PHYSICS, DUAL DEGREE ENGINEERING EMPHASIS, MAJOR

Liberal Arts (Code 230-206)

University Requirements

GRADUATION REQUIREMENTS FOR BACCALAUREATE DEGREE

Credit Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum total for graduation</td>
<td>120</td>
</tr>
<tr>
<td>Upper division credits (courses numbered 300 and higher)</td>
<td>39</td>
</tr>
<tr>
<td>Liberal Education Core (<a href="http://catalog.uwec.edu/undergraduate/graduation-requirements/#header1">http://catalog.uwec.edu/undergraduate/graduation-requirements/#header1</a>)</td>
<td>36</td>
</tr>
<tr>
<td>Academic Concentrations (<a href="http://catalog.uwec.edu/undergraduate/graduation-requirements/#header16">http://catalog.uwec.edu/undergraduate/graduation-requirements/#header16</a>)</td>
<td></td>
</tr>
<tr>
<td>Grade Point Requirements (<a href="http://catalog.uwec.edu/undergraduate/graduation-requirements/#header14">http://catalog.uwec.edu/undergraduate/graduation-requirements/#header14</a>)</td>
<td></td>
</tr>
</tbody>
</table>

Total

2.00 average

Resident

2.00 average

Major

2.00 average

Minor

2.00 average

Certificate

2.00 average

University Residency Requirements (http://catalog.uwec.edu/undergraduate/graduation-requirements/#header15)

Minimum total

30

Senior year

23

Major, Standard, upper division in residence

12

Major, Comprehensive, upper division in residence

21

Certificate

25 percent of credits

Procedures Required for Graduation

Obtain admission to the degree program and/or the College offering it.

Apply for graduation on CampS.

Applicability of Credits Toward Graduation

Junior College or Two-Year College Credits. A maximum of 72 semester credits earned in a junior college or two-year college will be accepted as degree credits at UW-Eau Claire.

Extension Credits. Credits earned in credit outreach courses offered by UW-Eau Claire are treated as resident credits. Credits earned in extension courses offered by other units of the University of Wisconsin System are treated as transfer credits. All other (non-UW) extension and correspondence credits are normally limited to one-fourth of the total required for graduation from any curriculum.

WTCS Credits. A maximum of 72 semester credits earned in college parallel programs at Madison Area Technical College, Milwaukee Area Technical College, Nicolet Area Technical College, or Chippewa Valley Technical College may be accepted as degree credits at UW-Eau Claire. A set number of general education courses will be accepted from other technical schools.

Occupational and technical courses may also be considered for transfer if the quality and content of the course work from the technical college is judged to be comparable to course work at UW-Eau Claire. Refer to the Transfer Credit Wizard (https://my.uwec.edu/psp/PUBLIC/EMPLOYEE/HRMS/c/EAU_SS_CUSTOM.EAU_TRNCRDZWZ.GBL) or contact the UW-Eau Claire Admissions Office for information about the current transfer policy.

USAIF Credit. UW-Eau Claire will accept up to 32 semester credits for work done through the United States Armed Forces Institute, under the provision for non-UW correspondence credit (see Extension Credits above).

Activity Credit (band, chorus, drama, KINS 100-184 courses) Students may count toward graduation no more than one credit of KINS 110-184 courses. Students may count toward graduation no more than four credits earned in any single activity course and no more than 12 credits resulting from any combination of activity courses (excluding KINS 110-184 courses).

Other Restricted Credits. For other University restrictions, see the following: Cooperative Education; Credit by Examination; Satisfactory/Unsatisfactory Registration; Transfer of Credits. College or departmental restrictions may also be placed on Independent Study (399-499 courses), Directed Study (395-495), and other types of credits.

APPLICABILITY OF CREDITS TOWARD GRADUATION

<table>
<thead>
<tr>
<th>Credit Restrictions</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfactory/Unsatisfactory</td>
<td>maximum 12</td>
</tr>
<tr>
<td>Major, Standard</td>
<td>maximum 1 course</td>
</tr>
<tr>
<td>Major, Comprehensive</td>
<td>maximum 2 courses</td>
</tr>
<tr>
<td>Minor</td>
<td>maximum 1 course</td>
</tr>
<tr>
<td>Total degree credit</td>
<td>maximum ¼ of total</td>
</tr>
<tr>
<td>Major or minor</td>
<td>maximum ½ of total</td>
</tr>
<tr>
<td>Two-Year College Credits</td>
<td>maximum 72 credits</td>
</tr>
<tr>
<td>Total KINS 100-184</td>
<td>maximum 1 credit</td>
</tr>
<tr>
<td>Total Band, chorus, drama</td>
<td>maximum 12 credits</td>
</tr>
<tr>
<td>Single course band, chorus, drama</td>
<td>maximum 4 credits</td>
</tr>
<tr>
<td>Extension credits</td>
<td>no maximum</td>
</tr>
<tr>
<td>Other extension/correspondence</td>
<td>maximum ¼ of total</td>
</tr>
<tr>
<td>USAIF</td>
<td>maximum 32 credits</td>
</tr>
</tbody>
</table>
Liberal Education Core
The University of Wisconsin-Eau Claire measures learning outcomes to ensure that its graduates have achieved a liberal education and prepared themselves to contribute to a complex society. Upon graduation, each undergraduate will have met the five learning goals of our liberal education core and the 12 learning outcomes they comprise.

LIBERAL EDUCATION CORE REQUIREMENTS

Knowledge Goal
Knowledge Outcome 1 (K1): Natural Sciences (http://catalog.uwec.edu/undergraduate/attribute-k1/)
Two (2) learning experiences

One experience in laboratory science must be selected from either K1 or K2.

Knowledge Outcome 2 (K2): Social Sciences (http://catalog.uwec.edu/undergraduate/attribute-k2/)
Two (2) learning experiences

One experience in laboratory science must be selected from either K1 or K2.

Knowledge Outcome 3 (K3): Humanities (http://catalog.uwec.edu/undergraduate/attribute-k3/)
Two (2) learning experiences

Knowledge Outcome 4 (K4): Fine Arts (http://catalog.uwec.edu/undergraduate/attribute-k4/)
One (1) learning experience

Skills Goal
Skills Outcome 1 (S1): Written and Oral Communication (http://catalog.uwec.edu/undergraduate/attribute-s1/)
Two (2) learning experiences

One S1 must meet the University Writing Requirement (http://catalog.uwec.edu/undergraduate/graduation-requirements/#header10)

Skills Outcome 2 (S2): Mathematics (http://catalog.uwec.edu/undergraduate/attribute-s2/)
One (1) learning experience

One S2 to meet the University Mathematics Requirement (http://catalog.uwec.edu/undergraduate/graduation-requirements/#header11)

Skills Outcome 3 (S3): Creativity (http://catalog.uwec.edu/undergraduate/attribute-s3/)
One (1) learning experience

Responsibility Goal
Responsibility Outcome 1 (R1): Equity, Diversity, and Inclusivity (http://catalog.uwec.edu/undergraduate/attribute-r1/)
Two (2) learning experiences

One R1 must satisfy Design for Diversity (http://catalog.uwec.edu/undergraduate/attribute-DDIV/#header13)

Responsibility Outcome 2 (R2): Global Perspectives (http://catalog.uwec.edu/undergraduate/attribute-r2/)
One (1) learning experience

Responsibility Outcome 3 (R3): Civic and Environmental Issues (http://catalog.uwec.edu/undergraduate/attribute-r3/)
One (1) learning experience

Integration Goal
Integration Outcome 1 (I1): Integration (http://catalog.uwec.edu/undergraduate/attribute-i1/)
Two (2) learning experiences

Service-Learning Goal
Service-Learning (http://catalog.uwec.edu/undergraduate/attribute-SL/#header13) 30 hours

College Degree Requirements
Bachelor of Arts or Bachelor of Science Degree (B.A./B.S.)

University Graduation Requirements. All candidates for degrees must fulfill the requirements for credits, curriculum, GPA, and University residency as specified in the section of this catalog titled University Graduation Requirements (http://catalog.uwec.edu/undergraduate/graduation-requirements/).

College Graduation Requirements: Grade Point Averages. All candidates for degrees in the College of Arts and Sciences must earn minimum resident and total GPAs of 2.00 in the major, the minor, and the certificate. The resident and total GPAs for the major are computed using all attempted credits applicable to the major including those offered by departments other than the major department. The resident and total GPAs for the minor and the certificate are computed similarly.

Major-Minor and Major-Certificate Requirements. A standard major (a minimum of 36 credits) must be supplemented by a minor (a minimum of 24 credits) or by a certificate (12 to 18 credits) to meet graduation requirements for completing a first and second degree program. No minor or certificate is required with a Comprehensive Major (60 or more credits) or with two majors of 36 or more credits each.

Certain degree programs, which include Comprehensive Majors, may require more than the minimum of 120 credits for graduation.

Acceptable academic program combinations are determined at the college level. A major and a minor or a major and certificate or two majors (if available) may not be elected in the same department or program, except in the approved combinations listed here (http://catalog.uwec.edu/undergraduate/arts-sciences/#academicprogramtext).

College Credits. Earn at least 90 credits in courses offered by the College of Arts and Sciences.

Bachelor of Arts Degree in the College of Arts and Sciences (B.A.)

Fulfillment of all University Graduation Requirements (which includes the Liberal Education Core); all College-level degree requirements (major and minor/certificate emphases, GPAs, earning at least 90 credits in Arts and Sciences course work); foreign language competency at the 102 level. Foreign language competency may be met in one of two ways: (1) Achieve a score on the foreign language placement test that qualifies the student to enter the 201-level course in a foreign language. (2) Earn a grade of at least C (not C-) or a mark of S in a 102-level foreign language course (or AIS 112 or AIS 122 / LANG 122 or CSD 103).

Bachelor of Science Degree in the College of Arts and Sciences (B.S.)

Fulfillment of all University Graduation Requirements (which includes the Liberal Education Core); all College-level degree requirements (major and minor/certificate emphases, GPAs, earning at least 90 credits in Arts and Sciences course work); mathematics competency at the MATH 111, MATH 112...
or MATH 113 level. Mathematics competency can be met in one of three ways:
1) Achieve a score on the mathematics placement test that qualifies the student to enter MATH 114. 2) Earn a grade of at least C (not C-) or a mark of S in MATH 111, MATH 112, or MATH 113. 3) Achieve a satisfactory score on the MATH 122 competency test. This test may be attempted no more than two times.

Major Requirements

Liberal Arts (Code 230-206)

This emphasis combines the benefits of a traditional physics degree with those of a formal engineering education. In this program students receive a UW-Eau Claire physics degree in conjunction with a bachelor’s degree in engineering from UW-Madison, UW-Milwaukee, UW-Stout, or the University of Minnesota-Twin Cities.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSE 120</td>
<td>Introduction to Engineering</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 231</td>
<td>University Physics I</td>
<td>5</td>
</tr>
<tr>
<td>PHYS 232</td>
<td>University Physics II</td>
<td>5</td>
</tr>
<tr>
<td>PHYS 332</td>
<td>University Physics III</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 340</td>
<td>Optics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 350</td>
<td>Electric and Electronic Circuits</td>
<td>4</td>
</tr>
</tbody>
</table>

Select one of the following:

- PHYS 365 Theoretical Mechanics
- PHYS 255 Statics
- PHYS 356 and Dynamics (option depends on engineering program)

The remaining Physics credits are to be selected from any physics course above 325 (including PHYS 374/MSE 374) and MSE 315, MSE 357, MSE 372, and MSE 451.

Required courses not counted toward credits in major:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</tr>
</thead>
<tbody>
<tr>
<td>MATH 312</td>
<td>Differential Equations and Linear Algebra</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following:

- PHYS 240 Computational Physics ¹
- CS 145 Programming for New Programmers
- CS 163 Introduction to Programming in C++
- CS 170 Computing for the Sciences and Mathematics

or advisor-approved course appropriate for the engineering program

Complete an engineering degree ²

¹ Many upper division physics courses require proficiency in Python so PHYS 240 is preferred. If CS 145, CS 163 or CS 170 is taken, Python proficiency will be required prior to enrollment in relevant upper division physics courses. Contact the department to complete the required programming exercise.

² To receive the UW-Eau Claire Dual Degree Engineering Emphasis physics degree, the student must complete an engineering degree from one of the above schools. Students will typically complete most of the UW-Eau Claire Liberal Education Core and Dual Degree physics requirements while at UW-Eau Claire before transferring to the engineering school. Students must complete 84 semester credits before transferring to the engineering school, 56 of which must be taken in residency at UW-Eau Claire, with a minimum of 12 upper-division credits of physics and a minimum of six credits of mathematics taken at UW-Eau Claire.

NOTE 1: The UW-Eau Claire physics degree will not be awarded until an official copy of the student’s engineering degree has been sent to UW-Eau Claire’s Registrar’s Office. If the engineering degree is not completed, then students must satisfy all of the requirements for another degree program at UW-Eau Claire.

NOTE 2: A maximum of six credits of any combination of PHYS 399, PHYS 491, and PHYS 499 can be counted toward the major.

NOTE 3: Limit of 3 credits of PHYS 495 counted toward major.