UNIVERSITY OF PITTSBURGH
DIETRICH SCHOOL OF ARTS AND SCIENCES
DEPARTMENT OF PHYSICS AND ASTRONOMY

Department of Physics and Astronomy Undergraduate Degree Tracks

Updated
10/21/2025

Graduation Requirements for the B.S. in Physics

	Course	Title	Credits
	Required Introductory Courses (8 credit hours):		
	PHYS 0174, 0475	Basic Physics for Science and Engineering 1	4
	PHYS 0175, 0476	Basic Physics for Science and Engineering 2	4
	Required Intermediate and Advanced Courses (20 credit hours):		
	PHYS 0477[1]	Intro to Thermodynamics, Relativity and Quantum Theory	4
	PHYS 1310	Undergraduate Seminar	1
	PHYS 1321	Computational Methods in Physics	3
	PHYS 1331	Mechanics	3
	PHYS 1341	Thermodynamics and Statistical Mechanics	3
	PHYS 1351	Electricity and Magnetism	3
	PHYS 1370	Introduction to Quantum Mechanics 1	3
	Laboratory Courses (Choose at least 10 credit hours):		
	ASTRON 1263	Techniques of Astronomy	3
	PHYS 0520	Modern Physical Measurements	3
	PHYS 0525	Analog and Digital Electronics	3
	PHYS 1361	Wave Motion and Optics	3
	PHYS 1415	Quantum Physics at the Nanoscale	2
	PHYS 1426	Modern Physics Laboratory	2
	Prerequisite Math Courses (18 credit hours):		
	MATH 0220	Analytic Geometry and Calculus 1	4
	MATH 0230, 0235	Analytic Geometry and Calculus 2	4
	MATH 0240, 0245	Analytic Geometry and Calculus 3	4
	MATH 0280, 1180, 1185	Introduction to Matrices and Linear Algebra	3
	MATH 0290, 1270	Applied Differential Equations	3
	Science Electives (Choose at least 9 credit hours from groups A and B with at least 3 credit hours from group B):		
	GROUP A		
	BIOSC 0150	Foundations of Biology 1	3
	BIOSC 0160	Foundations of Biology 2	3
	BIOENG 1070	Introduction to Cell Biology 1	3
	BIOENG 1071	Introduction to Cell Biology 2	3
	CHEM 0110, 0710	General Chemistry 1	4
	CHEM 0120, 0720	General Chemistry 2	4
	CHEM 0310, 0730	Organic Chemistry 1	3
	CHEM 0320, 0740	Organic Chemistry 2	3
	CS 0401	Intermediate Programming Using Java	4
	CS 0445	Data Structures	3
	ENGR 0240	Nanotechnology and Nano-Engineering	3
	GEOL 0800	Geology	3
	STAT 1151	Introduction to Probability	3
	STAT 1152	Introduction to Mathematical Statistics	3

[1] The pre-requisite for PHYS 0477 is a B- or better in PHYS 0175.

	Course	Title	Credits
	GROUP B		
	ASTRON 1120	Stars, Stellar Structure and Evolution	3
	ASTRON 1121	Galaxies and Cosmology	3
	CHEM 1410	Physical Chemistry 1	3
	CHEM 1420	Physical Chemistry 2	3
	CHEM 1620	Atoms, Molecules and Materials	3
	ECE 1232	Introduction to Lasers & Optical Electronics	3
	ECE 1247	Semiconductor Device Theory	3
	GEOL 1410	Exploration Geophysics	3
	MATH 1470	Partial Differential Equations 1	3
	MATH 1550	Vector Analysis and Applications	3
	MATH 1560	Complex Variables and Applications	3
	MEMS 1054	Materials Science	3
	PHYS 0481	Applications of Modern Physics	3
	PHYS 1374	Introduction to Solid State Physics	3
	PHYS 1375	Foundations of Nanoscience	3
	PHYS 1376	Introduction to Biological Physics	3
	PHYS 1378	Introduction to Nuclear/Particle Physics	3

Suggested sequence of courses for the B.S. in Physics

Semester Term	1 Fall	2 Spring	3 Fall	4 Spring	5 Fall	6 Spring	7 Fall	8 Spring
Physics	0174 or 0475	0175 or 0476	0520, 0477	0525	1321, 1351	1310, 1331	1361, 1370	1341 1426
Math	0220 or 0230	0230 or 0240	0240	0280	0290			
Electives				Group A/B			Group A/B	Group A/B

Suggested sequence of courses for more advanced students

Semester Term	1 Fall	2 Spring	3 Fall	4 Spring	5 Fall	6 Spring	7 Fall	8 Spring
Physics	0475	0476	0520, 0477	0525, 1331	1351, 1370	1310, 1341	1321, 1361	1426
Math	0230	0240, 0280	0290					
Electives				Group A/B	Group A/B	Group A/B		

Graduation Requirements for the B.S. in Physics – Graduate School Preparation

	Course	Title	Credits
	Required Introductory Courses (8 credit hours):		
	PHYS 0174, 0475	Basic Physics for Science and Engineering 1	4
	PHYS 0175, 0476	Basic Physics for Science and Engineering 2	4
	Required Intermediate and Advanced Courses (29 credit hours):		
	PHYS 0477[1]	Intro to Thermodynamics, Relativity and Quantum Theory	4
	PHYS 1310	Undergraduate Seminar	1
	PHYS 1321	Computational Methods in Physics	3
	PHYS 1331	Mechanics	3
	PHYS 1341	Thermodynamics and Statistical Mechanics	3
	PHYS 1351	Electricity and Magnetism	3
	PHYS 1370	Introduction to Quantum Mechanics 1	3
	PHYS 1371	Introduction to Quantum Mechanics 2	3
	PHYS 1372	Electromagnetic Theory	3
	PHYS 1373	Mathematical Methods of Physics	3
	Laboratory Courses (Choose at least 7 credit hours):		
	ASTRON 1263	Techniques of Astronomy	3
	PHYS 0520	Modern Physical Measurements	3
	PHYS 0525	Analog and Digital Electronics	3
	PHYS 1361	Wave Motion and Optics	3
	PHYS 1415	Quantum Physics at the Nanoscale	2
	PHYS 1426	Modern Physics Laboratory	2
	Prerequisite Math Courses (18 credit hours):		
	MATH 0220	Analytic Geometry and Calculus 1	4
	MATH 0230, 0235	Analytic Geometry and Calculus 2	4
	MATH 0240, 0245	Analytic Geometry and Calculus 3	4
	MATH 0280, 1180, 1185	Introduction to Matrices and Linear Algebra	3
	MATH 0290, 1270	Applied Differential Equations	3
	Science Electives (Choose at least 9 credit hours from groups A and B with at least 3 credit hours from group B):		
	GROUP A		
	BIOSC 0150	Foundations of Biology 1	3
	BIOSC 0160	Foundations of Biology 2	3
	BIOENG 1070	Introduction to Cell Biology 1	3
	BIOENG 1071	Introduction to Cell Biology 2	3
	CHEM 0110, 0710	General Chemistry 1	4
	CHEM 0120, 0720	General Chemistry 2	4
	CHEM 0310, 0730	Organic Chemistry 1	3
	CHEM 0320, 0740	Organic Chemistry 2	3
	CS 0401	Intermediate Programming Using Java	4
	CS 0445	Data Structures	3
	ENGR 0240	Nanotechnology and Nano-Engineering	3
	GEOL 0800	Geology	3
	STAT 1151	Introduction to Probability	3
	STAT 1152	Introduction to Mathematical Statistics	3

[1] The pre-requisite for PHYS 0477 is a B- or better in PHYS 0175.

	Course	Title	Credits
	GROUP B		
	ASTRON 1120	Stars, Stellar Structure and Evolution	3
	ASTRON 1121	Galaxies and Cosmology	3
	CHEM 1410	Physical Chemistry 1	3
	CHEM 1420	Physical Chemistry 2	3
	CHEM 1620	Atoms, Molecules and Materials	3
	ECE 1232	Introduction to Lasers & Optical Electronics	3
	ECE 1247	Semiconductor Device Theory	3
	GEOL 1410	Exploration Geophysics	3
	MATH 1470	Partial Differential Equations 1	3
	MATH 1550	Vector Analysis and Applications	3
	MATH 1560	Complex Variables and Applications	3
	MEMS 1054	Materials Science	3
	PHYS 0481	Applications of Modern Physics	3
	PHYS 1374	Introduction to Solid State Physics	3
	PHYS 1375	Foundations of Nanoscience	3
	PHYS 1376	Introduction to Biological Physics	3
	PHYS 1378	Introduction to Nuclear/Particle Physics	3

Suggested sequence of courses for the B.S. in Physics – Graduate School Preparation

Semester Term	1 Fall	2 Spring	3 Fall	4 Spring	5 Fall	6 Spring	7 Fall	8 Spring
Physics	0174 or 0475	0175 or 0476	0520, 0477	0525	1321, 1351, [1361]	1310, 1331, 1341	1361, 1370, 1373	1371, 1372, [1426]
Math	0220 or 0230	0230 or 0240	0240	0280	0290			
Electives			Group A/B	Group A/B		Group A/B		

Suggested sequence of courses for more advanced students

Semester Term	1 Fall	2 Spring	3 Fall	4 Spring	5 Fall	6 Spring	7 Fall	8 Spring
Physics	0475	0476	0520, 0477	0525, 1331	1321, 1351, [1361], 1370	1310, 1341, 1371, [1426]	1373	1372
Math	0230	0240, 0280	0290					
Electives			Group A/B	Group A/B			Group A/B	

Graduation Requirements for the B.S. in Physics – Education

	Course	Title	Credits
	Required Introductory Courses (8 credit hours):		
	PHYS 0174, 0475	Basic Physics for Science and Engineering 1	4
	PHYS 0175, 0476	Basic Physics for Science and Engineering 2	4
	Required Intermediate and Advanced Courses (11 credit hours):		
	PHYS 0477[1]	Intro to Thermodynamics, Relativity and Quantum Theory	4
	PHYS 1310	Undergraduate Seminar	1
	PHYS 1331	Mechanics	3
	PHYS 1351	Electricity and Magnetism	3
	Laboratory Courses (Choose at least 7 credit hours):		
	ASTRON 1263	Techniques of Astronomy	3
	PHYS 0520	Modern Physical Measurements	3
	PHYS 0525	Analog and Digital Electronics	3
	PHYS 1361	Wave Motion and Optics	3
	PHYS 1415	Quantum Physics at the Nanoscale	2
	PHYS 1426	Modern Physics Laboratory	2
	Prerequisite Math Courses (18 credit hours):		
	MATH 0220	Analytic Geometry and Calculus 1	4
	MATH 0230, 0235	Analytic Geometry and Calculus 2	4
	MATH 0240, 0245	Analytic Geometry and Calculus 3	4
	MATH 0280, 1180, 1185	Introduction to Matrices and Linear Algebra	3
	MATH 0290, 1270	Applied Differential Equations	3
	Required Science Electives (11 credit hours):		
	CHEM 0110, 0710	General Chemistry 1	4
	CHEM 0120, 0720	General Chemistry 2	4
	PHYS 0481	Applications of Modern Physics	3
	Education Related Courses (6 credit hours):		
	PSYED 1001	Introduction to Educational Psychology	3
	IL 1580	Foundations of Special Education	3
	Courses Emphasizing the Broader Impact of Science (Choose at least 3 credit hours):		
	HPS	Any History and Philosophy of Science (HPS) course.	3
	PHYS0086	Physics and Public Policy	3
	PHYS0087	Nuclear Science and Society	3

Suggested sequence of courses for the B.S. in Physics - Education

Semester Term	1 Fall	2 Spring	3 Fall	4 Spring	5 Fall	6 Spring	7 Fall	8 Spring
Physics	0174 or 0475	0175 or 0476	0520, 0477	0481	1351	1331	1361	0525, 1310
Math	0220 or 0230	0230 or 0240	0240	0280	0290			
Electives	CHEM 0110	CHEM 0120		Science			PSYED 1001	IL 1580

[1] The pre-requisite for PHYS 0477 is a B- or better in PHYS 0175.

Graduation Requirements for the B.S. in Physics and Astronomy

	Course	Title	Credits
	Required Introductory Courses (11 credit hours):		
	ASTRON 0113	Introduction to Astronomy	3
	PHYS 0174, 0475	Basic Physics for Science and Engineering 1	4
	PHYS 0175, 0476	Basic Physics for Science and Engineering 2	4
	Required Intermediate and Advanced Courses (29 credit hours):		
	ASTRON 1120	Stars, Stellar Structure and Evolution	3
	ASTRON 1121	Galaxies and Cosmology	3
	ASTRON 1122, GEOL 1701	Exoplanets and the Solar System	3
	PHYS 0477[1]	Intro to Thermodynamics, Relativity and Quantum Theory	4
	PHYS 1310	Undergraduate Seminar	1
	PHYS 1321	Computational Methods in Physics	3
	PHYS 1331	Mechanics	3
	PHYS 1341	Thermodynamics and Statistical Mechanics	3
	PHYS 1351	Electricity and Magnetism	3
	PHYS 1370	Introduction to Quantum Mechanics 1	3
	Laboratory Courses (Choose at least 7 credit hours including PHYS 0219 or 0520 and ASTRON 1263):		
	ASTRON 1263	Techniques of Astronomy	3
	PHYS 0520	Modern Physical Measurements	3
	PHYS 0525	Analog and Digital Electronics	3
	PHYS 1361	Wave Motion and Optics	3
	PHYS 1415	Quantum Physics at the Nanoscale	2
	PHYS 1426	Modern Physics Laboratory	2
	Prerequisite Math Courses (18 credit hours):		
	MATH 0220	Analytic Geometry and Calculus 1	4
	MATH 0230, 0235	Analytic Geometry and Calculus 2	4
	MATH 0240, 0245	Analytic Geometry and Calculus 3	4
	MATH 0280, 1180, 1185	Introduction to Matrices and Linear Algebra	3
	MATH 0290, 1270	Applied Differential Equations	3
	Science Electives (Choose at least 3 credit hours):		
	CHEM 0110, 0710	General Chemistry 1	4
	CHEM 0120, 0720	General Chemistry 2	4
	CHEM 1410	Physical Chemistry 1	3
	CS 0401	Intermediate Programming Using Java	4
	CS 0445	Data Structures	3
	GEOL 0800	Geology	3
	GEOL 1410	Exploration Geophysics	3
	GEOL 1701[2]	Geology of the Planets	3
	MATH 1470	Partial Differential Equations 1	3
	MATH 1550	Vector Analysis and Applications	3
	MATH 1560	Complex Variables and Applications	3
	PHYS 0481	Applications of Modern Physics	3
	PHYS 1371	Introduction to Quantum Mechanics 2	3
	PHYS 1372	Electromagnetic Theory	3
	PHYS 1373	Mathematical Methods of Physics	3
	PHYS 1378	Introduction to Nuclear/Particle Physics	3
	STAT 1151	Introduction to Probability	3
	STAT 1152	Introduction to Mathematical Statistics	3

[1] The pre-requisite for PHYS 0477 is a B- or better in PHYS 0175.

[2] GEOL 1701 may be used to satisfy either one of the required astronomy courses or the science elective, but not both.

Suggested sequence of courses for the B.S. in Physics and Astronomy

Semester Term	1 Fall	2 Spring	3 Fall	4 Spring	5 Fall	6 Spring	7 Fall	8 Spring
Astronomy				0113 or 0413	1120[1] or 1263[2]	1121[3] or 1122[4]	1120 or 1263	1121 or 1122
Physics	0174 or 0475	0175 or 0476	0520, 0477		1321, 1351	1310, 1331	1361, 1370	1341
Math	0220 or 0230	0230 or 0240	0240, 0290	0280				
Electives				Science				

Suggested sequence of courses for more advanced students

Semester Term	1 Fall	2 Spring	3 Fall	4 Spring	5 Fall	6 Spring	7 Fall	8 Spring
Astronomy				0413	1120 or 1263	1121 or 1122	1120 or 1263	1121 or 1122
Physics	0475	0476	0520, 0477	1331	1321, 1351, 1370	1310, 1341	1361	
Math	0230	0240, 0280	0290					
Electives								Science

[1] ASTRON 1120 is only offered in even years.

[2] ASTRON 1263 is only offered in even years.

[3] ASTRON 1121 is only offered in odd years.

[4] ASTRON 1122 is only offered in odd years.

Graduation Requirements for the B.S. in Physics and Astronomy – Graduate School Preparation

	Course	Title	Credits
	Required Introductory Courses (11 credit hours):		
	ASTRON 0113	Introduction to Astronomy	3
	PHYS 0174, 0475	Basic Physics for Science and Engineering 1	4
	PHYS 0175, 0476	Basic Physics for Science and Engineering 2	4
	Required Intermediate and Advanced Courses (38 credit hours):		
	ASTRON 1120	Stars, Stellar Structure and Evolution	3
	ASTRON 1121	Galaxies and Cosmology	3
	ASTRON 1122, GEOL 1701	Exoplanets and the Solar System	3
	PHYS 0477[1]	Intro to Thermodynamics, Relativity and Quantum Theory	4
	PHYS 1310	Undergraduate Seminar	1
	PHYS 1321	Computational Methods in Physics	3
	PHYS 1331	Mechanics	3
	PHYS 1341	Thermodynamics and Statistical Mechanics	3
	PHYS 1351	Electricity and Magnetism	3
	PHYS 1370	Introduction to Quantum Mechanics 1	3
	PHYS 1371	Introduction to Quantum Mechanics 2	3
	PHYS 1372[2]	Electromagnetic Theory	3
	PHYS 1373	Mathematical Methods of Physics	3
	Laboratory Courses (Choose at least 7 credit hours including PHYS 0219 or 0520 and ASTRON 1263):		
	ASTRON 1263	Techniques of Astronomy	3
	PHYS 0520	Modern Physical Measurements	3
	PHYS 0525	Analog and Digital Electronics	3
	PHYS 1361	Wave Motion and Optics	3
	PHYS 1415	Quantum Physics at the Nanoscale	2
	PHYS 1426	Modern Physics Laboratory	2
	Prerequisite Math Courses (18 credit hours):		
	MATH 0220	Analytic Geometry and Calculus 1	4
	MATH 0230, 0235	Analytic Geometry and Calculus 2	4
	MATH 0240, 0245	Analytic Geometry and Calculus 3	4
	MATH 0280, 1180, 1185	Introduction to Matrices and Linear Algebra	3
	MATH 0290, 1270	Applied Differential Equations	3
	Science Electives (Choose at least 3 credit hours):		
	CHEM 0110, 0710	General Chemistry 1	4
	CHEM 0120, 0720	General Chemistry 2	4
	CHEM 1410	Physical Chemistry 1	3
	CS 0401	Intermediate Programming Using Java	4
	CS 0445	Data Structures	3
	GEOL 0800	Geology	3
	GEOL 1410	Exploration Geophysics	3
	GEOL 1701[3]	Geology of the Planets	3
	MATH 1470	Partial Differential Equations 1	3
	MATH 1550	Vector Analysis and Applications	3
	MATH 1560	Complex Variables and Applications	3
	PHYS 0481	Applications of Modern Physics	3
	PHYS 1378	Introduction to Nuclear/Particle Physics	3
	STAT 1151	Introduction to Probability	3
	STAT 1152	Introduction to Mathematical Statistics	3

Suggested sequence of courses for the B.S. in Physics and Astronomy – Graduate School Preparation

[1] The pre-requisite for PHYS 0477 is a B- or better in PHYS 0175.

[2] PHYS 1372 and 1373 will also count as a science elective.

[3] GEOL 1701 may be used to satisfy either one of the required astronomy courses or the science elective, but not both.

Semester Term	1 Fall	2 Spring	3 Fall	4 Spring	5 Fall	6 Spring	7 Fall	8 Spring
Astronomy				0113 or 0413	1120[1] or 1263[2]	1121[3] or 1122[4]	1120 or 1263	1121 or 1122
Physics	0174 or 0475	0175 or 0476	0520, 0477		1321, 1351, 1361	1310, 1331, 1341	1370, 1373	1371, 1372
Math	0220 or 0230	0230 or 0240	0240, 0290	0280				
Electives				Science				

Suggested sequence of courses for more advanced students

Semester Term	1 Fall	2 Spring	3 Fall	4 Spring	5 Fall	6 Spring	7 Fall	8 Spring
Astronomy				0113 or 0413	1120 or 1263	1121 or 1122	1120 or 1263	1121 or 1122
Physics	0475	0476	0520, 0477	1331	1321, 1351, 1370	1310, 1341, 1371	1361, 1373	1372
Math	0230	0240, 0280	0290					
Electives				Science				

[1] ASTRON 1120 is only offered in even years.

[2] ASTRON 1263 is only offered in even years.

[3] ASTRON 1121 is only offered in odd years.

[4] ASTRON 1122 is only offered in odd years.

Graduation Requirements for the B.S. in Physics and Astronomy –Education

	Course	Title	Credits
	Required Introductory Courses (11 credit hours):		
	ASTRON 0113	Introduction to Astronomy	3
	PHYS 0174, 0475	Basic Physics for Science and Engineering 1	4
	PHYS 0175, 0476	Basic Physics for Science and Engineering 2	4
	Required Intermediate Courses (20 credit hours):		
	ASTRON 1120	Stars, Stellar Structure and Evolution	3
	ASTRON 1121	Galaxies and Cosmology	3
	ASTRON 1122, GEOL 1701	Exoplanets and the Solar System	3
	PHYS 0477[1]	Intro to Thermodynamics, Relativity and Quantum Theory	4
	PHYS 1310	Undergraduate Seminar	1
	PHYS 1331	Mechanics	3
	PHYS 1351	Electricity and Magnetism	3
	Required Laboratory Courses (8 credit hours):		
	ASTRON 1263	Techniques of Astronomy	3
	PHYS 0520	Modern Physical Measurements	3
	PHYS 1361	Wave Motion and Optics	3
	Prerequisite Math Courses (18 credit hours):		
	MATH 0220	Analytic Geometry and Calculus 1	4
	MATH 0230, 0235	Analytic Geometry and Calculus 2	4
	MATH 0240, 0245	Analytic Geometry and Calculus 3	4
	MATH 0280, 1180, 1185	Introduction to Matrices and Linear Algebra	3
	MATH 0290, 1270	Applied Differential Equations	3
	Science Electives (Choose 11 credit hours including CHEM 0110 and CHEM 0120):		
	CHEM 0110, 0710	General Chemistry 1	4
	CHEM 0120, 0720	General Chemistry 2	4
	PHYS 0481	Applications of Modern Physics	3
	PHYS 1341	Thermodynamics and Statistical Mechanics	3
	PHYS 1370	Introduction to Quantum Mechanics 1	3
	Education Related Courses (12 credit hours):		
	PSYED 1001	Introduction to Educational Psychology	3
	IL 1580	Foundations of Special Education	3

Suggested sequence of courses for the B.S. in Physics and Astronomy - Education

Semester Term	1 Fall	2 Spring	3 Fall	4 Spring	5 Fall	6 Spring	7 Fall	8 Spring
Astronomy				0113 or 0413	1120[2] or 1263[3]	1121[4] or 1122[5]	1120 or 1263	1121 or 1122
Physics	0174 or 0475	0175 or 0476	0520, 0477	[0481]	1351	1310, 1331	1361, [1370]	[1341]
Math	0220 or 0230	0230 or 0240	0240, 0290	0280				
Electives	CHEM 0110	CHEM 0120			Science		PSYED 1001	IL 1580

[1] The pre-requisite for PHYS 0477 is a B- or better in PHYS 0175.

[2] ASTRON 1120 is only offered in even years.

[3] ASTRON 1263 is only offered in even years.

[4] ASTRON 1121 is only offered in odd years.

[5] ASTRON 1122 is only offered in odd years.

Graduation Requirements for the B.S. in Physics and Quantum Computing

	Course	Title	Credits
	Required Introductory Courses (9 credit hours):		
	PHYS 0174, 0475	Basic Physics for Science and Engineering 1	4
	PHYS 0175, 0476	Basic Physics for Science and Engineering 2	4
	PHYS 0330	Physics and Quantum Computing Seminar	1
	Required Introductory and Intermediate Computer Science Courses (13 credit hours):		
	CS OR CMPINF 0401	Intermediate Programming Using Java	4
	CS 0441	Discrete Structures for CS	3
	CS 0445	Data Structures	3
	CS 0447	Computer Organization and Assembly Language	3
	Required Intermediate and Advanced Courses (16 credit hours):		
	PHYS 0477[1]	Intro to Thermodynamics, Relativity and Quantum Theory	4
	PHYS 1331	Mechanics	3
	PHYS 1341	Thermodynamics and Statistical Mechanics	3
	PHYS 1351	Electricity and Magnetism	3
	PHYS 1370	Introduction to Quantum Mechanics 1	3
	Required Introductory and Intermediate Computer Science Courses (9 credit hours):		
	CS 1501	Algorithms and Data Structures	3
	CS 1502	Formal Methods in Computer Science	3
	CS 1613	Quantum Computation	3
	Physics Laboratory Courses (Choose at least 5 credit hours):		
	PHYS 0520	Modern Physical Measurements	3
	PHYS 0525	Analog and Digital Electronics	3
	PHYS 1361	Wave Motion and Optics	3
	PHYS 1415	Quantum Physics at the Nanoscale	2
	PHYS 1426	Modern Physics Laboratory	2
	Prerequisite Math Courses (18 credit hours):		
	MATH 0220	Analytic Geometry and Calculus 1	4
	MATH 0230, 0235	Analytic Geometry and Calculus 2	4
	MATH 0240, 0245	Analytic Geometry and Calculus 3	4
	MATH 0280, 1180, 1185	Introduction to Matrices and Linear Algebra	3
	MATH 0290, 1270	Applied Differential Equations	3
	Capstone Research, Project or Internship (3 credit hours)[2]		
	CS 1900	Internship	1-6
	CS 1901	Internship	1-3
	CS 1950	Directed Research: Capstone	3
	CS 1980	Team Project Design and Implementation	3
	PHYS 1900	Internship	1-9
	PHYS 1903	Directed Research	1-3
	Optional Focus (Choose either Physics or Computer Science, 9 credit hours):		
	PHYSICS		
	PHYS 1371	Introduction to Quantum Mechanics 2	3
	PHYS 1372	Electromagnetic Theory	3
	PHYS 1373	Mathematical Methods of Physics	3
	COMPUTER SCIENCE		
	CS 1500 Level or above	An CS course 1500 or above	3
	CS 1500 Level or above	An CS course 1500 or above	3
	CS 1500 Level or above	An CS course 1500 or above	3

[1] The pre-requisite for PHYS 0477 is a B- or better in PHYS 0175.

[2] Students who are planning to complete their Capstone project with CS 1900, 1901, 1950, MEMS 1097, PHYS 1900 or 1903 are required to send (i) a summary of their proposed research or internship to Professor Roger Mong (rmong@pitt.edu) prior to starting the course, and (ii) a summary of the work done upon completion of the course.

Suggested sequence of courses for the B.S. in Physics and Computer Science

Semester Term	1 Fall	2 Spring	3 Fall	4 Spring	5 Fall	6 Spring	7 Fall	8 Spring
Physics	0174 or 0475, 0330	0175 or 0476	0520, 0477		1351	1331, 1341, 0525	1370	
CS	0401	0441	0445	0447, 1501	1502		Capstone	1613
Math	0220 or 0230	0230 or 0240	0240	0280	0290			

Suggested sequence of courses for more advanced students - Physics

Semester Term	1 Fall	2 Spring	3 Fall	4 Spring	5 Fall	6 Spring	7 Fall	8 Spring
Physics	0475, 0330	0476	0520, 0477		1351	1331, 0525	1370, 1373	1341, 1371, 1372
CS	0401	0441	0445	0447, 1501	1502	1613	Capstone	
Math	0220 or 0230	0230 or 0240	0240	0280	0290			

Suggested sequence of courses for more advanced students – Computer Science

Semester Term	1 Fall	2 Spring	3 Fall	4 Spring	5 Fall	6 Spring	7 Fall	8 Spring
Physics	0475, 0330	0476	0520, 0477		1351	1331, 1341, 0525	1370	
CS	0401	0441	0445	0447, 1501	1502		>1500, Capstone	>1500, >1500, 1613
Math	0220 or 0230	0230 or 0240	0240	0280	0290			

Students who are planning to complete their Capstone project with CS 1900, 1901, 1950, MEMS 1097, PHYS 1900 or 1903 are required to send (i) a summary of their proposed research or internship to Professor Roger Mong (rmong@pitt.edu) prior to starting the course, and (ii) a summary of the work done upon completion of the course.

Graduation Requirements for the B.A. in Astronomy

	Course	Title	Credits
	Required Courses (22 credit hours):		
	ASTRON 0113	Introduction to Astronomy	3
	PHYS 0174, 0475	Basic Physics for Science and Engineering 1	4
	PHYS 0175, 0476	Basic Physics for Science and Engineering 2	4
	PHYS 0477[1]	Intro to Thermodynamics, Relativity and Quantum Theory	4
	PHYS 0481	Applications of Modern Physics	3
	PHYS 1310	Undergraduate Seminar	1
	PHYS 1331	Mechanics	3
	Intermediate/Advanced Astronomy Courses (Choose at least 6 credit hours):		
	ASTRON 1120	Stars, Stellar Structure and Evolution	3
	ASTRON 1121	Galaxies and Cosmology	3
	ASTRON 1122, GEOL 1701	Exoplanets and the Solar System	3
	Laboratory Courses (Choose at least 5 credit hours):		
	ASTRON 1263	Techniques of Astronomy	3
	PHYS 0219[2]	Basic Lab. Physics for Science and Engineering	2
	PHYS 0520	Modern Physical Measurements	3
	Prerequisite Math Courses (15 credit hours):		
	MATH 0220	Analytic Geometry and Calculus 1	4
	MATH 0230, 0235	Analytic Geometry and Calculus 2	4
	MATH 0240, 0245	Analytic Geometry and Calculus 3	4
	MATH 0290, 1270	Applied Differential Equations	3
	Course in History and Philosophy of Science or Science Policy/Management (Choose at least 3 credit hours):		
	HPS	Any History and Philosophy of Science (HPS) course.	3
	BUSERV 1915	Introduction to Management	3
	PHYS0086	Physics and Public Policy	3
	PHYS0087	Nuclear Science and Society	3
	PUBSRV 1315	Managing Projects and Contracts	3
	Writing or Communication Course (Choose at least 3 credit hours):		
	COMMRC 0320	Mass Communication Process	3
	COMMRC 0520	Public Speaking	3
	COMMRC 1105	Television and Society	3
	ENGCMP 0400	Written Professional Communication	3
	ENGCMP 1101	Language of Science and Technology	3
	ENGCMP 1400	Grant and Proposal Writing	3
	ENGWRT 1330	Intermediate Nonfiction: Scene and Point-of-View	3
	ENGWRT 1340	Advanced Nonfiction: Long Form Narrative	3
	ENGWRT 1394	Science Writing	3
	LING 1000	Introduction to Linguistics	3

[1] The pre-requisite for PHYS 0477 is a B- or better in PHYS 0175.

[2] PHYS 0219 or 0520 may be used as a lab elective, but not both.

	Course	Title	Credits
	Science Electives (Choose at least 6 credit hours):		
	BIOSC 0150	Foundations of Biology 1	3
	BIOSC 0160	Foundations of Biology 2	3
	BIOENG 1070	Introduction to Cell Biology 1	3
	BIOENG 1071	Introduction to Cell Biology 2	3
	CHEM 0110, 0710	General Chemistry 1	4
	CHEM 0120, 0720	General Chemistry 2	4
	CHEM 0310, 0730	Organic Chemistry 1	3
	CHEM 0320, 0740	Organic Chemistry 2	3
	CHEM 1410	Physical Chemistry 1	3
	CHEM 1420	Physical Chemistry 2	3
	CS 0401	Intermediate Programming Using Java	4
	CS 0445	Data Structures	3
	GEOL 0800	Geology	3
	GEOL 1410	Exploration Geophysics	3
	GEOL 1701[1]	Geology of the Planets	3
	MATH 0280, 1180, 1185	Introduction to Matrices and Linear Algebra	3
	MATH 1470	Partial Differential Equations 1	3
	MATH 1550	Vector Analysis and Applications	3
	MATH 1560	Complex Variables and Applications	3
	PHYS 1321	Computational Methods in Physics	3
	PHYS 1341	Thermodynamics and Statistical Mechanics	3
	PHYS 1351	Electricity and Magnetism	3
	PHYS 1370	Introduction to Quantum Mechanics 1	3
	PHYS 1378	Introduction to Nuclear/Particle Physics	3
	STAT 1151	Introduction to Probability	3
	STAT 1152	Introduction to Mathematical Statistics	3

Suggested sequence of courses for the B.A. in Astronomy

Semester Term	1 Fall	2 Spring	3 Fall	4 Spring	5 Fall	6 Spring	7 Fall	8 Spring
Astronomy			0113 or 0413		1120[2] or 1263[3]	1121[4] or 1122[5]	1120 or 1263	1121 or 1122
Physics	0174 or 0475	0175 or 0476	0219 or 0520, 0477	0481		1310, 1331		
Math	0220 or 0230	0230 or 0240	0240	0290	0280			
Electives						HPS or SPM	Science	Science, Writing

[1] GEOL 1701 may be used to satisfy either one of the required astronomy courses or the science elective, but not both.

[2] ASTRON 1120 is only offered in even years.

[3] ASTRON 1263 is only offered in even years.

[4] ASTRON 1121 is only offered in odd years.

[5] ASTRON 1122 is only offered in odd years.

Graduation Requirements for the B.A. in Astronomy – Science Communication

	Course	Title	Credits
	Required Courses (22 credit hours):		
	ASTRON 0113	Introduction to Astronomy	3
	PHYS 0174, 0475	Basic Physics for Science and Engineering 1	4
	PHYS 0175, 0476	Basic Physics for Science and Engineering 2	4
	PHYS 0477[1]	Intro to Thermodynamics, Relativity and Quantum Theory	4
	PHYS 0481	Applications of Modern Physics	3
	PHYS 1310	Undergraduate Seminar	1
	PHYS 1331	Mechanics	3
	Intermediate/Advanced Astronomy Courses (Choose at least 6 credit hours):		
	ASTRON 1120	Stars, Stellar Structure and Evolution	3
	ASTRON 1121	Galaxies and Cosmology	3
	ASTRON 1122, GEOL 1701	Exoplanets and the Solar System	3
	Laboratory Courses (Choose at least 5 credit hours):		
	ASTRON 1263	Techniques of Astronomy	3
	PHYS 0219[2]	Basic Lab. Physics for Science and Engineering	2
	PHYS 0520	Modern Physical Measurements	3
	Prerequisite Math Courses (15 credit hours):		
	MATH 0220	Analytic Geometry and Calculus 1	4
	MATH 0230, 0235	Analytic Geometry and Calculus 2	4
	MATH 0240, 0245	Analytic Geometry and Calculus 3	4
	MATH 0290, 1270	Applied Differential Equations	3
	Course in History and Philosophy of Science or Science Policy/Management (Choose at least 3 credit hours):		
	HPS	Any History and Philosophy of Science (HPS) course.	3
	BUSERV 1915	Introduction to Management	3
	PHYS0086	Physics and Public Policy	3
	PHYS0087	Nuclear Science and Society	3
	PUBSRV 1315	Managing Projects and Contracts	3
	Writing or Communication Course (3 credit hours):		
	ENGCMP 0400	Written Professional Communication	3
	Communication Electives (Choose at least 12 credit hours):		
	COMMRC 0320	Mass Communication Process	3
	COMMRC 0520	Public Speaking	3
	COMMRC 1105	Television and Society	3
	ENGCMP 1101	Language of Science and Technology	3
	ENGCMP 1400	Grant and Proposal Writing	3
	ENGWRT 0610	Introduction to Journalism and Non-fiction	3
	ENGWRT 1330	Intermediate Nonfiction: Scene and Point-of-View	3
	ENGWRT 1340	Advanced Nonfiction: Long Form Narrative	3
	ENGWRT 1394	Science Writing	3
	LING 1000	Introduction to Linguistics	3

Suggested sequence of courses for the B.A. in Astronomy – Science Communication

Semester Term	1 Fall	2 Spring	3 Fall	4 Spring	5 Fall	6 Spring	7 Fall	8 Spring
Astronomy			0113 or 0413		1120[3] or 1263	1121[3] or 1122	1120[3] or 1263[3]	1121 or 1122
Physics	0174 or 0475	0175 or 0476	0219 or 0520, 0477	0481		1310, 1331		
Math	0220 or 0230	0230 or 240	0240	0290	0280			
Electives		HPS or SPM	ENGCMP 0400		Communication	Communication	Communication	Communication

[1] The pre-requisite for PHYS 0477 is a B- or better in PHYS 0175.

[2] PHYS 0219 or 0520 may be used as a lab elective, but not both.

[3] ASTRON 1121 and 1122 are only offered in odd years, and ASTRON 1120 and 1263 are only offered in even years.

Graduation Requirements for the B.A. in Astronomy – Science Breadth

	Course	Title	Credits
	Required Courses (19 credit hours):		
	ASTRON 0113	Introduction to Astronomy	3
	PHYS 0174, 0475	Basic Physics for Science and Engineering 1	4
	PHYS 0175, 0476	Basic Physics for Science and Engineering 2	4
	PHYS 0477[1]	Intro to Thermodynamics, Relativity and Quantum Theory	4
	PHYS 1310	Undergraduate Seminar	1
	PHYS 1331	Mechanics	3
	Intermediate/Advanced Astronomy Courses (Choose at least 6 credit hours):		
	ASTRON 1120	Stars, Stellar Structure and Evolution	3
	ASTRON 1121	Galaxies and Cosmology	3
	ASTRON 1122, GEOL 1701	Exoplanets and the Solar System	3
	Laboratory Courses (Choose at least 5 credit hours):		
	ASTRON 1263	Techniques of Astronomy	3
	PHYS 0219[2]	Basic Lab. Physics for Science and Engineering	2
	PHYS 0520	Modern Physical Measurements	3
	Prerequisite Math Courses (15 credit hours):		
	MATH 0220	Analytic Geometry and Calculus 1	4
	MATH 0230, 0235	Analytic Geometry and Calculus 2	4
	MATH 0240, 0245	Analytic Geometry and Calculus 3	4
	MATH 0290, 1270	Applied Differential Equations	3
	Course in History and Philosophy of Science or Science Policy/Management (Choose at least 3 credit hours):		
	HPS	Any History and Philosophy of Science (HPS) course.	3
	BUSERV 1915	Introduction to Management	3
	PHYS0086	Physics and Public Policy	3
	PHYS0087	Nuclear Science and Society	3
	PUBSRV 1315	Managing Projects and Contracts	3
	Science Electives (Choose one of the three tracks below totaling at least 6 credit hours):		
	Science Elective Track 1		
	CHEM 0310, 0730	Organic Chemistry 1	3
	CHEM 0330	Organic Chemistry Laboratory 1	1
	CHEM 0320, 0740	Organic Chemistry 2	3
	CHEM 0340	Organic Chemistry Laboratory 2	1
	Science Elective Track 2		
	CS 0401	Intermediate Programming Using Java	4
	CS 0445	Data Structures	3
	Science Elective Track 3		
		Any advanced course in BIOSC, BIOENG, CHEM, CS or GEOL	3
		Any advanced course in BIOSC, BIOENG, CHEM, CS or GEOL	3

[1] The pre-requisite for PHYS 0477 is a B- or better in PHYS 0175.

[2] PHYS 0219 or 0520 may be used as a lab elective, but not both.

	Course	Title	Credits
	Science Requirements (Choose two of the three tracks below totaling at least 16 credit hours):		
	Science Requirement Track 1		
	CHEM 0110, 0710	General Chemistry 1	4
	CHEM 0120, 0720	General Chemistry 2	4
	Science Requirement Track 2A		
	BIOSC 0150	Foundations of Biology 1	3
	BIOSC 0050	Foundations of Biology Laboratory 1	1
	BIOSC 0160	Foundations of Biology 2	3
	BIOSC 0060	Foundations of Biology Laboratory 2	1
	Science Requirement Track 2B		
	BIOENG 1070	Introduction to Cell Biology 1	3
	BIOSC 0050	Foundations of Biology Laboratory 1	1
	BIOENG 1071	Introduction to Cell Biology 2	3
	BIOSC 0060	Foundations of Biology Laboratory 2	1
	Science Requirement Track 3		
	GEOL 0800	Geology	3
	GEOL 0055	Geology Laboratory	2
	GEOL 0890	Physical Oceanography	3

Suggested sequence of courses for the B.A. in Astronomy – Science Breadth

Semester Term	1 Fall	2 Spring	3 Fall	4 Spring	5 Fall	6 Spring	7 Fall	8 Spring
Astronomy			0113 or 0413		1120[1] or 1263[2]	1121[3] or 1122[4]	1120 or 1263	1121 or 1122
Physics	0174 or 0475	0175 or 0476	0219 or 0520, 0477			1310, 1331		
Math	0220 or 0230	0230 or 240	0240	0290	0280			
Electives		HPS	Science	Science	Science	Science	Science	Science

[1] ASTRON 1120 is only offered in even years.

[2] ASTRON 1263 is only offered in even years.

[3] ASTRON 1121 is only offered in odd years.

[4] ASTRON 1122 is only offered in odd years.

Requirements for the Quantum Computing and Quantum Information Certificate

	Course	Title	Credits
	Required Course (3 credit hours):		
	PHYS 1470	Foundations of Quantum Computing & Quantum Information	3
	Quantum Related Elective Courses (Choose 6-9 credit hours):		
	CHEM 1410	Physical Chemistry 1	3
	CHEM 1430	Physical Chemistry Lab 1	1
	CHEM 1480	Intermediate Physical Chemistry	3
	CHEM 1620	Atoms, Molecules and Materials	3
	CHEM 2120	Descriptive Inorganic and Organometallic Chemistry	3
	CS 1613	Quantum Computation	3
	ECE 1232	Introduction to Lasers & Optical Electronics	3
	ECE 1247	Semiconductor Device Theory	3
	ECE 1272	Simulation and Design of Silicon Photonics	3
	ENGR 1066	Introduction to Solar Cells and Nanotechnology	3
	HPS 1612	Philosophy of 20th Century Physics	3
	MEMS 1058	Electromagnetic Properties of Materials	3
	PHYS 0477	Intro to Thermodynamics, Relativity and Quantum Theory	4
	PHYS 0330	Physics and Quantum Computing Seminar	1
	PHYS 0520	Modern Physical Measurements	3
	PHYS 1370	Introduction to Quantum Mechanics 1	3
	PHYS 1371	Introduction to Quantum Mechanics 2	3
	PHYS 1374	Introduction to Solid State Physics	3
	CHEM 1710	Undergraduate Research	3
	CS 1950	Directed Research: Capstone	3
	CS 1951	Directed Research	1-3
	ECE 1893	ECE Undergraduate Research Project	1-3
	INFSCI 1710	Directed Research	3
	PHYS 1903	Directed Research	1-3
	Quantum Adjacent Elective Courses (Choose 3-6 credit hours):		
	CHEM 1000	Mathematics for Chemistry	4
	CHEM 1420	Physical Chemistry 2	3
	CHEM 1440	Physical Chemistry Lab 2	1
	CS OR CMPINF 0401	Intermediate Programming Using Java	4
	CS 0441	Discrete Structures for CS	3
	CS 0445	Data Structures	3
	CS 1501	Algorithms and Data Structures 2	3
	CS 1502	Formal Methods in Computer Science	3
	CS 1510	Algorithm Design	3
	CS 1656	Introduction to Data Science	3
	CS 1675	Introduction to Machine Learning	3
	CS 1678	Introduction to Deep Learning	3
	ECE 0201	Digital Circuits and Systems	4
	ECE 0301	ECE Problem Solving with C++	3
	ECE 1250	Nanotechnology & Nano-Engineering	3
	ENGCMP 0530	Writing for the Sciences	3
	ENGR 1453	Data Science: Statistical Learning, Modeling & Prediction	3
	HPS 1653	Intro to Philosophy of Science	3
	IE 1081	Operations Research	3
	IE 1082	Probabilistic Methods in Operations Research	3
	INFSCI 0310	Computation in Information Science	3
	INFSCI 0610	Networks and Information	3
	INFSCI 1470	Immersive Media Technologies	3
	INFSCI 1520	Information Visualization	3
	INFSCI 1530	Data Mining	3
	INFSCI 1600	Security and Privacy	3
	INFSCI 1630	Communication Networks	3
	INFSCI 1640	Wireless Networks	3
	PHYS 1341	Thermodynamics and Statistical Mechanics	3
	PHYS 1351	Electricity and Magnetism	3
	PHYS 1361	Wave Motion and Optics	3

Requirements for the Joint Nanoscience and Engineering Certificate Obsolete

	Course	Title	Credits
	Required Courses (9 credit hours):		
	ENGR 0240	Nanotechnology and Nano-Engineering	3
	PHYS 1375 or CHEM 1630	Foundations of Nanoscience	3
	PHYS 1903	Directed Research in Nanoscience and Nanotechnology	3
	Elective Courses (Choose at least 6 credit hours):		
	CHEM 1410/1420 or 1480	Physical Chemistry 1, 2 or Intermediate	3
	CHEM 1450	Molecular Modeling and Graphics	3
	CHEM 1600	Synthesis and Characterization of Polymers	3
	CHEM 1620	Atoms, Molecules and Materials	3
	ECE 0257	Analysis & Design of Electronic Circuits	3
	ECE 1247	Semiconductor Device Theory	3
	ECE 2295	Nanosensors	3
	ENGR 0241	Fabrication and Design in Nanotechnology	3
	IE 1012, 2012	Manufacture of Structural Nano-Materials	3
	MEMS 1057	Micro/Nano Manufacturing	3
	MEMS 1447	Nanocharacterization	3
	MEMS 1469	Materials Science of Nanostructures	3
	MEMS 1477	Thin Film Processes and Characterization	3
	MEMS 1478	Nanoparticles: Science and Technology	3
	MEMS 1480	Introduction to Microelectromechanical Systems	3
	PHYS 0520	Modern Physical Measurements	3
	PHYS 1361	Wave Motion and Optics	3
	PHYS 1370/1371	Introduction to Quantum Mechanics 1 or 2	3
	PHYS 1374	Introduction to Solid State Physics	3

Requirements for the Physics Minor

	Course	Title	Credits
	Required Courses (12 credit hours):		
	PHYS 0174, 0475	Basic Physics for Science and Engineering 1	4
	PHYS 0175, 0476	Basic Physics for Science and Engineering 2	4
	PHYS 0477[1]	Intro to Thermodynamics, Relativity and Quantum Theory	4
	Laboratory Course (Choose at least 2 credit hours):		
	PHYS 0219	Basic Lab. Physics for Science and Engineering	2
	PHYS 0520	Modern Physical Measurements	3
	Prerequisite Math Courses (12 credit hours):		
	MATH 0220	Analytic Geometry and Calculus 1	4
	MATH 0230, 0235	Analytic Geometry and Calculus 2	4
	MATH 0240, 0245	Analytic Geometry and Calculus 3	4
	Elective Courses (3 credit hours)		
	PHYS 0481	Applications of Modern Physics	3
	PHYS 1374	Introduction to Solid State Physics	3
	PHYS 1375	Foundations of Nanoscience	3
	PHYS 1376	Introduction to Biological Physics	3
	PHYS 1378	Introduction to Nuclear/Particle Physics	3

[1] The pre-requisite for PHYS 0477 is a B- or better in PHYS 0175.