

STUDENT SOCIETIES

AIAA AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS – STUDENT CHAPTER
 umich.edu/~aiaa

SEDS STUDENTS FOR EXPLORATION AND DEVELOPMENT OF SPACE
 www.facebook.com/sedsatum

SGT SIGMA GAMMA TAU – UNDERGRADUATE HONORS IN AEROSPACE ENGINEERING
 umsgt.org | Facebook facebook.com/umsgt

MICHIGAN AVIATORS
 michiganaviators.org

TBP TAU BETA PI – COE GRADUATE STUDENT ENGINEERING HONORS SOCIETY

AIRCRAFT STUDENT PROJECT TEAMS

- Human Powered Helicopter: Design, build, and fly the human-powered helicopter
- MAAV (Michigan Autonomous Aerial Vehicles): Join this highly competitive interdisciplinary design team to compete in the annual International Aerial Robotics Competition (ARC)
- M-Jet: Get hands-on jet engine experience and learn the inner workings of a turbine engine
- M-Fly Aero Design: Apply what you know to special design projects outside of the classroom
- Solar Drones Team: Design, build and test unmanned-aerial vehicles

SPACE STUDENT PROJECT TEAMS

- Mars Rover: Contribute to research that builds and tests prototypes of manned rovers for use in a human mission to Mars
- MASA (Michigan Aeronautical Science Association): Design and fabricate rockets with new hybrid propulsion technologies and composite structures
- MXL (Michigan Exploration Laboratory): Develop novel space vehicles and missions
- MICHIGAN MARS ROVER TEAM (MROVER): umrover.org

AEROSPACE ENGINEERING

UNIVERSITY OF MICHIGAN
 COLLEGE OF ENGINEERING

UNDERGRADUATE PROGRAM

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AEROSPACE ENGINEERING
 UNIVERSITY OF MICHIGAN



RESEARCH OPPORTUNITIES

SURE: SURE offers summer research internships to outstanding undergraduate students who have entered or completed their junior year by the time of their internship. Participants have the opportunity to conduct 10-12 weeks of fulltime summer research with some of the country's leading faculty engineers.

Directed Study Courses: Students can earn academic credit by participating in advanced research projects under the supervision of a faculty member.

FALL/WINTER PROGRAMS

UROP: The Undergraduate Research Opportunity Program (UROP) provides a structured research experience for credit or pay through a work-study program. Apply in the spring before your freshman or sophomore year.

WELCOME

Michigan Aerospace is one of the most highly-ranked undergraduate and graduate aerospace engineering department in the US, we provide a very vibrant environment of intellectual challenge and excitement that is at the same time collegial and conducive to higher learning. Our faculty members have a high level of enthusiasm and accessibility and a strong dedication to excellence in teaching our undergraduate and graduate students. Curriculum and research activities focus on fundamental and advanced topics organized within Gas Dynamics, Structures and Materials, Space Systems, and Dynamics and Controls. Our world-class facilities are accessible to all Aerospace students for coursework and research activities.

The University of Michigan has a distinguished heritage of student project teams engaging students at all levels, from first-year undergraduates to graduate students, which you will learn more about in this brochure.

PROGRAM DESCRIPTION

Here at the University of Michigan, students in Aerospace Engineering begin with a set of courses that provide an exceptional background in all the fundamental aspects of the field. These span the entire spectrum of aerospace technologies.

AERODYNAMICS AND PROPULSION COURSES

Treat fluid and gas flow around bodies and through turbojet engines and rocket nozzles. Also involved is the study of large- and small-scale air motion in the atmosphere and its relationship to environmental and noise problems.

STRUCTURAL MECHANICS COURSES

Aircraft and spacecraft structures must be lightweight and endure significant loads in extreme environmental conditions while protecting the payload (passengers, instrumentation) and providing aerodynamic shape. Our courses address how to analyze and design such lightweight structures and how to size them for different loading conditions.

FLIGHT DYNAMICS AND CONTROL SYSTEMS COURSES

Dynamic behavior of vehicles and systems as a whole, their stability and controllability both by human pilots and autonomous systems. These courses cover everything from the fundamentals to the design and construction of aircraft, spacecraft and other vehicular systems and subsystems. Integration of all this material takes place in the senior design course, which gives students an appreciation of the interrelation of the various areas of study in the design of an overall system. Students can select either aircraft or spacecraft design.



TEN POSSIBLE CAREERS

1. Aerospace Engineer
2. Aircraft and Spacecraft Designer
3. Mission or Payload Specialist
4. Data Processing Manager
5. Military Space Engineer
6. Inspector and Compliance
7. Aerospace Systems Analyst
8. Aerodynamics Analyst
9. Structures Analyst
10. Propulsion Analyst

WHEN DO I APPLY?

GENERAL ADMISSIONS

First-year students are not admitted directly to the Aerospace Engineering Department but to U-M and the CoE. Students declare a major, typically in their second or third semester at Michigan. Students declaring Aerospace Engineering as their major are assigned a faculty advisor in the department.

Information on admission for first year students, transfer students and international students is available at admissions.umich.edu and engin.umich.edu/college/admissions/undergrad

TAILOR YOUR ACADEMIC EXPERIENCE

The Aerospace Engineering program offers considerable flexibility. Students tailor the program to their own interests by choosing electives from advanced aerospace courses or from minors in a wide range of topics.

These include the following applications:

- Aerodynamics • Helicopters • Air vehicle systems
- Rocket and spacecraft propulsion • Orbital dynamics and satellite control • Materials and advanced composites
- Computer and information systems for aerospace vehicles
- Computer science • Electrical Engineering
- Materials Science and Engineering • Mathematics • Physics

PROGRAM SCHEDULE

FIRST TERM - 17

- MATH 115 - 4
- ENG 100 - 4
- CHEM 125/126 - 2
- CHEM 130 - 3
- IB ELECTIVE - 4

THIRD TERM - 16

- MATH 215 - 4
- PHYSICS 240 - 4
- PHYSICS 241 - 1
- AERO 201 - 3
- AERO 205 - 3
- AERO 285 - 1

FIFTH TERM - 16

- AERO 315 - 4
- AERO 335 - 4
- ENGR. DISTR. 1 - 4
- ENGR. DISTR. 2 - 4

SEVENTH TERM - 15

- AERO 405 - 4
- AERO 470 - 3
- TECHNICAL ELECTIVE - 4
- IB ELECTIVE - 4

SECOND TERM - 17

- MATH 116 - 4
- ENG 101 - 4
- PHYSICS 140 - 4
- PHYSICS 141 - 1
- IB ELECTIVE - 4

FOURTH TERM - 16

- MATH 216 - 4
- ME 240 - 4
- AERO 225 - 4
- AERO 215 - 4

SIXTH TERM - 16

- AERO 305 - 4
- AERO 325 - 4
- AERO 341 - 3
- GENERAL ELECTIVE - 3
- GENERAL ELECTIVE - 2

EIGHTH TERM - 15

- AERO 481 - 4
- TECHNICAL ELECTIVE - 3
- GENERAL ELECTIVE - 4
- IB ELECTIVE - 4

Elective courses are to be chosen as follows:

INTELLECTUAL BREADTH (16 credits):

See the College of Engineering Bulletin for rules. Requirements include:

1. A 3 credits Humanities class marked HU in the LSA course guide
2. Professional & Creative Development Courses (PCDC): no more than 4 credits of PCDC as defined in bulletin
3. Liberal Arts Courses (LACs): Any course offered by any UM-Ann Arbor unit marked as HU or SS
4. At least 3 credits in the Humanities or LACs must be at the 300 level or higher.

ENGINEERING DISTRIBUTION (8 credits):

Select two courses from: MSE 220, MSE 350, EECS 215, EECS 216, EECS 280, EECS 281

TECHNICAL ELECTIVES (7 credits):

A total of 10 credits of technical elective courses is required. The courses must be upper division (that is 300 level or above) courses from engineering, mathematics, physical science, or other courses approved by an academic advisor, that are chosen to satisfy the following constraints:

Advanced Math Science Tech Elective (3 credits): One course of 3 or more credits must be advanced mathematics or advanced science/mathematics. This could include a course in astronomy, biology, chemistry, computer science, or physics. Recommended courses include: Math 351, Math 371, Math 404, Math 412, Math 416, Math 417, Math 419, Math 425, Math 450, Math 454, Math 471, Stat 412, Physics 340, Physics 390, Physics 391, Physics 402, Physics 405, Physics 413, Physics 451, AEROSP 423. Other courses can be selected if approved by an academic adviser.

Technical Electives: Any upper-division (3xx or higher) engineering, mathematics, physical science, or other course approved by advisor. Typically, Aero courses (any 400 or 500 level Aero course) are used for this requirement.

A maximum of 3 credits of directed study is allowed for technical elective credit.

A maximum of 2 credits of seminar, such as AE 585, is allowed for technical elective credit.

A maximum of 3 credits of AE 390 or AE 490, based on satisfactory completion of flight certification, can be used to satisfy the technical elective requirement.