ENGINEERING MECHANICS, BS

REQUIREMENTS

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UNIVERSITY GENERAL EDUCATION REQUIREMENTS

All undergraduate students at the University of Wisconsin–Madison are required to fulfill a minimum set of common university general education requirements to ensure that every graduate acquires the essential core of an undergraduate education. This core establishes a foundation for living a productive life, being a citizen of the world, appreciating aesthetic values, and engaging in lifelong learning in a continually changing world. Various schools and colleges will have requirements in addition to the requirements listed below. Consult your advisor for assistance, as needed. For additional information, see the university Undergraduate General Education Requirements (http://guide.wisc.edu/undergraduate/#requirementsforundergraduatestudytext) section of the *Guide*.

General Education

- Breadth–Humanities/Literature/Arts: 6 credits
- Breadth–Natural Science: 4 to 6 credits, consisting of one 4- or 5-credit course with a laboratory component; or two courses providing a total of 6 credits
- Breadth–Social Studies: 3 credits
- Communication Part A & Part B *
- Ethnic Studies *
- Quantitative Reasoning Part A & Part B *

* The mortarboard symbol appears before the title of any course that fulfills one of the Communication Part A or Part B, Ethnic Studies, or Quantitative Reasoning Part A or Part B requirements.

ENGINEERING MECHANICS CURRICULUM

The following curriculum applies to students admitted to the engineering mechanics degree program.

SUMMARY OF REQUIREMENTS

Code	Title	Credits
Mathematics and Statistics [1]		22
Science [1]		10
Engineering Science		27
Engineering Mechanics Core		31
EMA Electives		9
Technical Electives		5
Communication Skills		8
Liberal Studies		16
Total Credits		**128**

[1] If the Mathematics and Statistics and the Science requirements are fulfilled with fewer than 30 credits combined, additional math/science credits will be needed to meet the math/science auxiliary credit condition.

MATHEMATICS AND STATISTICS

Code	Title	Credits
MATH 221	Calculus and Analytic Geometry 1	5
or MATH 217	Calculus with Algebra and Trigonometry II	
MATH 222	Calculus and Analytic Geometry 2	4
MATH 234	Calculus--Functions of Several Variables	4
MATH 320	Linear Algebra and Differential Equations	3
MATH 321	Applied Mathematical Analysis	3
STAT 324	Introductory Applied Statistics for Engineers	3
Total Credits		**22**

SCIENCE

Code	Title	Credits
Select one of the following:		5-9
CHEM 109	Advanced General Chemistry	
CHEM 103 & CHEM 104	General Chemistry I and General Chemistry II	
PHYSICS 202	General Physics	5
Total Credits		**10-14**

ENGINEERING SCIENCE

Code	Title	Credits
E M A 200	Introduction to Mechanics and Aerospace [1]	3
or M E 201	Introduction to Mechanical Engineering	
M E 231	Geometric Modeling for Design and Manufacturing	3
E P 271	Engineering Problem Solving I	3-4
or COMP SCI 200	Programming I	
or COMP SCI 220	Data Science Programming I	
M S & E 350	Introduction to Materials Science	3
M E 361	Thermodynamics	3
M E 363	Fluid Dynamics	3
or CIV ENGR 310	Fluid Mechanics	
M E 364	Elementary Heat Transfer	3
E C E 376	Electrical and Electronic Circuits	3-4
or PHYSICS 321	Electric Circuits and Electronics	
Computing Elective (Select One)		3
COMP SCI 300	Programming II	
COMP SCI 412	Introduction to Numerical Methods	
E M A/E P 471	Intermediate Problem Solving for Engineers	

E M A/E P 476	Introduction to Scientific Computing for Engineering Physics	
Total Credits		**27-29**

[1] E M A 200 or M E 201 are preferred introduction to engineering options. E M A 200 is offered in the fall only. M E 201 can be taken in the first or second semester. If a student begins in another engineering major, other introduction to engineering courses can count for the introduction to engineering requirement.

ENGINEERING MECHANICS CORE

Code	Title	Credits
E M A 201	Statics (with a grade of C or better)	3
E M A 202	Dynamics	3
E M A 303	Mechanics of Materials	3
E M A/M E 307	Mechanics of Materials Lab	1
E M A 405	Practicum in Finite Elements	3
E M A 469	Design Problems in Engineering	3
E M A 506	Advanced Mechanics of Materials I	3
Experimental Mechanics Elective (Select One)		*3*
E M A/M E 570	Experimental Mechanics	
E M A/M E 540	Experimental Vibration and Dynamic System Analysis	
E M A 611	Advanced Mechanical Testing of Materials	
E M A 522	Aerodynamics Lab	
E M A 521	Aerodynamics	3
or M E 563	Intermediate Fluid Dynamics	
E M A 542	Advanced Dynamics	3
or E M A 545	Mechanical Vibrations	
E M A 569	Senior Design Project	3
Total Credits		**31**

ENGINEERING MECHANICS AND AEROSPACE ENGINEERING ELECTIVES

Code	Title	Credits
Select 9 credits from any E M A course numbered 500 and above		9

TECHNICAL ELECTIVES

Code	Title	Credits
Select 5 credits from:		**5**
E M A 1	Cooperative Education Program (no more than 3 credits)	
Courses numbered 300+ in the College of Engineering except for E P D/INTEREGR		
Up to 3 credits of independent study such as E M A 599; independent study from other engineering subjects may be approved on an individual basis		
Courses numbered 300+ MATH, PHYSICS, COMP SCI, STAT (except STAT 301), ASTRON, MED PHYS, and CHEM departments		
PHYSICS 205	Modern Physics for Engineers	
or PHYSICS 241	Introduction to Modern Physics	

Students may also propose any class that they feel will benefit their education path with pre-requisite of two physics or calculus classes. For these courses the advisor will review the request and if approved, recommend a DARS substitution.

COMMUNICATION SKILLS

Code	Title	Credits
ENGL 100	Introduction to College Composition	3
or COM ARTS 100	Introduction to Speech Composition	
or LSC 100	Science and Storytelling	
or ESL 118	Academic Writing II	
E P D 275	Technical Presentations	2
INTEREGR 397	Engineering Communication	3
Total Credits		**8**

LIBERAL STUDIES

Code	Title	Credits
College of Engineering Liberal Studies Requirements		
complete requirements/ (http://guide.wisc.edu/undergraduate/engineering/mechanical-engineering/requirementstext/) [1]		16
Total Credits		**16**

[1] Students must take 16 credits that carry H, S, L, or Z breadth designators. These credits must fulfill the following sub-requirements:

1. A minimum of two courses from the same subject area (https://registrar.wisc.edu/subjectareas/) (the description before the course number). At least one of these two courses must be designated as above the elementary level (I, A, or D) in the course listing.
2. A minimum of 6 credits designated as humanities (H, L, or Z in the course listing), and an additional minimum of 3 credits designated as social science (S or Z in the course listing). Foreign language courses count as H credits. Retroactive credits for language courses may not be used to meet the Liberal Studies credit requirement (they can be used for subrequirement 1 above).
3. At least 3 credits in courses designated as ethnic studies (lower case "e" in the course listing). These courses may help satisfy subrequirements 1 and 2 above, but they count only once toward the total required. *Note:* Some courses may have "e" designation but not H, S, L, or Z designation; these courses do not count toward the Liberal Studies requirement.

TOTAL CREDITS: 128

For information on credit load, adding or dropping courses, course substitutions, pass/fail, auditing courses, dean's honor list, repeating courses, probation, and graduation, see the College of Engineering Official Regulations (http://guide.wisc.edu/undergraduate/engineering/#policiesandregulationstext).

NAMED OPTIONS IN ENGINEERING MECHANICS

Students may elect to declare a named option under the Engineering Mechanics BS. The named option in Aerospace Engineering can be declared as of Fall 2020. The named option in Astronautics is suspended

as of Summer 2020; the last term to earn the named option is Summer 2026.

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- **ENGINEERING MECHANICS: AEROSPACE ENGINEERING (HTTP://GUIDE.WISC.EDU/UNDERGRADUATE/ENGINEERING/MECHANICAL-ENGINEERING/ENGINEERING-MECHANICS-BS/ENGINEERING-MECHANICS-AEROSPACE-ENGINEERING-BS/)**
- **ENGINEERING MECHANICS: ASTRONAUTICS (HTTP://GUIDE.WISC.EDU/UNDERGRADUATE/ENGINEERING/MECHANICAL-ENGINEERING/ENGINEERING-MECHANICS-BS/ENGINEERING-MECHANICS-ASTRONAUTICS-BS/)**

HONORS IN UNDERGRADUATE RESEARCH PROGRAM

Qualified undergraduates may earn a Honors in Research designation on their transcript and diploma by completing 6 credits of undergraduate honors research, including a senior thesis. Further information is available in the department office.

UNIVERSITY DEGREE REQUIREMENTS

Total Degree	To receive a bachelor's degree from UW–Madison, students must earn a minimum of 120 degree credits. The requirements for some programs may exceed 120 degree credits. Students should consult with their college or department advisor for information on specific credit requirements.
Residency	Degree candidates are required to earn a minimum of 30 credits in residence at UW–Madison. "In residence" means on the UW–Madison campus with an undergraduate degree classification. “In residence” credit also includes UW–Madison courses offered in distance or online formats and credits earned in UW–Madison Study Abroad/Study Away programs.
Quality of Work	Undergraduate students must maintain the minimum grade point average specified by the school, college, or academic program to remain in good academic standing. Students whose academic performance drops below these minimum thresholds will be placed on academic probation.