Aerospace Engineering and Mechanics

Freshman Year

Fall Semester
- Math 1371 Calculus I (placement into course or pre-req)
- Chem 1065 Chem Princ I Lab
- Liberal Education course or Writ 1301
- Liberal Education course or Writ 1301

Spring Semester
- Math 1372 Calculus II (1371)
- Phys 1301W Intro Physics I (&Math 1371)
- CSci 1113 Intro to C/C++ (Math 1371)
- Liberal Education course or Writ 1301

Sophomore Year

Fall Semester
- Math 2374 Multivariable Calc (1372)
- Phys 1302W Intro Physics II (1301, &Math 1372)
- AEM 2011 Statics (Phys 1301, &Math 2374)
- MatS 2001 Intro to Engrg Matls (Chem 1061/65, Math 1372, Phys 1301, CSE)

Spring Semester
- Math 2373 Lin Alg/Diff Eq (1372)
- Phys 2303 Phys III: Matter (1302)
- AEM 2012 Dynamics (2011, &Math 2373)
- AEM 2301 Mechanics of Flight (Phys 1301, &Math 2373)

Junior Year

Fall Semester
- AEM 4201 Fluid Mechanics (UD, 2012, Math 2373, Math 2374)
- AEM 3031 Deform Body Mech (2011, Math 2374, &Math 2373)
- AEM 3101 Simulation (UD, Math 2373)
- EE 3005 Fundamentals EE (Phys 1302, Math 2373)
- EE 3006 Fund EE Lab (63005)

Spring Semester
- AEM 4202 Aerodynamics (UD, 4201)
- AEM 4501 Aerospace Structures (UD, 3031)
- AEM 4601 Instrumentation Lab (UD, EE 3005, 3006, CSci 1113)
- AEM 4301 Orbital Mechanics (UD, 2012, Math 2373)
- Liberal Education course

Senior Year

Fall Semester
- ME 3324 Intro to Thermal Sci (Chem 1061/65, Phys 1301, Math 2373)
- AEM 4331 Aero Vehicle Design (AEM Sr., 2301, 4202)
- AEM 4602W Aeromechanics Lab (UD, 4201, 4501, 4601, Writ 1301)
- Technical Elective I
- Liberal Education course

Spring Semester
- AEM 4203 Aerospace Propulsion (UD, 4202)
- AEM 4303W Flight Dyn Control (UD, 2012, 2301, 3101, Writ 1301)
- Technical Elective II
- Technical Elective III

About This Plan
- This plan is not a contract. Curriculum can change. The APAS is the official method for tracking completion of University degree requirements.
- Shaded courses are only offered in the indicated semester.
- Course pre-requisites and co-requisites (designated by &) are listed below the course number and title. Upper Division (UD) requires admission to the major prior to enrollment.
- Students can take either the CSE-only or University-wide versions of the math courses (1371/1271, 1372/1272, 2373/2243, 2374/2263).

Applying to Your Major
Students who have completed the required courses for admission to this major (indicated with double boxes on plan) and have a 3.2 UM-TC technical GPA at the end of the fall semester will be guaranteed admission. All other students who have completed the required courses will be considered for admission on a space-available basis. Admission following the spring semester is only based on space availability. The major application database is available at z.umn.edu/csemajorapp.

Total Credits Needed for Degree: 122

Department Contact Information
- Website: www.aem.umn.edu/teaching/undergraduate/advising_guide/
- Main Phone: 612-625-8000; Main Office: 107 Akerman Hall
- Director of Undergraduate Studies: Professor Tom Shield
- Email: aem-dugs@umn.edu
- Permission Number Website: www.aem.umn.edu/srs

University Degree Requirements
- All students must complete the following Writing & Liberal Education requirements, as noted on their APAS report.
- See link for full Core & Theme names: z.umn.edu/liberaleducation

Writing Requirements:
- University Writing:
  - Writ 1301/1401 or equivalent
- Writing Intensive (WI):
  - Two: 1xxx or 2xxx level **
  - One: 3/4/5xxx level (in major)*
  - One: 3/4/5xxx level (any dept.)*
- Requirements with an (*) will be fulfilled by taking courses at UM-TC required for this major.

Liberal Education
- CORES:
  - Bio
  - Phy*
  - His
  - SocS
  - Ltr
  - AH
  - Mth*
- THEMES:
  - 4 of 5:
    - Civ
    - DSJ
    - Env
    - GP
    - TS

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What can I do with a major in...
Aerospace engineering and mechanics?

**ACTIVITIES AEROSPACE ENGINEERING AND MECHANICS MAJORS DO:**
Aerospace engineers design, develop, and test new technologies for use in aviation, defense systems, and space exploration, often specializing in areas such as structural design, guidance, navigation and control, instrumentation and communication, or production methods. They often use computer-aided design (CAD) software, robotics, and lasers and advanced electronic optics. They also may specialize in a particular type of aerospace product, such as commercial transports, military fighter jets, helicopters, spacecraft, or missiles and rockets. Aerospace engineers may be experts in aerodynamics, thermodynamics, celestial mechanics, propulsion, acoustics, or guidance and control systems. Aerospace engineers often apply their knowledge to related fields such as environmental engineering and mechanical engineering.

**INDUSTRIES AEROSPACE ENGINEERING AND MECHANICS MAJORS WORK IN (SAMPLE LISTING):**
- Aircraft design
- Aircraft parts manufacturing
- Higher education
- Space flight
- Marketing
- Insurance
- Consulting
- Satellite design and construction
- National defense
- Research
- Rocketry
- Propulsion engineering

**EMPLOYERS WHO HIRE AEROSPACE ENGINEERING AND MECHANICS MAJORS (SAMPLE LISTING):**
- ATK
- Federal Aviation Administration
- NASA-Johnson Space Center
- Boeing
- FM Global
- NAVAIR
- Eaton Corporation
- General Electric
- Schlumberger
- Emerson Process Management
- Honeywell Aerospace
- The Aerospace Corporation
- ExxonMobil
- Lockheed Martin
- UTC Aerospace Systems
- HUSCO International
- Ford Motor Company

**TYPES OF POSITIONS FOR AEROSPACE ENGINEERING AND MECHANICS MAJORS (SAMPLE LISTING):**
- **Development engineer**: Applies research findings to develop new or improved products or manufacturing processes.
- **Analytical engineer**: Conducts in-depth assessments of proposed products and evaluates whether the design of each product meets customer requirements.
- **Design engineer**: Takes the concept or working model of a product to create a design that meets the customer’s requirements, industry standards, and can be manufactured economically.
- **Test engineer**: Designs and oversees the performance testing of products in wind tunnels and in actual flight.
- **Project engineer**: Plans, directs, and coordinates activities of company projects.
- **Sales engineer**: Contacts customers and makes sales presentations to demonstrate how products or services can fulfill their particular needs.
- **Field service engineer**: Examines performance reports on products and makes recommendations to solve problems.
- **Systems engineer**: Performs the requirements, analysis, and definition of the overall system and its subsystem.
- **Materials engineer**: Tests and evaluates materials, conventional or composite, used in aerospace structures.
- **Manufacturing engineer**: Plans the tooling, construction, and assembly of the product as dictated by the design specifications.

**Some of these positions may require an advanced degree.**