APPLIED MATHEMATICS, ENGINEERING, AND PHYSICS, B.S. AMEP

REQUIREMENTS

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.

COLLEGE OF LETTERS & SCIENCE DEGREE REQUIREMENTS: BACHELOR OF SCIENCE–APPLIED MATHEMATICS, ENGINEERING, AND PHYSICS (B.S.–AMEP)

Students pursuing a Bachelor of Science—Applied Mathematics, Engineering, and Physics degree in the College of Letters & Science must complete all of the requirements below. The B.S.—AMEP is a special degree program; it is not considered a major. The B.S.—AMEP degree is not available to students who intend to earn a degree outside the College of Letters & Science.

BACHELOR OF SCIENCE – AMEP DEGREE REQUIREMENTS

Mathematics	Complete the University General Education Requirements for Quantitative Reasoning A (QR-A) and Quantitative Reasoning B (QR-B) coursework.
Foreign Language	Complete the second unit of a foreign language.
Liberal Arts and Science Requirement	Complete a minimum of 20 credits in Liberal Arts and Science (LAS) coursework outside the physical and mathematical sciences, including: • at least of 12 credits of Humanities and/or Social Science, including at least 6 credits in Humanities and at least 3 credits of Social Science • a maximum of 8 credits of Biological Science • additional eligible coursework to reach 20 total credits. Courses that carry the Physical Science breadth designation, or are listed (or cross-listed) in the MATH or COMP SCI subjects, are not eligible.
Total Credits	Complete at least 125 credits.
UW—Madison Experience	Complete both: • 30 credits in residence, overall, and • 30 credits in residence after the 90th credit.
Quality of Work	• 2.000 in all coursework at UW–Madison

REQUIREMENTS FOR THE PROGRAM

A total of at least 125 credits with a minimum GPA of 2.000 is required for this degree plan. Of these credits, at least 82 must be devoted to Mathematics, Physics, Engineering, and Chemistry requirements; 20 must be devoted to University General Education requirements; and the balance may be from electives.

Code	Title	Credits
FOUNDATION: Mathematics		**13–19**
Single Variable Calculus. Completed with credit for both othe following courses:		
MATH 221	Calculus and Analytic Geometry 1	
MATH 222	Calculus and Analytic Geometry 2	
Multivariable calculus. Completed with credit for one of the following two options:		
MATH 234	Calculus--Functions of Several Variables	
MATH 375 & MATH 376	Topics in Multi-Variable Calculus and Linear Algebra and Topics in Multi-Variable Calculus and Differential Equations [1]	
FOUNDATION: Physics		**11–14**
First Introductory course		
PHYSICS 247	A Modern Introduction to Physics	
or PHYSICS 207	General Physics	
or PHYSICS 201	General Physics	
or E M A 202	Dynamics	
or M E 240	Dynamics	
Second Introductory course		

PHYSICS 248	A Modern Introduction to Physics	
or PHYSICS 208	General Physics	
or PHYSICS 202	General Physics	

Third Introductory course

PHYSICS 249	A Modern Introduction to Physics	
or PHYSICS 241	Introduction to Modern Physics	
or PHYSICS 205	Modern Physics for Engineers	
or PHYSICS/ E C E 235	Introduction to Solid State Electronics	

CHEMISTRY. Completed with credit for one of the following options.		**5-9**
CHEM 109	Advanced General Chemistry	
CHEM 103 & CHEM 104	General Chemistry I and General Chemistry II	
CHEM 115	Chemical Principles I	

MATHEMATICS. Completed with at least six courses for 18 credits.		**18**

Core: Linear Algebra

MATH 320	Linear Algebra and Differential Equations [2]	
or MATH 340	Elementary Matrix and Linear Algebra	
or MATH 341	Linear Algebra	
or MATH 375	Topics in Multi-Variable Calculus and Linear Algebra	

Core: Differential Equations

MATH 320	Linear Algebra and Differential Equations [2]	
or MATH 319	Techniques in Ordinary Differential Equations	
or MATH 376	Topics in Multi-Variable Calculus and Differential Equations	

Core: Applied Analysis. Complete both courses.

MATH 321	Applied Mathematical Analysis	
MATH 322	Applied Mathematical Analysis	

MATH electives. [3]

Completed with at least three courses for nine credits.
Select from:

MATH 415	Applied Dynamical Systems, Chaos and Modeling	
MATH 421	The Theory of Single Variable Calculus	
MATH/STAT 431	Introduction to the Theory of Probability	
or MATH/ STAT 309	Introduction to Probability and Mathematical Statistics I	
MATH 443	Applied Linear Algebra	
MATH/ COMP SCI 513	Numerical Linear Algebra	
MATH/ COMP SCI 514	Numerical Analysis	
MATH 519	Ordinary Differential Equations	
MATH 521	Analysis I	
MATH 522	Analysis II	
MATH 531	Probability Theory	
MATH 561	Differential Geometry	

MATH 619	Analysis of Partial Differential Equations	
MATH 623	Complex Analysis	
MATH 627	Introduction to Fourier Analysis	
MATH/I SY E/ OTM/STAT 632	Introduction to Stochastic Processes	
PHYSICS. Completed with at least 5 courses for 15 credits.		**15**

Core Physics. Complete both:

PHYSICS 311	Mechanics	
PHYSICS 322	Electromagnetic Fields	

Physics electives: [4]

Remaining courses/credits from any PHYSICS course numbered 307 and above.	

ENGINEERING	

21 credits in Engineering courses with the following conditions: [5]		*21*
Courses must be numbered 300 or above.		
Courses must be distinct from any used to fulfill math and physics requirements above.		
LABORATORY EXPERIENCE. Minimum of three credits selected from the options below. [6]		**0-3**
The following course applies as three credits of lab:		
E M A 522	Aerodynamics Lab	
The following courses apply as two credits of lab each:		
PHYSICS 307	Intermediate Laboratory-Mechanics and Modern Physics	
PHYSICS 321	Electric Circuits and Electronics	
PHYSICS 325	Optics	
PHYSICS 407	Advanced Laboratory	
PHYSICS 623	Electronic Aids to Measurement	
PHYSICS 625	Applied Optics	
The following courses apply as one credit of lab each:		
E C E 270	Circuits Laboratory I	
E M A/M E 307	Mechanics of Materials Lab	
Computational Experience. [6]		**0-3**
Select one:		
COMP SCI 412	Introduction to Numerical Methods	
E P/E M A 471	Intermediate Problem Solving for Engineers	
MATH/ COMP SCI 513	Numerical Linear Algebra	
MATH/ COMP SCI 514	Numerical Analysis	
Bachelor of Science General Education Requirements		**20**
Electives to Reach 125 Credits		**6-23**
Total Credits		**125**

RESIDENCE AND QUALITY OF WORK

- Minimum 2.000 GPA in AMEP program courses.[7]
- Minimum 2.000 GPA and 15 upper-level AMEP program credits, taken in residence.[7,8]

- 15 credits in AMEP program courses, taken on the UW–Madison campus.[7]

HONORS IN THE MAJOR

Honors in the Major is not available in Applied Mathematics, Engineering, and Physics.

FOOTNOTES

1

MATH 375 may also be used to fulfill the Linear Algebra requirement below. MATH 376 may be used to fulfill the Diferential Equations requirement below.

2

 MATH 320 fulfills both the Linear Algebra and Differential Equations requirement. AMEP students are encouraged to consider the honors version of the course which is taught by AMEP faculty.

3

A default plan may include MATH 415, MATH/STAT 431, and MATH/COMP SCI 514.

4

A default plan might inlcude courses slected from
PHYSICS 307, PHYSICS 321, PHYSICS 325, PHYSICS 415, PHYSICS 448, and PHYSICS 449.

5

Work with an AMEP Engineering advisor to construct a progressive and cohesive sequence of courses. We recommend you begin enrolling in engineering courses at or near the completion of your MATH and PHYSICS core requirements.

6

Course used to fulfill this requirement need not be distinct from courses used to fulfill Mathematics, Physics, and Engineering requirements in AMEP.

7

This includes only those courses which may be used to fulfill Mathematics, Physics, Engineering, Chemistry, Laboratory, and Computational requirements described in the tables above.

8

A course numbered 300 or above is considered upper level in the program.

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.