

BA OR BS PHYSICS AP + MS COMPUTER SCIENCE

Program Overview

AP Coordinator	Kaitlin Hoffmann, 845-257-3533, hoffmank4@newpaltz.edu
Physics Coordinator	Catherine Herne, (845) 257-3742, hernecc@newpaltz.edu
Program ID	BA or BS Physics AP (511A) MS Computer Science AP (270)
Credits	BA or BS Physics AP (77-80 credits – inclusive of 6 GR credits) MS Computer Science (30 credits)
Program Length	The Accelerated Pathway program in Computer Science may be completed in 10 semesters, but students must complete the graduate degree within 7 years.
Modality	In-person
Full-time/Part-time	Full-time or Part-time
Transfer Credits	6 graduate credits will be applied to both the BA/BS and MS degree programs.
Graduate Capstone	Comprehensive Exam or Thesis

Program Description

This accelerated plan of study provides a pathway to earning a bachelor's degree in Physics and a master's degree in Computer Science; Students enrolled in the (UG degree/GR degree) program complete 6-12 graduate-level credits during their senior year. These credits are offered at the reduced undergraduate tuition rate and fulfill both undergraduate and graduate program requirements.

SUNY New Paltz offers a 30-credit master's degree program in Computer Science, designed to help students from all backgrounds advance to new careers in technology fields. Our mission is to prepare the next generation of application developers, start-up entrepreneurs, and business analysts to thrive in a rapidly changing world. This program offers:

- **Flexible Course Scheduling:** Our Fall and Spring semester courses are offered in-person, and the summer courses are offered online. The full program can be completed in as few as 3 semesters of full-time study. A typical full-time student takes three courses (9 credits) per semester.
- **Building Foundation and Skills:** Our curriculum is focused on building a strong foundation in the theoretical concepts of computer science, while introducing applicable skills in areas like machine learning, web and database development, cybersecurity, and data science.
- **Faculty and Facilities:** Courses are taught by dedicated faculty who are experts in their fields with active research programs. Our network and security lab provide advanced computing facilities.
- **Responsive Curriculum:** Our curriculum is constantly evolving in step with current trends in technology, emphasizing the skills that

employers – especially in the Hudson Valley's growing tech industries – need right now.

- **Accessible Format:** Admission to the program is open to ALL undergraduate majors. While many of our students enter the program with undergraduate degrees in computer science or related fields, many successful candidates have come from fields as varied as Philosophy, Fine Arts, Journalism, Business, and Biology.

How does it work?

Get started by declaring the Physics AP major (511A) as an undergraduate:

- Meet with AP advisor, Kaitlin Hoffmann, to declare the Physics AP major.
- Work with your AP advisor to enroll in two graduate computer science courses during your senior year.
- Apply for the MS Computer Science program in your senior year.
- Transfer 6 credits of graduate electives taken as an undergraduate into your graduate program.

MS Computer Science Admission Requirements

Graduate admission requires submission of:

- Graduate application - select major 270.
- One set of official transcripts for all undergraduate and graduate course work, including a baccalaureate transcript from a regionally accredited institution, indicating at least a 3.0 cumulative grade point average.
- Grades of B or higher in graduate computer science courses taken as a senior.

Graduate Admission Deadlines

July 31	Fall Admission
January 1	Spring Admission

Accepting on a rolling basis until the program is full. However, applications must at least be started by the deadline, or they will not be considered.

Curriculum Requirements

BA or BS Physics AP (major 511A)

Code	Title	Credits
Required Physics Courses (35 Credits)		
PHY105	New Physics & Astronomy Student Seminar	1
PHY201	Physics I-Calculus-Based	3
PHY211	Physics I Laboratory	1
PHY202	Physics II-Calculus-Based	3

PHY212	Physics II Laboratory	1
PHY306	Mechanics 1	3
PHY308	Modern Physics I	3
PHY313	Electricity and Magnetism	3
PHY322	Optics	3
PHY323	Optics Laboratory	2
PHY331	Quantum Physics	3
PHY335	Thermal Physics	3
PHY424	Advanced Physics Laboratory	3
PHY491	Physics Senior Project (3-6)	3

Physics Electives (9 Credits)

Select 3 electives from the list below: 9

PHY305	Computational Physics	
PHY307	Mechanics 2	
PHY340	Introduction to Astrophysics	
PHY429	Solid State Physics	
PHY366	Nonlinear Dynamics	
PHY390	Research in Physics and Astronomy	

Required Cognate Courses (27-30 Credits)

CPS210	Computer Science I: Foundations	4
CHE201 & CHE211	General Chemistry I and General Chemistry I Lab	4
CHE202 & CHE212	General Chemistry II and General Chemistry II Lab	4
MAT251	Calculus I	4
MAT252	Calculus II	4
MAT353	Calculus III	4
MAT359 & MAT362 or MAT341	Ordinary Differential Equations and Linear Algebra Applied Mathematics I	3-6

Graduate Courses (6 Credits)

After completing CPS210 and CPS310, select 2 graduate courses by advisement: 6

CPS502	Discrete Structures	
CPS526	Advanced Data Structures	
CPS528	Algorithms	
CPS530	Computer Networks	
CPS534	Foundations of Computer Science	
CPS536	Machine Learning	
CPS540	Artificial Intelligence	
CPS553	Web and Database Programming	
CPS554	User Interface Programming	
CPS580	Functional Programming	
CPS593	Computer Science Selected topic	
CPS594	Fieldwork Comp Science	

Total Credits 77-80**MS Computer Science (major 270)**

Graduate study in Computer Science enables students to individualize their program of study by pursuing ten computer science courses (30 credits) and passing a comprehensive exam or completing eight courses (24 credits) and delving into a 6-credit thesis project. This flexibility allows students to explore conceptually based classes, enhance technical skills through applied learning courses, stay abreast of current

trends in the field through a wide range of special topics courses, and engage in research by pursuing an optional six-credit thesis.

Sample Comprehensive Exam Track

Code	Title	Credits
Transfer Credit (6 Credits)		
Graduate courses taken as an undergraduate		6
Individualized Comprehensive Exam Track (24 Credits)		
Select 8 courses by advisement:		24
CPS502	Discrete Structures	
CPS526	Advanced Data Structures	
CPS528	Algorithms	
CPS530	Computer Networks	
CPS534	Foundations of Computer Science	
CPS536	Machine Learning	
CPS540	Artificial Intelligence	
CPS551	Programming and Data Structures	
CPS553	Web and Database Programming	
CPS554	User Interface Programming	
CPS580	Functional Programming	
CPS593	Computer Science Selected topic *	
Total Credits		30

* Recently offered special topics courses include Cybersecurity, Database Management, Network Security, Computer Vision, and Managing Linux Environments.

Sample Thesis Track

Code	Title	Credits
Transfer Credit (6 Credits)		
Graduate courses taken as an undergraduate		6
Individualized Thesis Track (24 Credits)		
Select six graduate courses by advisement:		18
CPS502	Discrete Structures	
CPS526	Advanced Data Structures	
CPS528	Algorithms	
CPS530	Computer Networks	
CPS534	Foundations of Computer Science	
CPS536	Machine Learning	
CPS540	Artificial Intelligence	
CPS551	Programming and Data Structures	
CPS553	Web and Database Programming	
CPS554	User Interface Programming	
CPS580	Functional Programming	
CPS593	Computer Science Selected topic	
CPS590	Thesis in Computer Science	6
Total Credits		30

* Recently offered special topics courses include Cybersecurity, Database Management, Network Security, Computer Vision, and Managing Linux Environments.

Academic Standing Requirements for Accelerated Pathway Students

A cumulative GPA of less than 3.0 in graduate-level courses taken in the undergraduate portion of an accelerated pathway program precludes the student's good standing. Students with a cumulative GPA between 2.75 to 2.99 are strongly advised to reconsider continuing into the graduate program. Students with a cumulative GPA below 2.75 may not continue and will be de-matriculated from GR program.

Graduation Checklist

- Apply for graduation via my.newpaltz.edu#under "Graduation" tab according to the schedule in the academic calendar.
- Resolve any pending admission conditions (outlined in your acceptance letter) and/or missing documents if applicable.
- Review your progress report via my.newpaltz.edu to ensure that you have completed all program requirements.
- Remember that only two grades below a B- may be applied to your plan of study
- Contact your advisor if you need to amend your plan or process transfer credit.
- Ensure that you are in good academic standing with a GPA (Grade Point Average) of 3.0 or higher.
- Pass your capstone or culminating assessment.
- Complete your degree within the specified time limit outlined in the Program Overview.

BA/BS Physics AP Program Learning Outcomes

Upon graduation, students with a major in physics are expected to demonstrate knowledge of the following areas:

- Classical physics: Mechanics; electromagnetic theory
- Modern physics: Relativity; quantum physics; particle physics
- Thermal physics: Thermodynamics; statistical physics
- Circuit theory
- Electronics
- Solid-state physics

- Optics

Physics graduates will also be able to demonstrate the following skills:

- Apply numerical methods.
- Write a computer program.
- Understand and interpret graphical information.
- Use application software to:
 - Produce graphs using software for presentation of data.
 - Produce graphs using software for understanding relationships.
- Perform complex calculations, create visualizations, or control equipment.
- Present scientific information orally
- Present scientific information in writing
- Laboratory skills:
 - Formulate research questions.
 - Make measurements and collect data.
 - Analyze the results of an experiment.
 - Assess experimental error.
- Design an experiment.
- Use fabrication techniques (e.g., 3D printing, shop tools)
- Solve problems using physics knowledge and mathematical methods.
- Apply concepts from prior department coursework and synthesize knowledge from several previous courses.

MS Computer Science Program Learning Outcomes

Candidates who successfully complete all required components of the MS in Computer Science program at SUNY New Paltz will:

- Develop skills in programming in several high-level languages, assembly language, machine language, and microcode.

- Develop the ability to learn new programming languages without formal instruction.
- Design and analyze algorithms.
- Design a new programming language and write a compiler or interpreter for it.
- Apply object-oriented programming and software engineering principles.
- Design and implement digital circuits.
- Understand the structure and operation of a modern operating system.
- Understand theoretical computer science concepts, such as the Turing machines and automata and computability theory.
- Understand continuous and discrete mathematical structures relevant to computing.