CASE SCHOOL OF ENGINEERING
CASE WESTERN RESERVE UNIVERSITY

DEPARTMENT OF MECHANICAL AND AEROSPACE ENGINEERING

BACHELOR OF SCIENCE IN ENGINEERING DEGREE

Major in Aerospace Engineering

The courses you will take to earn a B.S. degree in Aerospace Engineering fall into three categories:

- University general education requirements
- Engineering general education requirements
- Major specific courses

General education requirements include:

- SAGES First Seminar
- two SAGES University Seminars
- 4 Breadth Electives (12 credits outside of the areas of engineering, natural science, and mathematics)
- two semesters of Physical Education

Engineering core requirements include:

- 7 preparatory courses in Math, Chemistry, and Physics
- 4 basic Engineering courses taken by most or all engineering majors
- one Departmental Seminar (ENGR398/ENGL398)

Major specific courses include:

- 18 required courses in Mechanical/Aerospace, Civil, and Electrical Engineering
- Physics 221
- one Technical Elective
- one Open Elective

More information about electives can be found after the recommended curriculum below.

First Year		**Credit Hours**	**Notes**
Fall			
FSCC 100	SAGES First Seminar	(4)	
CHEM 111	Principles of Chemistry for Engineers	(4)	
MATH 121	Calculus for Science and Engineering I	(4)	
PHYS 121	General Physics I - Mechanics	(4)	
PHED 101	Physical Education Activities	(0)	
	Total	(16)	
Spring			
University Seminar		(3)	
MATH 122	Calculus for Science and Engineering II	(4)	
PHYS 122	General Physics II - Electricity & Magnetism	(4)	
ENGR 131	Elementary Computer Programming	(3)	
ENGR 145	Chemistry of Materials	(4)	
PHED 102	Physical Education Activities	(0)	
	Total	(18)	
Second Year			
Fall			
University Seminar		(3)	
MATH 223	Calculus for Science and Engineering III	(3)	
ENGR 200	Statics and Strength of Materials	(3)	
EMAE 160	Mechanical Manufacturing	(3)	
EMAE 250	Computers in Mechanical Engineering	(3)	
	Total	(15)	
Spring			
MATH 224	Elementary Differential Equations	(3)	
PHYS 221	Introduction to Modern Physics	(3)	
ENGR 210	Introduction to Circuits and Instrumentation	(4)	
EMAE 181	Dynamics	(3)	
EMAE 251	Thermodynamics	(3)	
	Total	(16)	
Third Year			
Fall			
Breadth Elective		(3)	
EMAE 252	Fluid Mechanics	(3)	
EMAE 285	Mechanical Engineering Measurements Lab	(4)	
EMAE 350	Mechanical Engineering Analysis	(3)	
ECIV 310	Strength of Materials	(3)	
	Total	(16)	

Spring

Breadth Elective		(3)	
EMAE 353	Heat Transfer	(3)	
EMAE 359	Aero/Gas Dynamics	(3)	offered Spring only
EMAE 376	Aerostructures	(3)	offered Spring only
EMAE 351	Control of Mechanical Systems	(3)	
	Total	(15)	

Fourth Year

Fall

Breadth Elective		(3)	
EMAE 383	Flight Mechanics	(3)	offered Fall only
EMAE 384	Orbital Dynamics	(3)	offered Fall only
EMAE 355	Design of Fluid and Thermal Elements	(3)	
Open Elective		(3)	
	Total	(15)	

Spring

Breadth Elective		(3)	
EMAE 356	Aerospace Design	(3)	offered Spring only
EMAE 382	Propulsion	(3)	offered Spring only
EMAE 398	Senior Project	(3)	
ENGL/ENGR 398	Professional Communications for Eng.	(3)	
Technical Elective		(3)	
	Total	(18)	

Total	**(129)**

BACHELOR OF SCIENCE IN ENGINEERING DEGREE

Major in Mechanical Engineering

The courses you will take to earn a B.S. degree in Mechanical Engineering fall into three categories:

- University general education requirements
- Engineering general education requirements
- Major specific courses

General education requirements include:

- SAGES First Seminar
- two SAGES University Seminars
- 4 Breadth Electives (12 credits outside of the areas of engineering, natural science, and mathematics)
- two semesters of Physical Education

Engineering core requirements include:

- 7 preparatory courses in Math, Chemistry, and Physics
- 4 basic Engineering courses taken by most or all engineering majors
- one Departmental Seminar (ENGR398/ENGL398)

Major specific courses include:

- 15 required courses in Mechanical, Civil, and Electrical Engineering
- 4 Technical Electives
- 1 Science Elective
- 1 Open Elective

More information about electives can be found after the recommended curriculum below.

First Year		**Credit Hours**	**Notes**
Fall			
FSCC 100	SAGES First Seminar	(4)	
CHEM 111	Principles of Chemistry for Engineers	(4)	
MATH 121	Calculus for Science and Engineering I	(4)	
PHYS 121	General Physics I - Mechanics	(4)	
PHED 101	Physical Education Activities	(0)	
	Total	(16)	
Spring			
University Seminar		(3)	
MATH 122	Calculus for Science and Engineering II	(4)	
PHYS 122	General Physics II - Electricity & Magnetism	(4)	
ENGR 131	Elementary Computer Programming	(3)	
ENGR 145	Chemistry of Materials	(4)	
PHED 102	Physical Education Activities	(0)	
	Total	(18)	
Second Year			
Fall			
University Seminar		(3)	
MATH 223	Calculus for Science and Engineering III	(3)	
ENGR 200	Statics and Strength of Materials	(3)	
EMAE 160	Mechanical Manufacturing	(3)	
EMAE 250	Computers in Mechanical Engineering	(3)	
	Total	(15)	
Spring			
Math 224	Elementary Differential Equations	(3)	
Science Elective		(3)	
ENGR 210	Introduction to Circuits and Instrumentation	(4)	
EMAE 181	Dynamics	(3)	
EMAE 251	Thermodynamics	(3)	
	Total	(16)	
Third Year			
Fall			
Breadth Elective		(3)	
EMAE 252	Fluid Mechanics	(3)	
EMAE 285	Mechanical Engineering Measurements Lab	(4)	
EMAE 350	Mechanical Engineering Analysis	(3)	
ECIV 310	Strength of Materials	(3)	
	Total	(16)	

Spring

Breadth Elective	(3)	
EMAE 260 Design and Manufacturing I	(3)	
EMAE 353 Heat Transfer	(3)	
EMAE 370 Design of Mechanical Elements	(3)	
EMAE 351 Control of Mechanical Systems	(3)	
Technical Elective	(3)	
Total	(18)	

Fourth Year

Fall

Breadth Elective	(3)	
EMAE 355 Design of Fluid and Thermal Elements	(3)	
EMAE 360 Design and Manufacturing II	(3)	offered Fall only
Technical Elective	(3)	
Open Elective	(3)	
Total	(15)	

Spring

Breadth Elective	(3)	
EMAE 398 Senior Project	(3)	
ENGL/ENGR 398 Professional Communications for Eng.	(3)	
Technical Elective	(3)	
Technical Elective	(3)	
Total	(15)	

Total	**(129)**

BACHELOR OF SCIENCE IN ENGINEERING DEGREE

Double Major in Mechanical Engineering and Aerospace Engineering

The courses you will take to earn a B.S. degree in Mechanical Engineering and Aerospace Engineering fall into three categories:

- University general education requirements
- Engineering general education requirements
- Major specific courses

General education requirements include:

- SAGES First Seminar
- two SAGES University Seminars
- 4 Breadth Electives (12 credits outside of the areas of engineering, natural science, and mathematics)
- two semesters of Physical Education

Engineering core requirements include:

- 7 preparatory courses in Math, Chemistry, and Physics
- 4 basic Engineering courses taken by most or all engineering majors
- one Departmental Seminar (ENGR398/ENGL398)

Major specific courses include:

- 21 required courses in Mechanical/Aerospace, Civil, and Electrical Engineering
- Physics 221

More information about electives can be found after the recommended curriculum below.

First Year		**Credit Hours**	**Notes**
Fall			
FSCC 100	First Seminar	(4)	
CHEM 111	Principles of Chemistry for Engineers	(4)	
MATH 121	Calculus for Science and Engineering I	(4)	
PHYS 121	General Physics I - Mechanics	(4)	
PHED 101	Physical Education Activities	(0)	
	Total	(16)	
Spring			
University Seminar		(3)	
MATH 122	Calculus for Science and Engineering II	(4)	
PHYS 122	General Physics II - Electricity & Magnetism	(4)	
ENGR 131	Elementary Computer Programming	(3)	
ENGR 145	Chemistry of Materials	(4)	
PHED 102	Physical Education Activities	(0)	
	Total	(18)	
Second Year			
Fall			
University Seminar		(3)	
MATH 223	Calculus for Science and Engineering III	(3)	
ENGR 200	Statics and Strength of Materials	(3)	
EMAE 160	Mechanical Manufacturing	(3)	
EMAE 250	Computers in Mechanical Engineering	(3)	
	Total	(15)	
Spring			
MATH 224	Elementary Differential Equations	(3)	
PHYS 221	Introduction to Modern Physics	(3)	
ENGR 210	Introduction to Circuits and Instrumentation	(4)	
EMAE 181	Dynamics	(3)	
EMAE 251	Thermodynamics	(3)	
	Total	(16)	
Third Year			
Fall			
Breadth Elective		(3)	
EMAE 252	Fluid Mechanics	(3)	
EMAE 285	Mechanical Engineering Measurements Lab	(4)	
EMAE 350	Mechanical Engineering Analysis	(3)	
ECIV 310	Strength of Materials	(3)	
	Total	(16)	

Spring

EMAE 260	Design and Manufacturing I	(3)	
EMAE 353	Heat Transfer	(3)	
EMAE 359	Aero/Gas Dynamics	(3)	offered Spring only
EMAE 370	Design of Mechanical Elements	(3)	
EMAE 376	Aerostructures	(3)	offered Spring only
EMAE 351	Control of Mechanical Systems	(3)	
	Total	(18)	

Fourth Year

Fall

Breadth Elective		(3)	
EMAE 383	Flight Mechanics	(3)	offered Fall only
EMAE 384	Orbital Dynamics	(3)	offered Fall only
EMAE 355	Design of Fluid and Thermal Elements	(3)	
EMAE 360	Design and Manufacturing II	(3)	offered Fall only
	Total	(15)	

Spring

Breadth Elective		(3)	
Breadth Elective		(3)	
EMAE 356	Aerospace Design	(3)	offered Spring only
EMAE 382	Propulsion	(3)	offered Spring only
EMAE 398	Senior Project	(3)	
ENGL/ENGR 398	Professional Communication for Eng.	(3)	
	Total	(18)	

Total **(132)**

TECHNICAL ELECTIVES

All 200, 300, and 400 level courses from the following areas:

EMAE ALL, EMAE CROSS LISTED, EBME ALL, EBME CROSS LISTED, ECIV ALL, ECSE ALL, ECSE CROSS LISTED, EMAC ALL, EMAC CROSS LISTED, EMSE ALL, EMSE CROSS LISTED

ALL 300 and 400 level courses in ECHE

ALL 300 level MATH and STAT courses with the concurrence of the advisor.

OPEN ELECTIVE

You may take *any course you wish* to fill the Open Elective slot.

SCIENCE ELECTIVE (for Mechanical Engineering Major)

SIS is currently setup to accept PHYS 221 or STAT 312 as a science elective.
Other courses for individual students can be selected **with the approval of the student's advisor and the chair** using an Academic Advisement Requirement Form.

BREADTH ELECTIVE REQUIREMENTS

The General Education Requirements of the Case School of Engineering requires twelve (12) credit-hours of Breadth Electives. The Breadth Elective requirements are satisfied by any course outside of the areas of engineering, natural science, and mathematics offered by:

- the College of Arts and Sciences
- the Weatherhead School of Management
- the Frances Payne Bolton School of Nursing
- the Jack, Joseph, and Morton Mandel School of Applied Social Sciences
- the School of Medicine Department of Bioethics
- the Cleveland Institute of Music
- the Cleveland Institute of Art

Other courses approved by the School of Engineering's Undergraduate Studies Committee are also acceptable. The selection of courses to satisfy this requirement should be done in consultation with the student's academic advisor(s).

NOTES

All courses may be taken in Fall or Spring unless otherwise noted

Revision Control

10/12/2021	Updated EMAE 353 offered both Fall and Spring semesters Introduced new course EMAE 351 replacing ECSE 304
10/27/2020	Updated EMAE 251 and EMAE 252 offered both Fall and Spring semesters Changed department designation from EECS to ECSE
03/27/2019	Updated information on CSE Breadth Elective requirements: replaced Humanities or Social Science electives with Breadth electives
10/17/2017	Included information on EMAE Course requirements change