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 courses in the Humanities and Social Sciences (electives)
- 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)	offered Spring only
	Total	(16)	
Third Year			
Fall			
Humanities or Social Science Elective		(3)	
EMAE 252	Fluid Mechanics	(3)	offered Fall only
EMAE 285	Mechanical Engineering Measurements Lab	(4)	
EMAE 350	Mechanical Engineering Analysis	(3)	offered Fall only
ECIV 310	Strength of Materials	(3)	
	Total	(16)	

Spring

Humanities or Social Science Elective		(3)	
EMAE 353	Heat Transfer	(3)	offered Spring only
EMAE 359	Aero/Gas Dynamics	(3)	
EMAE 376	Aerostructures	(3)	
EECS 304	Control Engineering I	(3)	optional 1 credit Lab (305); offered Spring only
	Total	(15)	

Fourth Year

Fall

Humanities or Social Science 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

Humanities or Social Science 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 courses in the Humanities and Social Sciences (electives)
- 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)	offered Spring only
	Total	(16)	
Third Year			
Fall			
Humanities or Social Science Elective		(3)	
EMAE 252	Fluid Mechanics	(3)	offered Fall only
EMAE 285	Mechanical Engineering Measurements Lab	(4)	
EMAE 350	Mechanical Engineering Analysis	(3)	offered Fall only
ECIV 310	Strength of Materials	(3)	
	Total	(16)	

Spring

Humanities or Social Science Elective		(3)	
EMAE 260	Design and Manufacturing I	(3)	
EMAE 353	Heat Transfer	(3)	offered Spring only
EMAE 370	Design of Mechanical Elements	(3)	offered Spring only
EECS 304	Control Engineering I	(3)	optional 1 credit Lab (305); offered Spring only
Technical Elective		(3)	
	Total	(18)	

Fourth Year

Fall

Humanities or Social Science 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

Humanities or Social Science 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 courses in the Humanities and Social Sciences (electives)
- 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)	offered Spring only
	Total	(16)	
Third Year			
Fall			
Humanities or Social Science Elective		(3)	
EMAE 252	Fluid Mechanics	(3)	offered Fall only
EMAE 285	Mechanical Engineering Measurements Lab	(4)	
EMAE 350	Mechanical Engineering Analysis	(3)	offered Fall only
ECIV 310	Strength of Materials	(3)	
	Total	(16)	

Spring

EMAE 260	Design and Manufacturing I	(3)	
EMAE 353	Heat Transfer	(3)	offered Spring only
EMAE 359	Aero/Gas Dynamics	(3)	offered Spring only
EMAE 370	Design of Mechanical Elements	(3)	offered Spring only
EMAE 376	Aerostructures	(3)	offered Spring only
EECS 304	Control Engineering I	(3)	optional 1 credit Lab (305); offered Spring only
	Total	(18)	

Fourth Year

Fall

Humanities or Social Science 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

Humanities or Social Science Elective		(3)	
Humanities or Social Science 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, EECS ALL, EECS CROSS LISTED, EMAC ALL

ALL 300 and 400 level courses in ECHE and EMSE areas.

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

[We are **not** accepting EMSE201 as a technical elective.]

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.

HUMANITIES AND SOCIAL SCIENCES REQUIREMENTS

The General Education Requirements of the Case School of Engineering lists the following departments as satisfying this requirement for twelve (12) credit-hours comprised of 3- or 4-credit-hour courses.

Humanities: Arabic (ARAB), Art History (ARTH), Art Studio (ARTS), Chinese (CHIN), Classics (CLSC), Dance (DANC), English (ENGL), French (FRCH), German (GRMN), Greek (GREK), Hebrew (HBRW), History (HSTY), Italian (ITAL), Japanese (JAPN), Latin (LATN), Music - General (MUGN), Music - History (MUHI), Music - Theory (MUTH), Philosophy (PHIL), Portuguese (PORT), Religious Studies (RLGN), Russian (RUSN), Spanish (SPAN), Theater (THTR), World Literature (WLIT)

and/or

Social Sciences: Anthropology (ANTH), Cognitive Science (COGS), Communication Sciences (COSI), Economics (ECON), Political Science (POSC), Psychology (PSCL), Sociology (SOCI),

and/or

Other Courses that Meet this Requirement for CSE Degree Candidates: Applied Social Sciences (SASS), Bioethics (BETH)

NOTES

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

Effective January 2018:

The sequence of courses ENGR 225-EMAE 325 is replaced by the sequence of courses EMAE 251-EMAE 252-EMAE 353.

EECS 304 (Control Engineering I) replaces EECS 246 (Signals and Systems) as a required course in the ME and AE programs.

If courses completed are:	**Then:**
ENGR 225, EMAE 325, EECS 246	Requirements are satisfied
ENGR 225, EMAE 325, but not EECS 246	Student takes EECS 304 **AND** EECS 305 **(required)**
ENGR 225, but not EMAE 325 or EECS 246	Student takes EMAE 252 and EMAE 353 and EECS 304 (EECS 305 recommended)
None of the following: ENGR 225, EMAE 325 or EECS 246	Student takes EMAE 251, EMAE 252, EMAE 353 and EECS 304 (EECS 305 recommended)

EMAE 325 will not be offered after Fall 2017
EMAE 251 will be offered starting Spring 2018
EMAE 252 will be offered starting Fall 2018
EMAE 353 will be offered starting Spring 2019
EECS 304/305 is offered Spring semester only