



## Department of Physics and Astronomy Physics, Applied Physics, and Astrophysics

The Department of Physics intends to offer three-year Bachelor of Science degrees in Physics (BS3331), Physics Applied Physics (BS3332) and Physics Astrophysics (BS3335) as well as a three-year Bachelor of Arts degree in Physics (BA3331). The curricula outlined below are semester-by-semester plans of study for the aforementioned degrees in adherence to section 3333.71 of the Revised Code for three-year baccalaureate degrees.

The curricula given below show that High school students who apply with thirty semester hours of Tier I and Tier II credits (including the first year of Calculus and the first semester of Calculus-level Physics) from Advanced Placement (AP), transfer credit or other approved equivalent credit, will have finished the equivalent of the first year of our current program and would thus be able to finish the program within three years by successfully taking courses on the following schedules. The number of required credit hours could be reduced if students were able to take Freshman Composition or the Tier II courses or Foreign language in summer session or by taking a heavier course load during the academic year. The absolute minimum requirements to enter the program and graduate on schedule are to have equivalents to the first semester of Calculus (MATH 2301) and the first semester of Physics (PHYS 2051).

Note that these are sample curricula, and minor modifications in ordering of non-physics courses is probably possible while still finishing within the 3-year time frame. It is possible, but not guaranteed, that students with fewer than the suggested requirements for Calculus and Introductory Physics might be able to finish within 3 years, but this would require an intensity of Physics and Mathematics courses in senior year that only a small fraction of students would be able to complete successfully.

BS3338 Physics Meteorology is a program that has parallel versions of the program in Geography and Mathematics. Students take a heavy load of Physics, Math and Geography/Meteorology courses. It is possible for an extremely well-prepared student with AP credit for the full year of Calculus, the first semester of calculus-level Physics, the first semester of chemistry, the equivalent of GEOG 1100 (Physical Geography) and computer programming to have the equivalent of the first year courses for this major, but the program has a tight grid of prerequisites and offers many of its courses in alternate years, so a student should only undertake a three year degree in consultation with an advisor on an ad hominem basis. A detailed 3-year curriculum for this major is not included.

The scheduling scenario below is intended to present an example pattern by which this major can be completed in three years. Those interested in pursuing this option need to work with an academic advisor to develop a specific plan to earn the credit hours required for graduation.

**BS3331 Physics Major and BS3332 Physics – Applied Physics Major\***

<b>Post-Secondary Coursework or Transfer/AP/IB Credit</b>			
Course Subject and Title (Or General Tier/Major Requirement)	Credit Hours	Upper Division	Minimum Grade
Tier I - Freshman Composition	3		
Tier I - Quantitative skills - Calculus I	4		C
Tier II - Applied Science - Calculus II	4		C
Tier II - Natural Science - Physics I (Calculus level=PHYS 2051)	5		
Tier II - Humanities and Literature	3		
Tier II - Social Sciences	3		
Foreign Language	8		
Total hours (minimum 15)	30		

<b>Semester 1: Fall</b>			
Course Subject and Title (Or General Tier/Major Requirement)	Credit Hours	Upper Division	Minimum Grade
PHYS 1901 Seminar	1		
PHYS 2052 Physics II	5		
MATH 3300 Calculus III	4	YES	
Tier II - Cross Cultural Perspectives	3		
A&S Humanities	3		
Total hours for semester	15		

<b>Semester 2: Spring</b>			
Course Subject and Title (Or General Tier/Major Requirement)	Credit Hours	Upper Division	Minimum Grade
PHYS 2053 Contemporary Physics	3		
PHYS 2701 Electronics	2		
MATH 3400 Ordinary Differential Equations	3	YES	
Tier II - Fine Arts	3		
A&S Social Science	3		
Elective	1		
Total hours for semester	15		

<b>Semester 3: Summer</b>			
Course Subject and Title (Or General Tier/Major Requirement)	Credit Hours	Upper Division	Minimum Grade
PHYS 3001 Classical Mechanics	4	YES	
PHYS 3701 Junior Lab I	2	YES	
MATH 3200 Linear Algebra	3	YES	
MATH 3600 Numerical Methods	3	YES	
A&S Humanities	3		
Total hours for semester	15		

<b>Semester 4: Fall</b>			
Course Subject and Title (Or General Tier/Major Requirement)	Credit Hours	Upper Division	Minimum Grade
PHYS 3011 Thermal Physics	3	YES	
PHYS 3702 Junior Lab II	2	YES	
MATH 4410 PDE & Fourier Analysis	3	YES	
Tier I - Junior Composition	3	YES	
A&S Social Science	3		
Elective	1		
Total hours for semester	15		

<b>Semester 5: Spring</b>			
Course Subject and Title (Or General Tier/Major Requirement)	Credit Hours	Upper Division	Minimum Grade
PHYS 4031 Electricity and Magnetism I	3	YES	
PHYS 4021 Quantum Mechanics	3	YES	
Elective	3		
Elective	3		
Elective	3		
Total hours for semester	15		

<b>Semester 6: Summer</b>			
Course Subject and Title (Or General Tier/Major Requirement)	Credit Hours	Upper Division	Minimum Grade
PHYS 4032 Electricity and Magnetism II	3	YES	
PHYS 4051 Modern Physics (T3E) or other T3 or T3E	3	YES	
Elective	3		
Elective	3		
Elective	3		
Total hours for semester	15		

\*Note: The requirements for Applied Physics are the same as those for Physics. In consultation with the Applied Physics Advisor, students can replace some of the upper division courses with courses from other majors to provide a more applied focus to their degree.

## BA3331 Physics Major\*

<b>Post-Secondary Coursework or Transfer/AP/IB Credit</b>			
Course Subject and Title (Or General Tier/Major Requirement)	Credit Hours	Upper Division	Minimum Grade
Tier I - Freshman Composition	3		
Tier I - Pre-calculus (AP)	4		
Tier II - Humanities and Literature	3		
Tier II - Social Sciences	3		
Foreign Language (1 <sup>st</sup> year)	8		
Electives	9		
Total hours (minimum 15)	30		

<b>Semester 1: Fall</b>			
Course Subject and Title (Or General Tier/Major Requirement)	Credit Hours	Upper Division	Minimum Grade
PHYS 1901 Seminar	1		
MATH 2301 - Calculus I (Tier II - Applied Science)	4		
Foreign Lang. (2 <sup>nd</sup> year; Tier II - Cross Cultural Perspectives)	4		
A&S Social Science	3		
A&S Humanities	3		
Total hours for semester	15		

<b>Semester 2: Spring</b>			
Course Subject and Title (Or General Tier/Major Requirement)	Credit Hours	Upper Division	Minimum Grade
PHYS 2051 Physics I (Tier II - Natural Science)	5		
MATH 2302 - Calculus II	4		
Foreign Language (2 <sup>nd</sup> year)	4		
Tier II - Fine Arts	2		
Total hours for semester	15		

<b>Semester 3: Summer</b>			
Course Subject and Title (Or General Tier/Major Requirement)	Credit Hours	Upper Division	Minimum Grade
PHYS 2052 Physics II	5		
MATH 3400 Ordinary Differential Equations	3	YES	
A&S Humanities	3		
A&S Social Science	3		
Elective	1		
Total hours for semester	15		

<b>Semester 4: Fall</b>			
Course Subject and Title (Or General Tier/Major Requirement)	Credit Hours	Upper Division	Minimum Grade
PHYS 2053 Contemporary Physics	3		
PHYS 2701 Electronics	2		
Tier I - Junior Composition	3	YES	
A&S Social Science	3		
Elective	3		
Elective	1		
Total hours for semester	15		

<b>Semester 5: Spring</b>			
Course Subject and Title (Or General Tier/Major Requirement)	Credit Hours	Upper Division	Minimum Grade
PHYS 3001 Classical Mechanics	3	YES	
PHYS 3701 Junior Lab I	3	YES	
Elective	3		
Elective	3		
Elective	3		
Total hours for semester	15		

<b>Semester 6: Summer</b>			
Course Subject and Title (Or General Tier/Major Requirement)	Credit Hours	Upper Division	Minimum Grade
PHYS 3702 Junior Lab II	3	YES	
T3 or T3E	3	YES	
Elective	3		
Elective	3		
Elective	3		
Total hours for semester	15		

\*The Physics BA is designed as preparation for high school teaching or for students in other majors who are looking for a second major. The program requires students to complete at least 24 credit hours of PHYS and/or ASTR courses including PHYS 1901, 2051, 2052, 2053 and MATH 2301. The curriculum below meets these requirements. Many other selections are also possible.

## BS3335 Physics Astrophysics Major

<b>Post-Secondary Coursework or Transfer/AP/IB Credit</b>			
Course Subject and Title (Or General Tier/Major Requirement)	Credit Hours	Upper Division	Minimum Grade
Tier I - Freshman Composition	3		
Tier I - Quantitative skills - Calculus I	4		
Tier II - Applied Science - Calculus II	4		
Tier II - Natural Science - Physics I (Calculus level=PHYS 2051)	5		
Tier II - Humanities and Literature	3		
Tier II - Social Sciences	3		
Foreign Language	8		
Total hours (minimum 15)	30		

<b>Semester 1: Fall</b>			
Course Subject and Title (Or General Tier/Major Requirement)	Credit Hours	Upper Division	Minimum Grade
PHYS 1901 Seminar	1		
PHYS 2052 Physics II	5		
MATH 3300 Calculus III	4	YES	
Tier II - Cross Cultural Perspectives	3		
A&S Humanities	3		
Total hours for semester	16		

<b>Semester 2: Spring</b>			
Course Subject and Title (Or General Tier/Major Requirement)	Credit Hours	Upper Division	Minimum Grade
PHYS 2053 Contemporary Physics	3		
PHYS 2701 Electronics	2		
MATH 3400 Ordinary Differential Equations	3	YES	
ASTR 3251 Fundamentals of Astrophysics	3	YES	
Tier II - Fine Arts	3		
Elective	1		
Total hours for semester	15		

<b>Semester 3: Summer</b>			
Course Subject and Title (Or General Tier/Major Requirement)	Credit Hours	Upper Division	Minimum Grade
PHYS 3001 Classical Mechanics	4	YES	
PHYS 3701 Junior Lab I	2	YES	
MATH 3200 Linear Algebra	3	YES	
ASTR 4201 Stellar Astrophysics**	3	YES	
A&S Humanities	3		
Total hours for semester	15		

<b>Semester 4: Fall</b>			
Course Subject and Title (Or General Tier/Major Requirement)	Credit Hours	Upper Division	Minimum Grade
PHYS 3011 Thermal Physics	3	YES	
PHYS 3702 Junior Lab II	2	YES	
MATH 4410 PDE & Fourier Analysis	3	YES	
ASTR 4202 Galaxies**	3		
Tier I - Junior Composition	3	YES	
A&S Social Science	1		
Total hours for semester	15		

<b>Semester 5: Spring</b>			
Course Subject and Title (Or General Tier/Major Requirement)	Credit Hours	Upper Division	Minimum Grade
PHYS 4031 Electricity and Magnetism I	3	YES	
ASTR 4271 - Observational Astrophysics**	3	YES	
A&S Social Science	3		
Elective	3		
Elective	3		
Total hours for semester	15		

<b>Semester 6: Summer</b>			
Course Subject and Title (Or General Tier/Major Requirement)	Credit Hours	Upper Division	Minimum Grade
PHYS 4032 Electricity and Magnetism II	3	YES	
T3 or T3E	3	YES	
Elective	3		
Elective	3		
Elective	3		
Total hours for semester	15		

\*\*ASTR 4201 + 4202 will be taught in Academic years that start with even numbers (e.g. 2012, 2014, etc.). ASTR 4271 will be offered in odd numbered years (e.g. 2013, 2015, etc.). Depending on the year they enter, students will thus take ASTR 4201 + 4202 in their junior or senior years.