IOWA STATE UNIVERSITY
Department of Aerospace Engineering

# 4-Year Plan for Undergraduates

2020 catalog/graduation requirements

## First Year

| | | | | | | |
|---|---|---|---|---|---|---|
| Fall 15 Credits | Calculus I Math 165 4 Credits | Chemistry for Engineers Chem167/177 4 Credits | Engineering Problem Solving AerE 160/H 3 Credits | Library Instruction Libr 160 1 Credit | English Composition I Engl 150 3 Credits | Engineering Orientation Engr 101 |
| Spring 15 Credits | Calculus II Math 166 4 Credits | Classical Physics I Phys 221 5 Credits | Num., Graph., & Lab Techniques AerE 161/H 3 Credits | General Education GenEd 3 Credits | Aerospace Seminar AerE 192/H | |

## Second Year

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|---|---|---|---|---|---|---|
| Fall 18 Credits | Multi-variable Calculus Math 265 4 Credits | Classical Physics II Phys 232 & 232L 5 Credits | Intro to Performance & Design AerE 261 3 Credits | Statics for Engineers CE/EM 274 3 Credits | English Composition II Engl 250 3 Credits | |
| Spring 16 Credits | Differential Equations Math 267 4 Credits | Dynamics ME/EM 345 3 Credits | Intro to Material Sci & Engrg MatE 273 3 Credits | Mechanics of Materials EM 324 3 Credits | General Education GenEd 3 Credits | |

## Third Year

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|---|---|---|---|---|---|---|---|
| Fall 17 Credits | Flight Structures AerE 321 3 Credits | Structures Lab AerE 322 2 Credits | Thermo-dynamics ME 231 3 Credits | Aero-dynamics I AerE 310 3 Credits | Astro-dynamics I AerE 351 3 Credits | Flight Dynamics & Control AerE 355 3 Credits | Flight Experience AerE 301 |
| Spring 18 Credits | Advanced Flight Structures AerE 421 3 Credits | Comp. Tech-niques for Aero. Design AerE 361 3 Credits | Aerospace Systems AerE 362 3 Credits | Aerodynam-ics/Propul-sion Lab AerE 344 3 Credits | Aero-dynamics II AerE 311 3 Credits | Flight Con-trol Systems AerE 331 3 Credits | |

## Fourth Year

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|---|---|---|---|---|---|
| Fall 15 Credits | Technical Elective TechE 3 Credits | Technical Elective TechE 3 Credits | Design Methodology AerE 461 3 Credits | Aerospace Vehicle Propulsion AerE 411 3 Credits | Technical Comm Engl 309/314 3 credits |
| Spring 15 Credits | Technical Elective TechE 3 Credits | Technical Elective TechE 3 Credits | Design of Aerospace Systems AerE 462 3 Credits | General Education GenEd 3 Credits | General Education GenEd 3 Credits |

Basic Program

Course Groups

- *Aerospace Requirement*
- *Technical Elective*
- *Engineering Fundamentals*
- *Mathematics*
- *Chemistry & Physics*
- *General Education*
- *Seminars*

## Basic Program - 24 credits

Must be completed (Basic Program GPA > 2.0 and Cumulative GPA > 2.0) before 200-Level Engr courses

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|---|---|---|---|---|---|
| Calculus I | Math 165 | 4 | Calculus II | Math 166 | 4 |
| Chemistry | Chem 167/177 | 4 | Physics I | Phys 221 | 5 |
| Engrg Prob Solving | AerE 160/H | 3 | English 150 | Engl 150 | 3 |
| Engrg Orientation | Engr 101 | | Library Instruction | Libr 160 | 1 |

## English Proficiency - 9 credits

A grade of C or better in both English 150 and 250; part of basic program

| | |
|---|---|
| English Comp I Engl 150 | 3 |
| English Comp II Engl 250 | 3 |
| Technical Comm Engl 309 or 314 | 3 |

## General Education - 12 credits

GenEd

US Diversity (3); International Perspective (3); (6) from list approved by department; Two semester sequence in a single foreign language may be applied per ISU Foreign Language Requirements.

## Aerospace Engineering - 47 credits in 7 areas of study

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|---|---|---|---|
| **Aerodynamics** | Aerodynamics I | AerE 310 | 3 |
| | Aerodynamics II | AerE 311 | 3 |
| | Aerodynamics/Propulsion Lab | AerE 344 | 3 |
| **Propulsion** | Propulsion | AerE 411 | 3 |
| **Structures** | Flight Structures | AerE 321 | 3 |
| | Structures Lab | AerE 322 | 3 |
| | Adv Flight Structures | AerE 421 | 2 |
| **Controls** | Flight Dynamics & Control | AerE 355 | 3 |
| | Control Systems | AerE 331 | 3 |
| **Astrodynamics** | Astrodynamics I | AerE 351 | 3 |
| **Systems and Design** | Aerospace Systems | AerE 362 | 3 |
| | Design Methodology | AerE 461 | 3 |
| | Design of Aero Sys | AerE 462 | 3 |
| **Analysis and Numerics** | Num., Graph., & Lab Techniques | AerE 161/H | 3 |
| | Aerospace Analysis II | AerE 261 | 3 |
| | Comp. Techniques for Aero. Design | AerE 361 | 3 |

## Technical Electives - 12 credits - Adviser Approval Required

Make to Innovate M:2:I/ Undergraduate Research

AerE 290- Freshman and Sophomores; Technical credits do not count towards graduation. AerE 490 - Juniors and Seniors; Max of 6 technical credits may count towards graduation. See Academic Adviser for registration procedure.

Technical Electives

(A) Aerospace Electives (3): Propulsion - AerE 412, Experimental Mechanics - AerE417, Structures - AerE 422, Composities - AerE 423, Design/Structures - AerE 426, Controls - AerE 432, Space Dyn & Ctrl. - AerE 433, V/STOL - AerE 442, Comp. Fluid Dynamics - AerE 446, Turbo. Mach. - AerE 448, Astrodynamics - AerE 451, Intro to Multi-disciplinary Design Optimization - AerE 463, Spacecraft Systems - AerE 464, Large Scale Complex Eng. Syst. - AerE 468, Aviation Safety/Piloting - AerE 471, Wind Energy - AerE 481

(B) Technical/Engineering Electives (3): Select from list approved by the Department; group (A) courses may be used to satisfy this requirement. Courses may need to be pre-approved by AER E Curriculum Committee

(C) Career (6): Select from the courses in (A) or (B) or from 300/400/500 level courses in the ISU Catalog. Courses may need to be pre-approved by AER E Curriculum Committee

March 2020