AEROSPACE ENGINEERING - BACHELOR OF SCIENCE IN AEROSPACE ENGINEERING

The aerospace engineering program prepares students for a range of professional engineering careers in aerospace and related professions. The aerospace engineering curriculum covers the important classical areas of low and high speed aerodynamics, propulsion, orbital mechanics, flight mechanics and control, aerospace structures and laboratory practice. In addition, the principles of systems engineering and design that are necessary to conceive, design, analyze and troubleshoot complex engineering systems are covered extensively and are considered to be especially important in the overall educational experience. Students will also be encouraged to participate in significant non-classroom experiences, including:

- co-ops and internships;
- industrial and laboratory field trips;
- guest speakers from outside NMSU;
- the New Mexico Space Grant Program;
- special seminar programs on current topics in aerospace.

Aerospace engineers find employment in areas of launch vehicles, space vehicles and missions, aircraft systems design, land and sea vehicle design, robotics and automated manufacturing, safety and other areas. The aerospace engineering background also allows graduates to pursue careers in non-aerospace fields of engineering. Graduates of the aerospace engineering program will be prepared to apply the following skills to problems of interest either in the industry or research and development:

- engineering sciences,
- mathematics,
- computational methods,
- modern experimental methods,
- effective communication skills and
- systems engineering principles.

The aerospace engineering program is also intended to prepare students to pursue graduate study, which can be of significant benefit in the aerospace profession. The general goals of the aerospace engineering program, as well as the program educational objectives, are the same as those stated above for the mechanical engineering program.

Requirements (123 Credits)

Students must complete all University degree requirements, which include: General Education requirements, Viewing a Wider World requirements, and elective credits to total at least 123 credits with 48 credits in courses numbered 300/3000 or above. Developmental coursework will not count towards the degree requirements and/or elective credits, but may be needed in order to take the necessary English and Mathematics coursework.

In addition to the NMSU and College of Engineering requirements for graduation, a student must obtain a minimum grade of C- in all math, science, and engineering courses applied toward their Bachelor of Science in Aerospace Engineering (AE) and/or Mechanical Engineering (ME) minor.

Prefix	Title	Credits
General Education		
Area I: Communications		
English Composition - Level 1		*4*
ENGL 1110G	Composition I	
ENGL 1110H	Composition I Honors	
English Composition - Level 2 [1]		*3*
ENGL 2210G	Professional and Technical Communication	
ENGL 2210H	Professional and Technical Communication	
Oral Communication [1]		*3*
COMM 1115G	Introduction to Communication	
COMM 1130G	Public Speaking	
HNRS 2175G	Introduction to Communication Honors	
Area II: Mathematics		*4*
MATH 1511G	Calculus and Analytic Geometry I [2]	
MATH 1511H	Calculus and Analytic Geometry I Honors	
Area III/IV: Laboratory Sciences & Social/Behavioral Sciences		
CHEM 1215G	General Chemistry I Lecture and Laboratory for STEM Majors	4
PHYS 1310G & PHYS 1310L	Calculus -Based Physics I and Calculus -Based Physics I Lab	4
Area IV: Social/Behavioral Sciences [1]		3
Areas V: Humanities [1]		*3*
Area VI: Creative and Fine Arts [1]		*3*
General Education Elective		*4*
MATH 1521G	Calculus and Analytic Geometry II	
MATH 1521H	Calculus and Analytic Geometry II Honors	
Viewing a Wider World		
Viewing a Wider World Electives [3]		6
Departmental/College Requirements		
Mechanical Engineering		
ENGR 110	Introduction to Engineering Design	3
ENGR 140	Introduction to Programming and Embedded Systems	4
ENGR 233	Engineering Mechanics I	3
ENGR 234	Engineering Mechanics II	3
ENGR 217	Manufacturing Processes	3
ENGR 217 L	Manufacturing Processes Lab	1
M E 228	Engineering Analysis I	3
M E 240	Thermodynamics	3
M E 261	Numerical Methods	3
M E 328	Engineering Analysis II	3
M E 341	Heat Transfer	3
M E 345	Experimental Methods I	3
M E 349	MAE Career Seminar	1
Aerospace Engineering		
A E 339	Aerodynamics I	3
A E 362	Orbital Mechanics	3
A E 363	Aerospace Structures	3
A E 364	Flight Dynamics and Controls	3
A E 419	Propulsion	3
A E 439	Aerodynamics II	3
A E 424	Aerospace Systems Engineering	3
A E 428	Aerospace Capstone Design [4]	3
A E 447	Aerofluids Laboratory	3

Select one Aerospace Engineering Senior Elective from the following:		3
A E 405	Special Topics	
A E 451	Aircraft Design	
A E 464	Advanced Flight Dynamics and Controls	
A E 469	Hypersonic Aerothermodynamics	
M E 401	Building Energy and Environment	
M E 405	Special Topics	
M E 452	Control System Design	
M E 456	Experimental Modal Analysis	
M E 457	Engineering Failure Analysis	
M E 458	Properties and Mechanical Behavior of Materials	
M E 460	Applied Finite Elements	
M E 481	Alternative and Renewable Energy	
M E 483	Introduction to Combustion	
M E 486	Introduction to Robotics	
M E 487	Mechatronics	
ENGR 400	Special Topics [5]	
Non- Departmental Requirements		
Mathematics		
MATH 2530G	Calculus III	3
Natural Science		
PHYS 1320G	Calculus -Based Physics II	3
Engineering		
ENGR 190	Introduction to Engineering Mathematics	4
C E 301	Mechanics of Materials	3
CHME 361	Engineering Materials	3
Second Language: (not required)		
Electives to bring the total credits to 123		**0**
Total Credits		**123**

1 See General Education (https://catalogs.nmsu.edu/nmsu/general-education-viewing-wider-world/) section in this catalog for a full list of courses.

2 MATH 1511G Calculus and Analytic Geometry I is required for the degree but students may need to take any prerequisites needed to enter MATH 1511G first.

3 See the Viewing a Wider World (https://catalogs.nmsu.edu/nmsu/general-education-viewing-wider-world/#viewingawiderworldtext) section in this catalog for a full list of courses.

4 A E 428 Aerospace Capstone Design can be substituted by ENGR 401 Engineering Capstone I for those who pursue dual degrees in Mechanical Engineering and in Aerospace Engineering.

5 The total number of credits must be 3 in order for ENGR 400 to be counted as Aerospace Engineering Elective.

A Suggested Plan of Study for Students

This roadmap assumes student placement in MATH 1511G Calculus and Analytic Geometry I and ENGL 1110G Composition I. The contents and order of this roadmap may vary depending on initial student placement in mathematics and English. It is only a suggested plan of study for students and is not intended as a contract. Course availability may vary from fall to spring semester and may be subject to modification or change.

Freshman		
Fall		**Credits**
MATH 1511G or MATH 1511H	Calculus and Analytic Geometry I [1] or Calculus and Analytic Geometry I Honors	4
ENGR 190	Introduction to Engineering Mathematics	4
CHEM 1215G	General Chemistry I Lecture and Laboratory for STEM Majors	4
ENGL 1110G or ENGL 1110H	Composition I or Composition I Honors	4
	Credits	**16**
Spring		
MATH 1521G or MATH 1521H	Calculus and Analytic Geometry II or Calculus and Analytic Geometry II Honors	4
PHYS 1310G & PHYS 1310L	Calculus -Based Physics I and Calculus -Based Physics I Lab	4
ENGR 110	Introduction to Engineering Design	3
ENGL 2210G or ENGL 2210H	Professional and Technical Communication or Professional and Technical Communication	3
Area IV: Social/Behavioral Sciences [2]		3
	Credits	**17**
Sophomore		
Fall		
MATH 2530G	Calculus III	3
ENGR 233	Engineering Mechanics I	3
PHYS 1320G	Calculus -Based Physics II	3
ENGR 140	Introduction to Programming and Embedded Systems	4
ENGR 217	Manufacturing Processes	3
ENGR 217 L	Manufacturing Processes Lab	1
	Credits	**17**
Spring		
M E 228	Engineering Analysis I	3
ENGR 234	Engineering Mechanics II	3
M E 261	Numerical Methods	3
M E 240	Thermodynamics	3
COMM 1115G or COMM 1130G or HNRS 2175G	Introduction to Communication or Public Speaking or Introduction to Communication Honors	3
	Credits	**15**
Junior		
Fall		
M E 328	Engineering Analysis II	3
A E 339	Aerodynamics I	3
A E 362	Orbital Mechanics	3
C E 301	Mechanics of Materials	3
CHME 361	Engineering Materials	3
M E 349	MAE Career Seminar	1
	Credits	**16**
Spring		
A E 363	Aerospace Structures	3
A E 439	Aerodynamics II	3
A E 424	Aerospace Systems Engineering	3
M E 345	Experimental Methods I	3
M E 341	Heat Transfer	3
	Credits	**15**

Senior		
Fall		
A E 428	Aerospace Capstone Design	3
A E 447	Aerofluids Laboratory	3
A E 364	Flight Dynamics and Controls	3
Area V: Humanities [2]		3
Area VI: Creative and Fine Arts [2]		3
	Credits	**15**
Spring		
A E 419	Propulsion	3
Aerospace engineering senior elective		3
Viewing a Wider World [3]		3
Viewing a Wider World [3]		3
	Credits	**12**
	Total Credits	**123**

1. MATH 1511G Calculus and Analytic Geometry I is required for the degree but students may need to take any prerequisites needed to enter MATH 1511G first.
2. See the General Education (https://catalogs.nmsu.edu/nmsu/general-education-viewing-wider-world/) section in this catalog for a full list of courses.
3. See the Viewing a Wider World (https://catalogs.nmsu.edu/nmsu/general-education-viewing-wider-world/#viewingawiderworldtext) section in this catalog for a full list of courses.