Individualized Degree in Aerospace Physics, B.S.

This major is for students who are interested in pursuing a Bachelor of Science in the field of Aerospace Physics through the Individualized Degree Program (IDP). With a combination of coursework from multiple departments, including Physics, Aerospace, and Math, the degree provides students with a solid foundation in this interdisciplinary field.

All IDP students are required to submit an IDP proposal for approval. If you have not done so already, please schedule an appointment with an IDP advisor for more information and for access to the Canvas IDP Student Center.

Degree/Graduation Requirements

- Ethnic Studies and Social Justice Course: 3 credits
  - Students may fulfill the multicultural requirement by taking approved courses within one of the following categories: Arts and Humanities; Historical; Natural and Physical Sciences; Or Social and Behavioral Sciences
- Senior Experience: 3 credits
  - PHY 4611: Computational Physics (2) and PHY 4921: Physics Senior Seminar (1)

General Requirements

General Studies Requirements

- Written Communication: 6 credits
  - Recommended: ENG 1010: Composing Arguments (3), and ENG 1020: Research & Argument Writing (3)
- Oral Communications: 3 credits
  - Recommended: COMM 1010: Presentational Speaking (3)
- Quantitative Literacy: 3 credits
  - Recommended: MTH 1410: Calculus (4)
- Arts and Humanities: 6 credits
  - Recommended: PHI 1030: Ethics (3) and any approved Arts and Humanities (3)
- Historical: 3 credits
- Natural & Physical Sciences: 6 credits
  - Recommended: CHE 1100: Principles of Chemistry (4), CHE 1150: Principles of Chemistry Lab (1) AND PHY 2321: General Physics 1 Laboratory
- Social and Behavioral Sciences: 6 credits
  - Recommended: ECO 2010: Principles of Macroeconomics (3) and ECO 2020: Principles of Microeconomics (3)
- Global Diversity: 0-3 credits
  - Students may fulfill the Global Diversity requirement by taking approved courses within one of the following categories: Arts and Humanities; Historical; Natural and Physical Sciences; Or Social and Behavioral Sciences

Total of required credits for General Studies: 33-39 credits

Overview of Major Requirements

- Core classes (60+ credits)
- Elective classes (additional credits needed to reach 120 total credits)

Major Requirements (60+ credits)

Aerospace Physics Courses

- AES 2050: Av. History & Aerospace History Dev (3)
- AES 2607: Intro to Aerospace Sys Sim (3)*
- AES 3530: Aerodynamics (3)
- AES 3600: Space Flight Operations I (3)*
- AES 4601: Space Flight Operations II (3)*
- AES 4602: Aerospace Comm Ops (3)*
- AES 4603: Aerospace Ops Syst Anal & Design (3)*
- JMP 2610: Intro to Technical Writing (3)
- MTH 1210: Introduction to Statistics (4)
- MTH 2410: Calculus II (4)
- MTH 2420: Calculus III (4)
- MTH 3420: Differential Equations (4)
- PHY 2311: General Physics I (4)
- PHY 2321: General Physics I Lab (1)
- PHY 2331: General Physics II (4)
- PHY 2341: General Physics II Lab (1)
- PHY 3231: Vibrations, Waves, and Mathematical Methods (4)
- PHY 3111: Modern Physics I (4)
- PHY 3711: Junior Physics Laboratory (2)
- PHY 3121: Modern Physics II (3)
- PHY 3311: Analytical Mechanics (4)
- PHY 4611: Computational Physics (2)
- PHY 4921: Physics Senior Seminar (1)
- PHY 4950: General Relativity (3) OR PHY 4040: Planetary Physics (3)
- *Other courses as suggested by your IDP Faculty Advisor*

Electives

Students will need to take electives not listed here to meet the 120 credit hours and 39 upper division credits to complete the degree requirements. Talk to your IDP Advisor about how many additional credits you may need to meet the graduation requirements.

Space Commercialization Certificate

Students completing AES 2607, 3600, 4601, 4602, and 4603 (see * in above list) will also earn an MSU Denver certificate in Space Commercialization. This certificate will provide the student with the knowledge to seek opportunities in an important and expanding part of the Colorado and national economy, as well as expand opportunities for those currently employed in the
industry.

Total Aerospace Physics Credits: 60+ credit hours, 30+ upper division

Total Credits: 120 credit hours, 39 upper division

Faculty from Key Departments: Dr. Michael Botyarov (Aerospace), Dr. Kamran Sahami (Physics)

Contact for the Center for Individualized Learning: Dr. Sara Jackson Shumate

Contact the Center for Individualized Learning here: CIL Website and CIL Contact Form

Academic Plan – Aerospace Physics

Semester 1 – Fall	Semester 2 – Spring
• COMM 1010 Presentational Speaking (3) (GS) • ENG 1010 Composing Arguments (3) (GS) • MTH 1410 Calculus (4) (GS) • MTH 1210 Introduction to Statistics (4) • ESSJ course (3) **Total Credit Hours 17**	• AES 2050 Av. History & Aerospace History Dev (3) • CHE 1100 Principles of Chemistry (4) (GS) • CHE 1150 Principles of Chemistry Lab (1) (GS) • ENG 1020 Research & Argument Writing (3) (GS) • MTH 2410 Calculus II (4) **Total Credit Hours 15**
Semester 3 – Fall	**Semester 4 – Spring**
• PHI 1030 Ethics (3) (GS) • ECO Principles of Macroeconomics (3) (GS) • PHY General Physics I (4) • PHY 2321 General Physics I Lab (1) • MTH 2420 Calculus III (4) **Total Credit Hours 15**	• ECO 2020 Principles of Microeconomics • (3) (GS) • JMP 2610 Intro to Technical Writing (3) • PHY 2331 General Physics II (4) • PHY General Physics II Lab (1) • Global Diversity course (3) **Total Credit Hours 14**
Semester 5 – Fall	**Semester 6 – Spring**
• AES 3600 Space Flight Operations I (3) • MTH 3420 Differential Equations (4) • PHY 2711 Waves and Vibrations (4) • PHY Modern Physics I (4) **Total Credit Hours 15**	• Arts and Humanities Course (3) • AES 3530 Aerodynamics (3) • AES 4601 Space Flight Operations II (3) • PHY Modern Physics II (3) • PHY 3711 Physical Lab I (2) **Total Credit Hours 14-15**
Semester 7 – Fall	**Semester 8 – Spring**
• AES 4602 Aerospace Comm Ops (3) • AES 4603 Aerospace Ops Syst Anal & Design (3) • History Course (3) • PHY 3211 Analytical Mechanics (4) • PHY XXXX (3) **Total Credit Hours 16**	• AES 2607 Intro to Aerospace Sys Sim (3) • AES XXXX (3) • PHY 4611 Computational Physics (2) • PHY 4921 Physics Senior Seminar (1) • PHY General Relativity (3) • Ethnic Studies and Social Justice course (3) **Total Credit Hours 15**