AEROSPACE ENGINEERING
COURSE 16

DESCRIPTION
Aerospace engineers design, develop, and test new technologies for use in aviation, defense systems, and space exploration. They often use computer-aided design (CAD) software, robotics hardware/software, and lasers and advanced electronic optics to develop or improve aerospace platforms such as planes, drones, rockets, satellites, and spacecraft. Aerospace engineers may be experts in aerodynamics, thermodynamics, celestial mechanics, propulsion, acoustics, structural mechanics, embedded software, or guidance and control systems.

SKILLS
Problem-solving and analytical abilities Teamwork
Familiarity with relevant computer software Time and project management
Interpret and write technical documentation

POSSIBLE FUTURE POSITIONS
- **Payload specialist:** Accompany equipment onboard spacecrafts to ensure proper installation and functionality.
- **Structural engineer:** Designs and analyzes an aerospace platform’s structural integrity to verify the vehicle can handle stresses experienced in flight.
- **Systems engineer:** Analyze mission and design requirements and coordinate high level stages of a project. Systems engineers are responsible for integrating different subsystems into the overall system.
- **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.

CAREER INDUSTRY EXAMPLES
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<th>Aerospace and defense</th>
<th>Consulting</th>
<th>Robotics</th>
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<td>Computer hardware</td>
<td>Electrical engineering</td>
<td>Chemicals and materials</td>
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SAMPLE EMPLOYERS
- Airbus
- NASA Jet Propulsion Laboratory
- OneWeb
- Aurora Flight Sciences
- Karem Aircraft
- Sikorski Aircraft
- Blue Origin
- Kitty Hawk Corporation
- SpaceX
- Boeing
- Northrop Grumman
- Verus Research
- Lockheed Martin
- Raytheon
- Sierra Nevada Corp.
- United Launch Alliance
- Lincoln Laboratory
- Draper
INSIDE COURSE 16

16 Aeronautics and Astronautics Undergraduates: 134
16-ENG S.B. in Engineering as recommended by the Department of Aeronautics and Astronautics Undergraduates: 37

DEPARTMENT FAVORITES

16.001 - Unified Engineering
16.004 Topics include statics, analysis of trusses, analysis of statically determinate and indeterminate systems, stress-strain behavior of materials, linear and time invariant systems, convolution, transform analysis, aircraft and aerodynamic performance, conservation laws for fluid flows, quasi-one-dimensional compressible flows, shock and expansion waves, thermodynamic state of a system, forms of energy, work, heat, the first law of thermodynamics, heat engines, and reversible and irreversible processes.

16.83 - Space Systems Engineering, Space Systems Development
16.831 Students design a complete space system, including systems analysis, trajectory analysis, entry dynamics, propulsion and power systems, structural design, avionics, thermal and environmental control, and human factors. Students participate in teams responsible for an integrated vehicle design. In 16.831, students build a space system, focusing on refinement of sub-system designs and fabrication of full-scale prototypes, which are integrated into a vehicle. Sub-system performance is verified experimentally, and compared to physical models and design goals.

16.100 - Aerodynamics
Extends fluid mechanic concepts from Unified Engineering to aerodynamic performance of wings and bodies in sub/supersonic regimes. Addresses themes such as subsonic potential flows, including source/vortex panel methods; viscous flows and boundary layer theory; aerodynamics of airfoils and wings; and supersonic and hypersonic airfoil theory.

COURSE 16-FRIENDLY LABS

Space Propulsion Laboratory Institute for Soldier Nanotechnologies
Engineering Systems Laboratory Aerospace Controls Laboratory
Human Systems Laboratory Space Systems Laboratory

GET INVOLVED WITH COURSE 16

Design/Build/Fly Society of Women Engineers
Rocket Team Students for the Exploration + Development of Space

Sources: MIT Global Education & Career Development, Graduating Student Survey 2015 - 2017. Collegeboard.org. University of Minnesota Center for Academic Planning. UPOP is here to help you! Come talk to us in 1-123 or email us at upopstudentprogram@mit.edu