

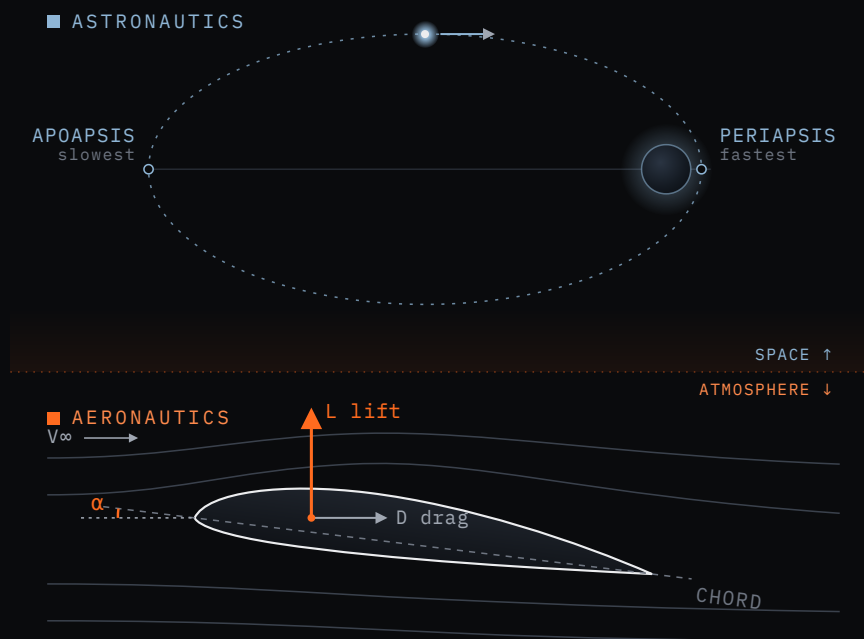
So, you want to be an aerospace engineer?

What aerospace engineering actually is, what you'll study, where it can take you, and how to prepare.

FOR STUDENTS & PARENTS

~8 MIN READ

SOURCED: BLS · ABET · FAA



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HOW TO READ THIS GUIDE

¹ marks a sourced fact; sources are listed on page 13 and every link is clickable. **GUIDANCE** marks our advice, which is not data. Figures are U.S. data unless noted.

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01

SECTION 01

What is aerospace engineering, really?

Aerospace engineers take a mission (cross an ocean, keep a satellite pointed at Earth, fly a camera through a forest) and turn it into a vehicle that does it safely and on budget.

Officially, they design, develop and test aircraft, spacecraft, satellites and missiles. ¹ In practice, **nobody designs “the plane.”** Each engineer owns a slice and spends much of their time making it work with everyone else’s.

THE AEROSPACE SYSTEM

MISSION

What must it do, and for whom?



REQUIREMENTS

Range, payload, mass, cost, safety margins



Aerodynamics

Airflow, lift and drag

Propulsion

Jets, props, motors, rockets

Structures

Strong enough, light enough

Materials

Metals, composites, failure

Controls & GNC

Stability, navigation, steering

Orbital mechanics

Paths through space

Systems eng.

Making every piece fit

Autonomy

Flying without a pilot



SIMULATION & TESTING

Models, wind tunnels, test stands, flight tests



VEHICLE

↺ Test results loop back up and can change the requirements.

02

SECTION 02

Air or space?

Aeronautics is vehicles that fly inside the atmosphere. **Astronautics** is spaceflight. Accredited “aerospace” programs go deep in one and cover the other.³

AERONAUTICS



Airliners, military aircraft, helicopters, UAVs, eVTOL, high-speed and autonomous aircraft.

ASTRONAUTICS



Rockets, satellites, spacecraft, landers, space stations, deep-space systems.

→ MOSTLY AIR

- Aerodynamics
- Flight dynamics & stability
- Jets & propellers
- Avionics

⊙ BOTH: THE SHARED CORE

- Calculus & physics
- Statics, dynamics, thermodynamics
- Fluids, materials, structures
- Controls & GNC
- Programming, CAD, simulation

WHY IT MATTERS

Most of the first two to three years are shared.

↑ MOSTLY SPACE

- Orbital mechanics
- Attitude control
- Rocket propulsion
- Space environment & thermal

You don't need your whole career figured out before college. The fundamentals overlap heavily.

03

SECTION 03

What should you actually be good at?

MATH

Algebra, trig, then calculus. **You don't need advanced math before college**; you need to be willing to practise.

PHYSICS

Forces, motion, energy, fluids. Understanding what an equation means beats memorising it.

PROBLEM SOLVING

Real problems aren't "find x." They're trade-offs with no single right answer.

CURIOSITY

"Why does that work?" and "What if I change this?" are already engineering instincts.

PERSISTENCE • THE ENGINEERING LOOP

DESIGN

→

TEST

→

FAIL

→

UNDERSTAND

→

CHANGE

→

TEST AGAIN

A failed test is information, not proof you're bad at this.

04

SECTION 04

What will you actually study?

Science, then general engineering, then aerospace, with hands-on design throughout. ABET requires accredited aerospace programs to include modeling, simulation, computing, testing and a culminating design experience.^[3] Exact courses vary by university.

01

≈ YEAR 1

FOUNDATION

Calculus

Physics

Chemistry

Programming

Intro to engineering

02

≈ YEARS 1-2

CORE ENGINEERING

Statics

Dynamics

Thermodynamics

Fluid mechanics

Materials

Mechanics of materials

03

≈ YEARS 2-3

AEROSPACE

Aerodynamics

Aircraft performance

Propulsion

Flight dynamics

Controls

Structures

Orbital mechanics

04

THROUGHOUT · PEAKS IN YEAR 4

APPLICATION

Labs

CAD

Simulation

Design projects

Capstone design

05

SECTION 05 · BEFORE YOU APPLY

Build something.

It doesn't need to be expensive. It needs to be a real problem you worked through.

LEVEL 1

\$0 – LOW COST

Learn basic Python

Script a physics homework problem.

Simulate something

A rocket's altitude with and without drag.

Learn free CAD

Model something on your desk to real dimensions.

Join a community

A club, maker space or rocketry group.

LEVEL 2

SMALL PROJECT

Arduino + sensor

Log accelerometer data and explain it.

3D-print a mechanism

A hinge or landing leg. Expect several versions.

Simple telemetry

Send sensor data wirelessly and plot it live.

Analyse flight data

Find where a flight was least stable, and why.

LEVEL 3

BIGGER PROJECT

Build a drone

Pick motors, props and battery to hit a flight-time target.

RC aircraft

Predict performance, then compare with flight.

Rocketry or robotics team

Real targets, deadlines and teammates.

Science fair or competition

Pose a testable question and test it properly.

NOT THE POINT

"I built a drone."

THE POINT

"I hit this problem, tried this, learned this, changed the design, and got this result."

FLYING IN THE U.S.? Register drones of 250 g or more, pass the free TRUST test, and stay at or below 400 ft in uncontrolled airspace. ⁴

06

SECTION 06

Before you commit to the major

Tick these honestly. There's no score. You make the call.

☐

Do I enjoy understanding how physical things work?

Try: read how a jet engine works and see if you want more.

☐

Am I okay with math being a big part of my education?

Try: one free intro calculus lecture.

☐

Do aircraft or spacecraft genuinely interest me?

Try: follow a real aircraft or launch program for a month.

☐

Am I willing to learn programming?

Try: two weekends of the Python tutorial.

☐

Can I handle problems where the answer isn't obvious?

Try: a small project with no instructions.

☐

Am I willing to fail before getting it right?

Try: notice how you react when a build doesn't work.

An unchecked box isn't a no. It's something to try before you decide.

07

SECTION 07 • U.S. DATA

Jobs & pay

U.S. Bureau of Labor Statistics figures for the occupation “aerospace engineers.” Wages are from May 2025; projections cover 2025–2035. ^[1]

MEDIAN PAY • MAY 2025	JOBS • 2025	GROWTH • 2025–35	OPENINGS / YEAR
\$134,960 vs \$50,980 for all occupations ^[1]	68,700 a fairly small occupation ^[1]	8% vs 3% for all occupations ^[1]	~3,800 many replacing retirees ^[1]

LARGEST EMPLOYERS • SHARE OF JOBS, 2025	MEDIAN ANNUAL WAGE • MAY 2025
Aerospace product & parts mfg. 38% 	Aerospace engineers \$134,960
Engineering services 16% 	All engineers \$108,620
Federal government 15% 	Mechanical engineers \$104,110
Navigation & control instruments 8% 	All occupations \$50,980
Research & development 8% 	Scale \$0–\$140k. Source: BLS. ^[1] ^[2]
Scale 0–40%. Source: BLS. ^[1]	

BLS links demand to quieter, more fuel-efficient aircraft, cheaper access to space and small satellites, and drones. ^[1] Defense work may need a security clearance, and some clearances require U.S. citizenship. ^[1]

GUIDANCE Hiring follows budgets and contracts, so single years can feel different from the ten-year average. The degree also leads to UAVs, robotics, autonomy, controls, simulation, testing and manufacturing, often at companies without “aerospace” in their name.

07

SECTION 07 • CONTINUED

Aerospace or mechanical?

Neither degree is “better.” They’re built for different kinds of focus, and engineers from both work in aerospace.

AERO, ORBITS, FLIGHT

SHARED CORE: MATH, STATICS, DYNAMICS,
THERMO, FLUIDS, MATERIALSMACHINES, HVAC,
MANUFACTURING

Schematic, not a measured percentage. Overlap varies by school.

	AEROSPACE	MECHANICAL
FOCUS	Aircraft, spacecraft, satellites, missiles ¹	Machines, engines, tools, thermal systems, robots ²
FIRST TWO YEARS	Largely shared: math, physics, statics, dynamics, thermodynamics, fluids, materials	
SPECIALISATION	Aerodynamics, propulsion, flight dynamics, orbital mechanics ³	Machine design, heat transfer, manufacturing, mechatronics
U.S. JOBS, 2025	68,700 · ~3,800 openings/yr ¹	298,500 · ~17,800 openings/yr ²
MEDIAN PAY, MAY 2025	\$134,960 ¹	\$104,110 ²
GROWTH, 2025–35	8% ¹	11% ²
BEST FIT IF...	Aircraft or spacecraft are what excite you	You want the broadest engineering base

Figures describe people working in each occupation, not graduates of each degree. Aerospace pay partly reflects which industries employ aerospace engineers.

GUIDANCE Many universities let students switch between the two in the first year or two, because early courses are shared. Check each school’s policy.

08

SECTION 08 · FOR PARENTS

What parents should know

Is it too specialised?

It's narrower and smaller than mechanical engineering,^[1]^[2] but the core skills (math, dynamics, controls, programming) transfer to fields like robotics and autonomy.

Do they need to be exceptional at math already?

No. Programs teach calculus and beyond. BLS recommends high school chemistry, physics and math.^[1]

How important are internships and projects?

BLS notes co-ops and internships give practical experience during school.^[1] **GUIDANCE** Both are the clearest evidence a student can do real engineering work, and projects come first, before internships are possible.

Is graduate school expected?

Not usually. A bachelor's is the typical entry-level education; graduate degrees help mainly for research and teaching.^[1]

What should we check when picking a school?

ABET accreditation. A degree from an accredited program is usually required for a Professional Engineering license later.^[1]

THE ONE THING TO REMEMBER

You don't become an engineer when someone hands you the degree. You start the first time you work a problem like this:

UNDERSTAND .
MODEL . BUILD .
TEST . LEARN .
IMPROVE .

Then do it again.



END OF GUIDE

Resources & references

GO FURTHER (FREE)

LEARN

MIT OpenCourseWare

ocw.mit.edu

LEARN

NASA Beginner's Guide to Aeronautics

nasa.gov

CODE

Official Python tutorial

python.org

COMPETE

American Rocketry Challenge

rocketrychallenge.org

CHOOSE A SCHOOL

ABET accreditation

abet.org

FLY LEGALLY

FAA recreational drone rules

faa.gov

REFERENCES · ACCESSED SEPTEMBER 25, 2026

-
- [1] U.S. BUREAU OF LABOR STATISTICS
Occupational Outlook Handbook: Aerospace Engineers
Wages May 2025; projections 2025–35; last modified Aug 27, 2026 · bls.gov/ooh/architecture-and-engineering/aerospace-engineers.htm
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- [2] U.S. BUREAU OF LABOR STATISTICS
Occupational Outlook Handbook: Mechanical Engineers
Wages May 2025; projections 2025–35; last modified Aug 27, 2026 · bls.gov/ooh/architecture-and-engineering/mechanical-engineers.htm
-
- [3] ABET
Criteria for Accrediting Engineering Programs, 2025–26 and 2026–27 · Aerospace program criteria
abet.org · [2025–2026 criteria](#) · [abet.org](#) · [2026–2027 criteria](#)
-
- [4] FEDERAL AVIATION ADMINISTRATION
Recreational Flyers & Community-Based Organizations
Last updated Mar 18, 2026 · faa.gov/uas/recreational_flyers
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