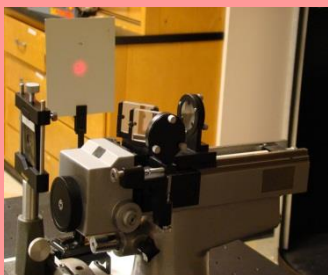
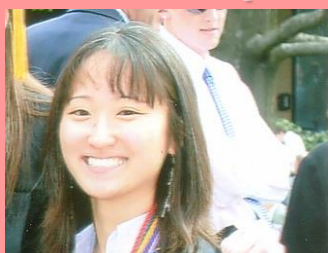


PHYSICS TEACHER PROGRAM



Department
of Physics

Mind, heart and spirit.



DEPARTMENT OF PHYSICS
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The Department of Physics and the School of Education at Duquesne University team up to offer a **five-year dual degree program** for students interested in becoming physics teachers in high school. The program leads to a **Bachelor's degree in Physics** (Science or Arts) and a **Master of Science in Secondary Education**.

The 4+1 model. This is an accelerated course of studies that combines the senior year of the undergraduate physics program with the first year of the graduate education program. Admission into the **physics major** is the first step. In the spring of the third year, candidates apply to the graduate school of education for fall entrance into the second degree. Candidates graduate from the school of natural sciences with a bachelor of science in physics at the end of the fourth year and continue graduate studies in education for one more year to receive their master's degree.

The curriculum. The curriculum for both physics degree options combines a strong mathematical foundation with an intense physics curriculum comparable to that of major physics programs nationwide. Both options include all general science and specific physics content required for teaching certification. The BS option includes a research experience and prepares students for professional employment as well as graduate studies in physics, astronomy, chemistry or engineering. The BA option accommodates a double major with mathematics.

Teaching experience. Required graduate education courses, including teaching experiences, are sequenced in the fourth year, but elective teaching courses **with field experiences** are available as early as the sophomore year. Joint advisement with the school of education is required.

The advantage. Teachers that have a bachelor's degree in physics are rare and highly competitive in the educational job market. Plus, they have a superior skill at teaching physics because they know well beyond what is presented in the high-school textbook.

Be one of a kind. Physics is a small community, and it feels like one, especially at Duquesne. Small classes, highly individualized attention and close advisement are all conducive to a solid learning experience. Plus, opportunities for additional training through tutoring, lab assistantships and undergraduate research are available and strongly encouraged.

What was YOUR physics experience in high school? If you think high school students deserve better, consider majoring in physics at Duquesne University as your first step to becoming the best teacher ever.



Physics Teacher Program
5 year dual degrees BA/MSEd or BS/MSEd
 Effective Fall 2012 (all incoming freshmen and transfers)

The Bachelor of Arts requires a minimum of 120 credits, with 32 credits in physics coursework at level 200 or above. The Bachelor of Science has a minimum of 130 credits and requires all courses in the bachelor of arts plus 11 more credits in physics coursework at level 300 or above and a research experience. A grade of C or better is required in all physics courses. The Master of Science in Education requires 36 credits of graduate coursework, some of which counting as general electives for the undergraduate physics degree.

Physics requirements for the Bachelor of Arts (32 credits)

- **Basic Sequence (15 credits)**
 1. PHYS 211 General Analytical Physics I with lab (4 credits)
 2. PHYS 212 General Analytical Physics II with lab (4 credits)
 3. PHYS 302 Optics (3 credits)
 4. PHYS 312 Optics Lab (1 credit)
 5. PHYS 374 Modern Physics (3 credits)
- **Advanced Sequence (17 credits). Required for teaching certification.**
 1. PHYS 364 Modern Physics Lab (1 credit)
 2. PHYS 401 Thermal Physics (3 credits)
 3. PHYS 461 Mechanics (4 credits)
 4. PHYS 470 Electricity and Magnetism (3 credits)
 5. PHYS 481 Descriptive Cosmology (3 credits)
 6. PHYS 482W Particle Physics (3 credits)

Additional requirements for teaching certification (7 credits)

1. PHYS 170 Acoustics (3 credits)
2. BIOL 111 and lab **or** BIOL 112 and lab (4 credits)

Graduate Education courses to be taken in the Senior year. **Up to 6 credits may count towards the BA degree.**

Fall

- GSC 520 Introduction to Teaching (3 credits)
- GSC 583 Field Experience (1 credit)
- GSC 570 Gateway 1: Technology (1 credit)

Spring

- GSC 501 Content Area Reading (3 credits)
- GESL 501 Helping English Language Learners in Mainstream Classes (3 credits)

University and School requirements for all physics degrees (41 credits)

- All courses in the **University Core** (28 credits). The following **MUST** be included:
 - LTFL 102 Ethics, Education & the Teaching Profession (3 credits).
 - LTFL 204 Social Justice in Educational Settings (3 credits).
- All courses in the **BSNES Core** (13 credits):
 - HIST 307 History of Science (3 credits)
 - ENGL 302 Science Writing (3 credits)
 - SPRG 105 Career Development Seminar (1 credit)

Extra-departmental requirements for all physics degrees (34 credits)

- Chemistry:
 1. CHEM 121 General Chemistry I and lab (5 credits)
 2. CHEM 122 General Chemistry II and lab (5 credits)
- Computer Science:
 1. COSC 160 Scientific Programming: Java (3 credits)
- Mathematics:
 1. MATH 115 Calculus I (4 credits)
 2. MATH 116 Calculus II (4 credits)
 3. MATH 215 Calculus III (4 credits)
 4. MATH 210 Matrix Algebra (3 credits) or MATH 310 Linear Algebra (4 credits)
 5. MATH 316 Differential Equations (3 credits)



6. MATH 225 Introduction to Biostatistics (3 credits) or MATH 301 Introduction to Probability and Statistics I (3 credits)

Bachelor of Science option (11 credits)

The student may receive a bachelor of science instead of arts by completing the following **in addition** to all courses above:

- | | |
|-------------------------------|-------------|
| 1. PHYS 332 Electronics | (3 credits) |
| 2. PHYS 473 Electrodynamics | (3 credits) |
| 3. PHYS 474 Quantum Mechanics | (3 credits) |
| 4. PHYS 499W Senior Research | (2 credits) |

Recommended Course Sequence

FRESHMAN YEAR

Fall		Cr	Spring		Cr
PHYS 211 GAP I and lab		4	PHYS 212 GAP II and lab		4
MATH 115 Calculus I		4	MATH 116 Calculus II		4
CHEM 121 General Chemistry I and lab		5	CHEM 122 General Chemistry II and lab		5
COSC 160 Java		3	UCOR English I		3
UCOR Information Literacy		1	SPRG 105 Career Development Seminar		1
17			17		

SOPHOMORE YEAR

Fall		Cr	Spring		Cr
PHYS 302 Optics		3	PHYS 374 Modern Physics		3
PHYS 312 Optics Lab		1	PHYS 364 Modern Physics Lab		1
(PHYS 332 Electronics) BS only		(3)	PHYS 170 Acoustics		3
MATH 215 Calculus III		4	MATH 314 Differential Equations		3
MATH 210 Matrix Algebra		3	UCOR ethics (LTFL 102 Teaching ethics)		3
UCOR global diversity		3	UCOR English II		3
14			16		
(17)					

JUNIOR YEAR

Fall		Cr	Spring		Cr
(PHYS 474 Quantum Mechanics) BS only		(3)	PHYS 482W Elementary Particle Physics		3
PHYS 401 Thermal Physics		3	PHYS 481 Cosmology		3
MATH 225 Biostatistics		3	HIST 307 History of Science		3
ENGL 302 Science Writing		3	BIOL 111 or BIOL 112		4
UCOR arts		3	UCOR social justice (LTFL 204 SS in Education)		3
12			16		
(15)					

SENIOR YEAR

Fall		Cr	Spring		Cr
PHYS 461 Mechanics		4	(PHYS 473 Electrodynamics) BS only		(3)
PHYS 470 Electricity and Magnetism		3	UCOR theology		3
UCOR faith and reason		3	(PHYS 499W Senior Research) BS only		(2)
GSCE 520 Introduction to Teaching		3	UCOR philosophy		3
GSCE 58x Field Experience		1	GSCE 501 Content Area Reading		3
GSCE 570 Gateway 1: Technology		1	GESL 501 Helping English Language Learners in Mainstream Classes		3
10+5			12 (17)		

Failure to take the recommended graduate education courses before graduating from the Physics program may result in significantly delayed graduation from the school of Education

Humanities and social sciences courses can be taken in any sequence.

Most physics and math courses must be sequenced as indicated because of prerequisite linking.

In addition to the physics advisor, students must meet with the School of Education advisor upon entrance to the program.



**Scenario for MEd Secondary Program
Dual Degree program BSNES/SOED
Entering in fall of Senior year**

Apply for Admission to School of Education in April of Junior Year

Course	Credits	SOED →				
		BSNES←		YEAR 5		
		SENIOR YEAR BA/BS	Fall	Spring	Summer	Fall
GSCE 500 Orientation	0	X				
GSCE 520 Introduction to Teaching	3	X				
GSCE 583 Field Experience	1	X				
GSCE 570 Gateway 1: Technology	1	X				
GSCE 501 Content area reading	3		X			
GESL 501 Helping English Language Learners in mainstream classes	3		X			
GSPE 501 Exploring inclusive teaching supports	3			X		
GSPE 502 Legal and ethical issues in Special Education	3			X		
GSPE 655 Secondary Practices and Transitions	3			X		
GFDE 510 Theories of the teaching and learning process	3				X	
GSCE 631 Instructional techniques	3				X	
GSCE 636 Teaching secondary school science (fall-afternoon)	3				X	
GSCE 593 Secondary methods field experience	1				X	
Student Teaching	6					X
Gateway 4: Leadership	0					X
MEd Total Credits	36	5	6	9	10	6