UCDAVIS
MECHANICAL AND AEROSPACE ENGINEERING

2022-2023 Mechanical and Aerospace Engineering Major Requirements

NOTE: Mechanical Engineering **AND** Aerospace Science and Engineering majors are required to complete **all** courses listed on this page prior to graduation.

University Requirements (required by all UC Davis students)	
American History & Institutions – Click here for more information	
Writing Requirements	
Entry Level Writing (ELWR) – Click here for more information	
Lower/Upper Division Writing – Click here for more information	
General Education – Topical Breadth (52 units needed)	
	Courses Covered by EMEC/EASE major
Arts/Humanities (AH): 12 – 20 units	NONE
Science & Engineering (SE): 12 – 20 units	MAT/PHY/CHE
Social Science (SS): 12 – 20 units	ENG 003 ENG 190
General Education – Core Literacy *(can be completed with some GE courses used for topical breadth as well as some major requirements)*	
Writing Experience (WE) – 6 units	EME 108 EME 150A (EMEC ONLY)
Oral Literacy (OL) / Add'l (WE) – 3 units	ENG 003/CMN 001
Visual Literacy (VL) – 3 units	NONE
Domestic Diversity (DD) – 3 units	NONE
World Cultures (WC) – 3 units	NONE
Quantitative Literacy – at least 3 units	MAT
Scientific Literacy – at least 3 units	PHY/CHE
Communication Requirement	
ENG 003 – Intro to Engineering Design **OR** CMN 001 – Intro. to Public Speaking	

† may be taken concurrently

STUDENTS ARE RESPONSIBLE FOR ENSURING THAT ALL REQUIREMENTS FOR GRADUATION ARE COMPLETE.

Lower Division Engineering Core Requirements – Mathematics/Physical Science (47 units)	
Course (units)	Pre-requisites *(C- or better needed in most instances)*
MAT 021A - Calculus (4)	Satisfactory score on math placement exam.
MAT 021B - Calculus (4)	MAT 21A/AH
MAT 021C - Calculus (4)	MAT 21B/BH
MAT 021D - Vector Analysis (4)	MAT 21C/CH
MAT 022A - Linear Algebra (3)	MAT 21C/CH, ENG 6, EME 5, ECH 60/MAT 22A†
MAT 022B - Differential Equations (3)	MAT 22A
CHE 002A - General Chemistry (5)	Qualifying score on Chemistry Placement Exam.
CHE 002B - General Chemistry (5)	C- or better in CHE 2A/AH
PHY 009A *(lab)* - Classical Physics (5)	MAT 21B
PHY 009B *(lab)* - Classical Physics (5)	PHY 9A, MAT 21C, MAT 21D†
PHY 009C *(lab)* - Classical Physics (5)	PHY 9B, MAT 21D, MAT 22A†

Engineering Core Requirements – (47 units)	
Course (units)	Pre-requisites *(C- or better needed in most instances)*
ENG 004 *(lab)* - Engineering Graphics in Design (3)	NONE
ENG 006/EME 5± *(lab)* - *Engr Prob Solving / Engr Appl. (4)*	MAT 21A & MAT 21B† / EME 5: MAT 21A†
ENG 017 - Circuits I (4)	MAT 21C
ENG 035 - Statics (4)	MAT 21C/CH
ENG 45/Y *(lab)*- Properties of Materials	MAT 21C and CHE 2A, PHY 9A
Upper Division Core	
ENG 100 *(lab)* - Electronic Circuits & Systems (3)	ENG 17 *(C- or better recommended)*
ENG 102 - Dynamics (4)	ENG 35 and MAT 22B
ENG 103 - Fluid Mechanics (4)	ENG 35, MAT 22B and PHY 9B
ENG 104 - Mechanics of Materials (4)	ENG 35 & MAT 22B
ENG 105 - Thermodynamics (4)	MAT 22B & PHY 9B
ENG 190 - Professional Responsibilities (3)	Upper Division Standing
EME 106 - Thermo-Fluid Dynamics (4)	ENG 103 & 105
EME 108 *(lab)* - Measurement Systems (4)	ENG 100 & 102; ENG 104 *recommended*
EME 109 *(lab)* – Exper. Methods Therm Fluids (4)	EME 106
EME 165 – Fund. of Heat Transfer (4)	ENG 6/EME 5/ECS 30, ENG 103 & 105
EME 172 - Automatic Control of Eng. Systems (4)	ENG 100 & ENG 102

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2022-2023 Mechanical and Aerospace Engineering Major Requirements

NOTE: The major requirements below must be completed with the CORE requirements listed on Page 1.

This program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org

Aerospace Science and Engineering Majors ONLY

Aerospace Science and Engineering Core Requirements	
Course (units)	Pre-requisites *(C- or better needed in most instances)*
EAE 129 - Stability & Control of Aerospace Vehicles (4) *(Winter ONLY)*	ENG 102
EAE 133 - Finite Element Methods in Structure (4) *(Fall ONLY)*	ENG 104
EAE 135 - Aerospace Structures (4) *(Winter ONLY)*	ENG 104; EAE 126 or 127 recommended
EAE 138 - Aircraft Propulsion (4) *(Winter ONLY)*	EME 106
Aerodynamics Elective, choose one:	
EAE 126 - Theoretical/Computational Aerodynamics (4)	ENG 103, ENG 105 and ENG 180* or MAT 128C or EME 115
EAE 127 - Applied Aircraft Aerodynamics (4) *(Fall ONLY)*	EME106
Applied Mathematics Elective, choose one:	
ENG 180 - Engineering Analysis (4) *(Fall ONLY)*	ENG 6/EME 5/ECS 30 & MAT 21D & 22B
EME 115 - Intro to Numerical Analysis (4)	ENG 6/EME 5/ECS 30 & MAT 21A-22B & PHY 9A-9C
ECS 130 - Scientific Computation (4)	(ECS 030/ENG 006/ECS 032A/ECS 010/ECS 036A); (MAT 022A/MAT 027A/MAT 067)
MAT 128A - Numerical Analysis (4)	MAT 021C; (ECS 032A/ENG 006/ EME 005/ECS 030)
MAT 128C - Numerical Analysis in Differential Equat (4)	MAT 22A, 22B; ENG 6/EME 5/ECS 32A/ECS 30

Astronautics Elective, choose one:	
Course (units)	Pre-requisites *(C- or better needed in most instances)*
EAE 140 - Rocket Propulsion (4)	EME 106
EAE 142 - Orbital Mechanics (4)	ENG 102
EAE 143A - Space Vehicle Design (4)	EAE 140 and EAE 142
Aeronautics Elective, choose one:	
EAE 140* - Rocket Propulsion (4)	EME 106
EAE 142* - Orbital Mechanics (4)	ENG 102
EAE 143A* - Space Vehicle Design (4)	ENG 102, ENG 103 & ENG 105
EAE 126 - Theoretical/Computational Aerodynamics (4)	ENG 103, ENG 105 and ENG 180* or MAT 128C or EME 115
EME 139* *(lab)* - Stability of Flexible Dynamic Systems (4)	ENG 102 and ENG 103
Upper Division Technical elective – (4 units needed)	
Any Upper Division Engineering course in the College of Engineering that has not been used to satisfy other major requirements, except BIM 110L, ENG 160, ECS 188 or any 197T course.	

Senior Design Capstone, choose one series: *(8 units total, completed in Winter and Spring of final year)*	
Series	Pre-requisites
EAE 130A/B - Aircraft Performance and Design	EAE 126/127 and EAE 129†
EAE 143A/B – Space Vehicle and Mission Design	EAE 140 and EAE 142

† may be taken concurrently
**If not used to satisfy other requirements*

EASE Major Total Unit Count: 164
(not including GE Requirements)

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NOTE: The major requirements below must be completed with the CORE requirements listed on Page 1 of this document.

Mechanical Engineering Majors ONLY

Mechanical Engineering Core Requirements	
Course (units)	Pre-requisites *(C- or better needed in most instances)*
EME 050 *(lab)* – Manufacturing Processes (4)	ENG 4 and PHY 9A
EME 150A – Mechanical Design (4)	ENG 45/Y, 104 and EME 50†
Applied Mathematics Elective, choose one:	
ECH 140 – Math Methods. Bio/Chem ENG (4)	MAT 22B; ENG 6/ECH 60
ECI 114 – Probability Systems Analysis	MAT 21C
ECS 130 - Scientific Computation (4)	MAT 22A; ENG 6/ECS 32A/36A/10/30
EME 115 - Intro to Numerical Analysis (4)	ENG 6/EME 5/ECS 30 & MAT 21A-22B & PHY 9A-9C
ENG 180 - Engineering Analysis (4) *(Fall ONLY)*	ENG 6/EME 5/ECS 30 & MAT 21D & 22B
MAT 118A – Partial Diff Equations (4)	MAT 21D, MAT 22A, MAT 22B
MAT 128A - Numerical Analysis (4)	MAT 021C; (ECS 032A/ENG 006/ EME 005/ECS 030)
MAT 128B – Numerical Analysis – Eq of Sol (4)	MAT 22A; ENG 6/EME 5/ECS 32A /30
STA 130A – Brief Math Statistics (4)	MAT 21C, STA 13/13Y /32/100
STA 131A - Intro to Probability Theory (4)	MAT 21C and MAT 22A/27A; MAT 21D strongly recommended
System Dynamics Elective, choose one:	
EME 121 *(lab)* - Eng Appl of Dynamics (4)	ENG 6/ EME 5/ ECS 30 & ENG 102
EME 139 *(lab)* – Stab of Flexible Dyn Sys (4)	ENG 102 and ENG 103
EME 150B – Mechanical Design (4)	EME 150A
EME 154 *(lab)* – Mechatronics (4)	ENG 100 and 102 and EME 50
EME 171 *(lab)* – Sim & Des Mech Sys (4)	ENG 100 and ENG 102
ENG 122 – Intro to Mech Vibrations (4)	ENG 6/EME 5/ECS 30 & ENG 102; *MATLAB programming*

† may be taken concurrently
**If not used to satisfy other requirements*

EMEC Major Total Unit Count: 152 (not including GE Requirements)

STUDENTS ARE RESPONSIBLE FOR ENSURING THAT ALL REQUIREMENTS FOR GRADUATION ARE COMPLETE.

Restricted Electives (8 units) – Choose (2) courses from the following:

Course (units)*	Pre-requisites *(C- or better needed in most instances)*
EAE 129 - Stability & Control of Aerospace Vehicles (4) *(Winter ONLY)*	ENG 102
EAE 138 - Aircraft Propulsion (4) *(Winter ONLY)*	EME 106
EAE 140 - Rocket Propulsion (4)	EME 106
EAE 142 - Orbital Mechanics (4)	ENG 102
EAE 143A/B – Space Vehicle & Mission Design (4)	EAE 140 and EAE 142
EME 121 – Engineering App of Dyn (4)	ENG 6/ EME 5/ECS 30 & ENG 102
EME 134 *(lab)* - Vehicle Stability (4)	ENG 102
EME 139 *(lab)* – Stab of Flexible Dyn Sys (4)	ENG 102 and ENG 103
EME 150B – Mechanical Design (4)	EME 150A
EME 154 *(lab)* – Mechatronics (4)	ENG 100 and 102 and EME 50
EME 161 - Combustion & the Envir (4)	EME 106
EME 163 *(lab)* - Internal Combustion Engines (4)	EME 106 and EME 050
EME 164 - Intro to HVAC (4)	EME 106 and EME 165
EME 171 *(lab)* - Sim & Dsgn of Mech Sys (4)	ENG 100 and ENG 102
EMS 180 - Materials Engin Design (4)	ENG 045
EMS 182 *(lab)* – Failure Analysis (4)	ENG 45; EMS174 (recommended)
ENG 122 – Intro to Mech Variat (4)	ENG 6/EME 5/ECS 30 & ENG 102; *MATLAB programming*
ENG 188 – Sci & Tech, Sustain Pwr (4)	PHY 009C

Senior Design Capstone, choose one series: *(8 units total, completed in Winter and Spring of final year)*	
Series	Pre-requisites
EME 185A/B - Mechanical Systems Design Project	EME 50, EME 150A and EME 165†; ENG 3, CMN 1 & *Upper Division Composition recommended*
EAE 130A/B - Aircraft Performance and Design	EAE 126/127 and EAE 129†
EAE 143A/B – Space Vehicle and Mission Design	EAE 140 and EAE 142

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Double Majoring in Aerospace and Mechanical Engineering

If a student is interested in double majoring with both Aerospace and Mechanical Engineering, the following conditions must be met.

1. If a student's primary major is Aerospace Science and Engineering, the student must meet the change of major criteria as if they were applying to the Mechanical Engineering Major.
    a. If a student's primary major is Mechanical Engineering, the student must meet the change of major criteria as if they were applying to the Aerospace Science and Engineering Major.
        - Change of major requirements can be found here.

2. Double major students will follow the Aerospace Science and Engineering Degree requirements and add the following courses required for Mechanical Engineering.
    a. EME 050 – Restricted to only Mechanical Engineering Majors (or approved double majors) – NO EXCEPTIONS
    b. EME 150A – This course will count as the "Technical Elective" for the Aerospace Major.
    c. EME 139 – This course can count as both an "Aeronautics Elective" for the Aerospace Major and the "System Dynamics Elective" for the Mechanical Engineering Major.
        - Students may also take (2) separate courses to fulfill these requirements. (1) for Aeronautics Elective and (1) for System Dynamics Elective.
    d. Applied MAT Elective: ENG 180, EME 115, ECS 130, MAT 128 A/C – NO EXCEPTIONS OR SUBSTITUTIONS
        - *MAE Advising strongly encourages completion of ENG 180 or EME 115 as these are department-controlled courses.*
        - *Enrollment in ECS or MAT courses is at the discretion of the respective departments.*
    e. Senior Design Capstone – Double majors may choose to complete EAE 130A/B **OR** EAE 143A/B
        - Additional information about the senior design capstone can be found here.

3. No Petition-to-Add (PTA) numbers will be provided for students who choose to double major. Core courses for both Mechanical and Aerospace may overlap in time depending on the quarter taken. Please speak with your MAE advisor for additional information.