

## Major in Physics – Physics-Engineering Dual Degree Emphasis

University of Wisconsin Oshkosh – Department of Physics and Astronomy

Emphasis for students who plan to pursue a physics-engineering dual degree. Students develop a strong foundational knowledge in physics to support their prospective engineering field. Students complete a minimum of three (3) years at UW Oshkosh and two (2) years at a partnering school of engineering. A schedule for the first three years is given here.

### Example 3-Year Plan (Calculus-ready)

<b>Semester 1</b>		<b>Semester 2</b>	
PHYS 109 – General Physics I	5 cr.	PHYS 110 – General Physics II	5 cr.
MATH 171 – Calculus I	4 cr.	MATH 172 – Calculus II	4 cr.
QUEST I	3-4 cr.	QUEST II	3 cr.
WBIS 188 or COMM 111	3 cr.	WBIS 188 or COMM 111	3 cr.
<i>Total Credits</i>	15-16 cr.	<i>Total Credits</i>	15 cr.

<b>Semester 3</b>		<b>Semester 4</b>	
PHYS 206 – Intro. to Modern Physics	3 cr.	PHYS 320 – Classical Physics	3 cr.
MATH 273 – Calculus III	4 cr.	PHYS 222 – Physics Lab I	2 cr.
QUEST III	3 cr.	MATH 371 – Differential Eqns. <sup>†</sup>	3 cr.
Physics Elective	3 cr.	USP Connect	3 cr.
USP Elective	3 cr.	Physics Elective	3 cr.
<i>Total Credits</i>	16 cr.	<i>Total Credits</i>	14 cr.

<b>Semester 5</b>		<b>Semester 6</b>	
Physics Elective	3 cr.	PHYS 417 (E&M) or 419 (Quantum) <sup>*</sup>	3 cr.
CHEM 105 – General Chemistry I	4 cr.	CHEM 106 – General Chemistry II	3 cr.
Physics Elective	3 cr.	Physics Elective	3 cr.
USP Elective	3 cr.	USP Elective	3 cr.
Elective	3 cr.	Elective	3 cr.
<i>Total Credits</i>	16 cr.	<i>Total Credits</i>	15 cr.

Note: This schedule does not include potential courses taken during the interim. Depending on your senior research project, at least one other elective course may be needed to reach the 120 credits necessary for graduation.

\* - Course is offered every fourth semester

† - Courses *may* be taken as a combined course at destination engineering school

## Requirements for the Major: Physics-Engineering Dual Degree Emphasis

### Core:

#### *Physics:*

PHYS 109 – General Physics I (5 cr.)  
PHYS 110 – General Physics II (5 cr.)  
PHYS 206 – Intro. to Modern Physics (3 cr.)  
PHYS 222 – Physics Lab I (2 cr.)  
PHYS 320 – Classical Physics (3 cr.)

#### *Math:*

MATH 171 – Calculus I (4 cr.)  
MATH 172 – Calculus II (4 cr.)  
MATH 273 – Calculus III (4 cr.)  
MATH 371 – Differential Equations (3 cr.)

#### *Chemistry:*

CHEM 105 – General Chemistry I (5 cr.)  
CHEM 106 – General Chemistry II (5 cr.)

### Electives (8 credits minimum):

PHYS 201 – Statics (3 cr.)  
PHYS 203 – Intro. to Astrophysics (3 cr.)  
PHYS 305 – Circuits and Devices (3 cr.)<sup>1</sup>  
PHYS 307 – Optics (3 cr.)<sup>1</sup>  
PHYS 310 – Stellar Structure & Evolution (3 cr.)<sup>§3</sup>  
PHYS 311 – Digital Instrumentation (3 cr.)  
PHYS 313 – Star Formation & Galaxies (3 cr.)<sup>§3</sup>  
PHYS 319 – Digital Signal Processing (3 cr.)<sup>3</sup>  
PHYS 408 – Thermodynamics (3 cr.)<sup>2</sup>  
PHYS 451 – Special Topics (1-3 cr.)  
PHYS 491 – Senior Research Project (1-4 cr.)

### Additional Requirement (3 credits):

Students must complete one of the two following courses.

#### *Physics:*

PHYS 417 – Electricity & Magnetism (3 cr.)<sup>3</sup>  
PHYS 419 – Quantum Mechanics (3 cr.)<sup>4</sup>

1 – Offered fall of every-other odd year

2 – Offered fall of every-other even year

3 – Offered spring of every-other odd year

4 – Offered spring of every-other even year

§ - A student may only take either PHYS 310 or PHYS 313 as an elective

### University Studies Program (USP) Requirements (41 credits minimum):

*From the UWO Undergraduate Bulletin:* Students will select USP Explore courses in three major categories: Nature (XM)/(XL), Culture (XC), and Society (XS). Three of those Explore courses are intense and distinct learning community courses called "Quests" that need to be taken at designated times: first semester-Quest I; second semester-Quest II; sophomore year-Quest III. Finally, in their fourth or fifth semester (after completing a Quest III course), students will take Connect. The Connect course is an advanced writing course that requires students to synthesize their learning in University Studies Program. Students need to select an additional 32 credits in Explore courses: 11 credits in Nature (3 – Mathematics, 8 – Lab Sciences), 9 credits in Culture, 9 credits in Society, and 3 credits in Ethnic Studies.

Baccalaureate Degree Requirements (120 credits minimum):

The University of Wisconsin Oshkosh has requirements that must be met for graduation with a baccalaureate degree. These requirements also depend on whether you pursue a Bachelor Degree in Science or a Bachelor Degree in Arts. Please see the following website for a full description.

<https://www.uwosh.edu/registrar/undergradbulletins/2015-2017/policies>