

Engineering Physics Major - Bachelor of Science (BS)

In today's high-tech world, the boundaries between the traditional engineering disciplines are blurring, producing the need for engineers that are adaptable and have a broad knowledge base. The **engineering physics major** focusses on the physical and mathematical fundamentals of mechanical, electrical, civil, optical and materials engineering and includes a solid foundation in physics, mathematics, chemistry, and electronics. Embedded in the program are opportunities for students to take part in undergraduate research, internships, seminars, collaborative assignments, technical writing, and capstone projects. Graduates of this program can either enter the workforce upon graduation, where they will be well prepared to tackle the cross-disciplinary engineering challenges of today, or pursue graduate studies in physics or engineering.

This major also fulfills a mathematics minor, please complete a change of major/minor form to declare this minor.

Major requirements

(All colleges)

88 credits

Code	Title	Credits
Mathematics and basic sciences core		
CHM 103	General Chemistry I	5
CHM 104	General Chemistry II	5
PHY 203	General Physics I ¹	4
or PHY 103	Fundamental Physics I	
PHY 204	General Physics II ¹	4
or PHY 104	Fundamental Physics II	
MTH 207	Calculus I	4
MTH 208	Calculus II	4
STAT 245	Probability and Statistics	4
MTH 308	Linear Algebra with Differential Equations	4
MTH 310	Calculus III: Multivariable Calculus	4
MTH 353	Differential Equations and Dynamical Systems	3
Engineering and computer sciences and engineering design core		
CS 120	Software Design I	4
PHY 305	General Physics III	3
PHY 306	Modern Physics	3
PHY 308	Optics	3
PHY 311	Experimental Physics	2
PHY 320	Statics	3
PHY 321	Dynamics	3
PHY 334	Electrical Circuits	3
PHY 335	Electronics	4
PHY 343	Engineering Thermodynamics	3
PHY 492	Capstone in Engineering I	3
PHY 493	Capstone in Engineering II	3
CPE 481	Professionalism in Engineering	1
CPE 483	Engineering Project Management	1
Electives		

Select eight additional credits from the following:		8
CPE 301	Introduction to Transient Analysis	
CPE 302	Introduction to Control Systems	
PHY 332	Electrodynamics	
PHY 374	Computational Physics	
PHY 401	Quantum Mechanics	
PHY 411	Advanced Experimental Physics	
PHY 432	Advanced Electrodynamics	
PHY 450	Physics and Engineering Internship	
PHY 460	Condensed Matter Physics	
PHY 461	Mathematical Physics	
PHY 476	Advanced Optics	
PHY 497	Physics and Engineering Seminar	
PHY 498	Physics and Engineering Research ²	
Total Credits		88

¹ PHY 203 and PHY 204 preferred.

² Maximum of three credits of PHY 498 can be applied to major.

Degree requirements

All students must complete the general education, college core, major/minor, and university degree requirements in order to qualify for a degree. The easiest way to track all of these requirements is to refer to the Advisement Report (AR) found in the Student Information System (WINGS) Student Center. All enrolled students have access to the AR.

- General education (<https://catalog.uwlax.edu/undergraduate/generaleducation/>)
- College core (p. 1)
- Baccalaureate degree requirements (p. 2)

College of Science and Health (CSH) Bachelor of Science core requirements

B.S. and B.A. students graduating from the College of Science & Health are required to take:

- two MTH/STAT courses or one MTH/STAT course and one CS course from the General Education: Quantitative Reasoning Category (GEN ED 1004); and
- two courses selected from the General Education: Experiential Science Category (GEN ED 1008) and/or from BIO 203, BIO 304, BIO 210, CHM 104, GEO 221, GEO 222, PHY 104 or PHY 204. One of the two courses must be from a department outside of the student's major department.

Notes: Mathematics courses can be pairs, i.e. MTH 150 and MTH 151.

For the Bachelor of Science degree, in addition to all other College of Science and Health core requirements, students from non-exempted programs¹ must complete one of the following options. It is recommended that courses are selected in consultation with students' academic advisor.

1. Complete a second major; or
2. Complete a minor outside the major; or
3. Complete two certificates outside the major with at least 12 combined credits at the 300/400 level; or

4. Complete an individualized option, consisting of 18 credits

- a. At least 12 credits must be earned at the 300/400 level outside the major department.
- b. The remaining six credits should come from
 - i. 100 level or higher courses outside the major (General education courses may apply provided they are not being used to fulfill minimum general education requirements.); or
 - ii. 300/400 level courses inside major not being used to fulfill major requirements.
- c. Internship credits may not count toward the individualized option.

¹ The list of exempted CSH programs is below.

Baccalaureate degree requirements

Candidates for the Bachelor of Arts or the Bachelor of Science degrees must accomplish the following:

1. Fulfill the general education requirements.
2. Complete at least one ethnic studies (diversity) course.
3. Complete the courses prescribed by the Undergraduate Curriculum Committee for the degree desired in the respective school or college.
4. Earn a minimum of 120 semester credits with at least a 2.00 cumulative GPA.^{1,2}
5. At least 40 credits must be earned in 300/400 level courses. Transfer courses earned or transferred at the 300/400 level apply to this requirement.
6. Complete major and minor requirements with at least a 2.00 GPA^{1,2} in each major and minor (and concentration or emphasis, if selected).
7. A minimum of 30 semester credits in residence at UWL is required for graduation. (See undergraduate resident requirement (<https://catalog.uwlax.edu/undergraduate/academicpolicies/graduation/#undergraduate-residence-requirement>)).
8. Submit an application for graduation via the "Submit Intent to Graduate" link in the WINGS Student Center as soon as the student has registered for his or her final semester or summer term in residence. December and winter intersession graduates should apply by May 1. May and summer graduates should apply by December 1.

¹ Grade point average requirements for some programs will be considerably higher than 2.00. Re-entering students may be required to earn credits in excess of the 120 needed for graduation in any curriculum in order to replace credits earned in courses in which the content has changed substantially in recent years. Each case will be judged on its own merit.

² The grade point average recorded at the time the degree is awarded will not be affected by future enrollment.

No degree will be awarded unless all requirements are fulfilled and recorded within 30 days after the official ending date of each term.

Sample degree plan

Below is a sample degree plan that can be used as a guide to identify courses required to fulfill the major and other requirements needed for degree completion. A student's actual degree plan may differ depending on the course of study selected (second major, minor, etc.). Also, this sample plan assumes readiness for each course and/or major plan, and some courses may not be offered every term. Review the course descriptions or the class timetable (<http://www.uwlax.edu/records/registration/>) for course offering information.

The sample degree plans represented in this catalog are intended for first-year students entering UWL in the fall term. Students should use the Advisement Report (AR) in WINGS (<https://wings.uwlax.edu>) and work closely with their faculty advisor(s) and college dean's office to ensure declaration and completion of all requirements in a timely manner.

General Education Program

The general education curriculum (Gen Ed) is the common educational experience for all undergraduates at UWL. Sample degree plans include Gen Ed placeholders to ensure completion of the general education requirements. Courses may be rearranged to fit the needs or recommendations of the student's program of study. Gen Ed courses may be taken during winter term (January between the semesters) and summer to reduce the course load during regular terms (fall and spring). Students should consult with their advisor and/or the college academic services director in their college/school for assistance with course and schedule planning. Refer to the general education requirements (<https://catalog.uwlax.edu/undergraduate/generaleducation/>) for more specific details.

At least 40 credits of the 120 credits required must be earned at the 300/400-level.

Note: New students and transfer students with less than 12 credits earned are required to take FYS 100 First-Year Seminar (3 cr.) during one of their first two semesters at UWL.

This sample degree plan does not establish a contractual agreement. It identifies the minimum requirements a student must successfully complete, to qualify for a degree, in a format intended to assist the student in planning their academic career. Actual degree plans may differ.

Year 1

Fall	Credits	Spring	Credits
PHY 203 (Gen Ed 1008 Experiential Science)		4 PHY 204	4
PHY 497 (Engineering Physics Elective)		1 PHY 497 (Engineering Physics Elective)	1
FYS 100 (Gen Ed 1001 First- Year Seminar)		3 MTH 208	4
ENG 110 (Gen Ed 1002 Written Literacy)		3 CST 110 (Gen Ed 1003 Spoken Literacy)	3
MTH 207 (Gen Ed 1004 Quantitative Reasoning)		4 Gen Ed 1009 Social and Behavioral Studies	3
	15		15

Year 2

Fall	Credits	Spring	Credits
PHY 305		3 PHY 306	3
PHY 320		3 PHY 334	3
MTH 310		4 MTH 308	4
Gen Ed 1007 Arts and Aesthetics		2 CS 120 (CSH Core)	4

Gen Ed 1006 Mind and Body	3 Gen Ed 1007 Arts and Aesthetics	2
15		16
Year 3		
Fall	Credits Spring	Credits
PHY 311	2 PHY 308	3
PHY 321	3 CPE 483	1
STAT 245	4 MTH 353	3
Gen Ed 1005 Ethnic Diversity	3 CHM 103 (CSH Core)	5
Gen Ed 1010 Stories We Tell	Gen Ed 1013 Cultures of Our World	3
Gen Ed 1012 Planet That Sustains Us	3	
15		15
Year 4		
Fall	Credits Spring	Credits
PHY 335	4 PHY 343	3
PHY 492	3 PHY 493	3
Engineering Physics Elective	3 Engineering Physics Elective	3
CPE 481	1 CHM 104	5
Gen Ed 1011 Past That Define Us	3 University Elective	1
14		15
Total Credits: 120		