1015 Composition or Ess Ed	3

May Add:

CH1153 optional	1
Activity	1

Total: 12-16

Typical Fall Schedule

MA1160/1, MA2160, or MA3160 - Calculus I, II, III

Course	Credits
MA1160/1, MA2160 (AP), or MA3160 (AP)	4-5
ENG1101 Engineering	3
CH1150/1151 Univ Chem/Lab (scheduled)	4
UN1015 Composition or Ess Ed	3
PH1100 Physics Lab *(maybe)*	1

May Add

CH1153 optional	1
Activity	1

Total: 14-18

Scheduling

If you are in Prep Chemistry (CH 1000) and earned a 'B' or better in high school Algebra and Chemistry (and at least in MA 1031/1032 for this fall), then you may change from CH 1000 to CH 1150/1151.

You may contact Susan Liebau

(206A Chem Sci, slliebau@mtu.edu) to discuss.

Email schedule@mtu.edu to change chemistry.

Likewise you might need to change from CH 1150/1151 to CH 1000

www.mtu.edu/chemistry/undergraduate/first-year/

Scheduling

- You can move back in the math sequence (e.g., MA 2160 or 3160 to MA 1160/1161 or MA 1160/1161 to MA 1032), but once this decision is made it is final.
- Cohort classes stay together (MA/ENG).
- Contact the Registrar's Office (schedule@mtu.edu) for possible changes (with good reason).

Do this ASAP if you need changes.

  - Athletics (3pm)
  - ROTC
  - Changing Math or Chemistry courses

Scheduling

Success Courses:

- You may not drop UN 1010 this fall unless you are in UN 1000 also (Learning Communities requirement).
- You may not drop UN 1000 (ExSEL requirement).
- Contact Wahtera Student Success Center for possible section changes if needed (success@mtu.edu).

Scheduling

Other Courses:

- You may not drop HON 1150 (Pavlis Honors College requirement).
- You may not drop KIP 1900 (Athletics requirement).

- If you are declared for an associate's degree in Engineering, that means you have a TIP scholarship. efadvise@mtu.edu

Scheduling

CH1150/1151 credit and scheduled for CH1160/1161 or MSE2100?

- See an MAE Academic Advisor

Initial math sequence is (MA 1030 & 1031) or MA 1032 and then MA 1161

Calculus lab sections (online) are weekly software assignment

If you transferred ENG 1101 (ENG 1101T credits), then you need to be in either the UN 1013 or UN 2013 seminar course, 1 cr.

Scheduling

ENG 1101 – Class times: 2 days for 2 hours and 1 day for

1 hour, different locations

- **2 days a week with large group**
- **1 day a week with small LEAP group - mentor**

PH 1100 - Physics 1 Lab, can be taken before or with

Physics 1 Lecture (PH2100)

No need to complete the science section of the Essential Education First-Year Course Request Form. Your science requirements are built into your major.

Transfer Credits

- **Official transcripts should be sent to Michigan Tech Transfer Services as soon as the course has been completed. A grade of 'C' (2.00/4.00) or better is required for a course to transfer.**

MAE Academic Advisors

Ryan Towles
Mark Provoast
Sarah Sohlden
meadvise@mtu.edu

MAE Advising Center
Room 205 – Inside MEEM 203
906/487-2564

https://www.mtu.edu/mechanical-aerospace/undergraduate/advising/