

PHYSICS MAJOR, B.A.

Everything around you is influenced or governed by physics. Physics seeks to understand the fundamental workings of the universe, from the smallest particles like neutrinos to the vast structure of the cosmos. It unveils the underlying principles governing the world around us and serves as the cornerstone of all natural sciences, including chemistry, biology, oceanography, and geography.

The Department of Physics and Astronomy offers a range of degree tracks tailored to various interests and career paths:

- B.A. Tracks
 - Physics
 - Astronomy
 - Computational Physics
 - Energy
 - Engineering Physics
 - Medical and Biological Physics
 - Quantitative Finance
- B.S. Tracks
 - Physics
 - Astrophysics

These tracks align with diverse employment opportunities (<https://www.aps.org/careers/physicists/prospects.cfm>) for physics graduates, spanning high schools, government laboratories, financial institutions, medical facilities, data science, and high-tech industries.

Upon graduation, approximately 50 percent of physics bachelors transition directly into the workforce, while others pursue advanced degrees in physics, medical physics, business, law, or computer science.

Opt for a B.A. degree if you seek to blend your passion for physics with complementary disciplines such as computer science, environmental science, biophysics, medicine, engineering, or finance.

Consider a B.S. degree if you intend to pursue graduate study in physics, astronomy, or a related field, or a career practicing physics.

Student Learning Outcomes

Upon completion of the physics program, students should be able to:

- Demonstrate knowledge of major concepts, theoretical reasoning, and empirical findings in physics and/or astronomy – Knowledge Base in Physics
- Use physics and mathematics knowledge to solve problems – Critical Thinking and Problem Solving
- Effectively conduct research under faculty guidance – Research and the Advancement of Physics and Astronomy
- Gain entry to top graduate programs, employment as physicists in industry, teaching positions in high school physics and astronomy, or leverage their skills in other rewarding careers – Preparation for Future Career

Requirements

In addition to the program requirements, students must

- earn a minimum final cumulative GPA of 2.000
- complete a minimum of 45 academic credit hours earned from UNC–Chapel Hill courses
- take at least half of their major core requirements (courses and credit hours) at UNC–Chapel Hill
- earn a minimum cumulative GPA of 2.000 in the major core requirements. Some programs may require higher standards for major or specific courses.

For more information, please consult the degree requirements section of the catalog (<https://catalog.unc.edu/undergraduate/degree-requirements/>).

Physics Major, B.A. – Standard Option

Code	Title	Hours
Core Requirements		
PHYS 118	Introductory Calculus-based Mechanics and Relativity ^{H, F}	4
PHYS 119	Introductory Calculus-based Electromagnetism and Quanta ^{H, F}	4
PHYS 281L	Experimental Techniques in Physics	3
PHYS 331	Numerical Techniques for the Sciences I	4
PHYS 201 or PHYS 401	Basic Mechanics ² Mechanics I	3
PHYS 211 or PHYS 311	Intermediate Electromagnetism ¹ Electromagnetism I	3
PHYS 421	Introduction to Quantum Mechanics ²	3
Nine additional credits chosen from ASTR (202 or numbered above 300) and PHYS (numbered above 200) ³		9
Additional Requirements		
MATH 231	Calculus of Functions of One Variable I ^{H, F}	4
MATH 232	Calculus of Functions of One Variable II ^{H, F}	4
MATH 233	Calculus of Functions of Several Variables ^{H, F}	4
MATH 383	First Course in Differential Equations ^H	3
CHEM 101	General Descriptive Chemistry I ^{H, F}	3
CHEM 101L	Quantitative Chemistry Laboratory I	1
Total Hours		52

^H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.

^F FY-Launch class sections may be available. A FY-Launch section fulfills the same requirements as a standard section of that course, but also fulfills the FY-SEMINAR/FY-LAUNCH First-Year Foundations requirement. Students can search for FY-Launch sections in ConnectCarolina using the FY-LAUNCH attribute.


















¹ Fall course.

² Spring course.

³ Mentored research courses (PHYS 295, PHYS 395, and PHYS 293) may only fulfill a maximum of 3 credit hours towards this requirement.

Astronomy (ASTR) and Physics (PHYS) course descriptions (<https://catalog.unc.edu/undergraduate/departments/physics-astronomy/#coursestext>).

Physics Major, B.A. – Astronomy Option

Code	Title	Hours
Core Requirements		
PHYS 118	 Introductory Calculus-based Mechanics and Relativity ^{H, F}	4
PHYS 119	 Introductory Calculus-based Electromagnetism and Quanta ^{H, F}	4
PHYS 281L	 Experimental Techniques in Physics	3
PHYS 331	Numerical Techniques for the Sciences I	4
PHYS 201	Basic Mechanics ²	3
or PHYS 401	Mechanics I	
PHYS 211	Intermediate Electromagnetism ¹	3
or PHYS 311	Electromagnetism I	
PHYS 421	Introduction to Quantum Mechanics ²	3
Six additional credits chosen from ASTR (numbered above 300)		6
Three additional credits chosen from:		3
ASTR (numbered above 300)		
PHYS 231	 Physical Computing ^{2, H}	
PHYS 295	 Research with Faculty Mentor I	
PHYS 395	 Research with Faculty Mentor II	
PHYS 691H	 Senior Honor Thesis Research I	
PHYS 692H	 Senior Honor Thesis Research II	
Additional Requirements		
One of the following courses:		3
ASTR 100	 Understanding the Universe	
or ASTR 101	 Introduction to Astronomy: The Solar System	
or ASTR 102	 Introduction to Astronomy: Stars, Galaxies & Cosmology	
or ASTR 103	 Alien Life in the Universe	
ASTR 100L	 Astronomy with Skynet: Our Place in Space	1
or ASTR 111	 Educational Research in Radio Astronomy	
ASTR 202	Introduction to Astrophysics ¹	3
MATH 231	 Calculus of Functions of One Variable I ^{H, F}	4
MATH 232	 Calculus of Functions of One Variable II ^{H, F}	4
MATH 233	 Calculus of Functions of Several Variables ^{H, F}	4
MATH 383	First Course in Differential Equations ^H	3
Total Hours		55

H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.









F FY-Launch class sections may be available. A FY-Launch section fulfills the same requirements as a standard section of that course, but also fulfills the FY-SEMINAR/FY-LAUNCH First-Year Foundations requirement. Students can search for FY-Launch sections in ConnectCarolina using the FY-LAUNCH attribute.

¹ Fall course.

² Spring course.

Astronomy (ASTR) and Physics (PHYS) course descriptions (<https://catalog.unc.edu/undergraduate/departments/physics-astronomy/#coursestext>).

Physics Major, B.A. – Computational Physics Option

Code	Title	Hours
Core Requirements		
PHYS 118	 Introductory Calculus-based Mechanics and Relativity ^{H, F}	4
PHYS 119	 Introductory Calculus-based Electromagnetism and Quanta ^{H, F}	4
PHYS 281L	 Experimental Techniques in Physics	3
PHYS 331	Numerical Techniques for the Sciences I	4
PHYS 332	Numerical Techniques for the Sciences II ¹	4
PHYS 201	Basic Mechanics ²	3
or PHYS 401	Mechanics I	
PHYS 211	Intermediate Electromagnetism ¹	3
or PHYS 311	Electromagnetism I	
PHYS 421	Introduction to Quantum Mechanics ²	3
Three additional credits chosen from:		3
PHYS/COMP 447	Quantum Computing	
COMP 301	Foundations of Programming	
Three additional credits chosen from:		3
ASTR 202	Introduction to Astrophysics ¹	
ASTR (numbered above 300)		
PHYS (numbered above 200) ³		
COMP (numbered above 420)		
MATH 347	Linear Algebra for Applications	
or MATH 577	Linear Algebra	
STOR 435	Introduction to Probability	
Additional Requirements		
MATH 231	 Calculus of Functions of One Variable I ^{H, F}	4
MATH 232	 Calculus of Functions of One Variable II ^{H, F}	4
MATH 233	 Calculus of Functions of Several Variables ^{H, F}	4
MATH 383	First Course in Differential Equations ^H	3
COMP 110	 Introduction to Programming and Data Science ^H	3
COMP 210	Data Structures and Analysis	3
COMP 283	 Discrete Structures ^H	3
or MATH 381	Discrete Mathematics	
Total Hours		58

H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.

F FY-Launch class sections may be available. A FY-Launch section fulfills the same requirements as a standard section of that course, but also fulfills the FY-SEMINAR/FY-LAUNCH First-Year Foundations requirement. Students can search for FY-Launch sections in ConnectCarolina using the FY-LAUNCH attribute.

¹ Fall course.








² Spring course.

³ PHYS 594 and PHYS 632 are recommended.

Astronomy (ASTR) and Physics (PHYS) course descriptions (<https://catalog.unc.edu/undergraduate/departments/physics-astronomy/#coursestext>).

Computer Science (COMP) course descriptions (<https://catalog.unc.edu/undergraduate/departments/computer-science/#coursestext>).

Physics Major, B.A. – Energy Option

Code	Title	Hours
Core Requirements		
PHYS 118	 Introductory Calculus-based Mechanics and Relativity ^{H, F}	4
PHYS 119	 Introductory Calculus-based Electromagnetism and Quanta ^{H, F}	4
PHYS 281L	 Experimental Techniques in Physics	3
PHYS 201	Basic Mechanics ²	3
or PHYS 401	Mechanics I	
PHYS 211	Intermediate Electromagnetism ¹	3
or PHYS 311	Electromagnetism I	
PHYS 331	Numerical Techniques for the Sciences I	4
PHYS 231	 Physical Computing ^H	4
or PHYS 451	Electronics I	
PHYS 381	Renewable Electric Power Systems	3
PHYS 421	Introduction to Quantum Mechanics ²	3
PHYS 441	Thermal Physics ¹	3
ENEC 2--	ENEC 200-Level Elective (One ENEC course numbered 200 or above)	3
ENEC 3--	ENEC 300-Level Elective (Two ENEC courses numbered 300 or above) ³	6
Additional Requirements		
MATH 231	 Calculus of Functions of One Variable I ^{H, F}	4
MATH 232	 Calculus of Functions of One Variable II ^{H, F}	4
MATH 233	 Calculus of Functions of Several Variables ^{H, F}	4
MATH 383	First Course in Differential Equations ^H	3
Total Hours		58

H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.

F FY-Launch class sections may be available. A FY-Launch section fulfills the same requirements as a standard section of that course, but also fulfills the FY-SEMINAR/FY-LAUNCH First-Year Foundations requirement. Students can search for FY-Launch sections in ConnectCarolina using the FY-LAUNCH attribute.











¹ Fall course.

² Spring course.

³ ENEC 548 and ENEC 698 are highly recommended. Additionally, PHYS 293 could potentially fulfill one of these course requirements. Please consult with one of our department advisors for confirmation and guidance regarding course selections and requirements.

Physics (PHYS) course descriptions (<https://catalog.unc.edu/undergraduate/departments/physics-astronomy/#coursestext>).

Physics Major, B.A. – Medical and Biological Physics Option

Code	Title	Hours
Core Requirements		
PHYS 118	 Introductory Calculus-based Mechanics and Relativity ^{H, F}	4
PHYS 119	 Introductory Calculus-based Electromagnetism and Quanta ^{H, F}	4
PHYS 281L	 Experimental Techniques in Physics	3
PHYS 331	Numerical Techniques for the Sciences I	4
PHYS 201	Basic Mechanics ²	3
or PHYS 401	Mechanics I	
PHYS 211	Intermediate Electromagnetism ¹	3
or PHYS 311	Electromagnetism I	
PHYS 421	Introduction to Quantum Mechanics ²	3
PHYS 405	Biological Physics	3
PHYS 461	Introduction to Medical Physics	3
or PHYS 586	Introduction to Biomedical Imaging Science	
Additional Requirements		
BIOL 101	 Principles of Biology ^{H, F}	3
CHEM 101 & 101L	 General Descriptive Chemistry I and  Quantitative Chemistry Laboratory I ^{H, F}	4
CHEM 102	 General Descriptive Chemistry II ^{H, F}	3
MATH 231	 Calculus of Functions of One Variable I ^{H, F}	4
MATH 232	 Calculus of Functions of One Variable II ^{H, F}	4
MATH 233	 Calculus of Functions of Several Variables ^{H, F}	4
MATH 383	First Course in Differential Equations ^H	3
Three additional credits chosen from:		3
BIOL (numbered above 200)		
CHEM 261	Introduction to Organic Chemistry I ^H	
CHEM 262	Introduction to Organic Chemistry II ^H	
CHEM 430	Introduction to Biological Chemistry ^H	
PHYS (numbered above 200) ³		
Total Hours		58

- H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.
- F FY-Launch class sections may be available. A FY-Launch section fulfills the same requirements as a standard section of that course, but also fulfills the FY-SEMINAR/FY-LAUNCH First-Year Foundations requirement. Students can search for FY-Launch sections in ConnectCarolina using the FY-LAUNCH attribute.

¹ Fall course.

² Spring course.

³ PHYS 295 and PHYS 395 with research projects in medical and biological physics, and Introduction to Magnetic Resonance (PHYS 529) are recommended.

Biology (BIOL) course descriptions (<https://catalog.unc.edu/undergraduate/departments/biology/#coursestext>).

Chemistry (CHEM) course descriptions (<https://catalog.unc.edu/undergraduate/departments/chemistry/#coursestext>).

Physics (PHYS) course descriptions (<https://catalog.unc.edu/undergraduate/departments/physics-astronomy/#coursestext>).

Physics Major, B.A. – Quantitative Finance Option

Code	Title	Hours
Core Requirements		
PHYS 118	Introductory Calculus-based Mechanics and Relativity ^{H, F}	4
PHYS 119	Introductory Calculus-based Electromagnetism and Quanta ^{H, F}	4
PHYS 281L	Experimental Techniques in Physics	3
PHYS 331	Numerical Techniques for the Sciences I	4
PHYS 201	Basic Mechanics ²	3
or PHYS 401	Mechanics I	
PHYS 211	Intermediate Electromagnetism ¹	3
or PHYS 311	Electromagnetism I	
PHYS 421	Introduction to Quantum Mechanics ²	3
PHYS/BMME 441	Thermal Physics ¹	3
or CHEM 481	Physical Chemistry I	
Three additional credits chosen from the following options ³		
BUSI 407	Financial Accounting ³	
BUSI 410	Business Analytics	
BUSI 584	Financial Modeling	
MATH courses numbered above 200		
PHYS courses numbered above 200		
COMP courses numbered above 200		
Additional Requirements		
BUSI 408	Corporate Finance ⁴	3
BUSI 580	Investments ^H	3
BUSI 588	Introduction to Derivative Securities and Risk Management ^{5, H}	1.5
BUSI 589	Fixed Income ^{5, H}	1.5
BUSI 600	Risk Management ⁵	1.5
BUSI 688	Applied Trading Strategies ^{5, H}	1.5

MATH 231	Calculus of Functions of One Variable I ^{H, F}	4
MATH 232	Calculus of Functions of One Variable II ^{H, F}	4
MATH 233	Calculus of Functions of Several Variables ^{H, F}	4
MATH 383	First Course in Differential Equations ^H	3
Total Hours		57

H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.

F FY-Launch class sections may be available. A FY-Launch section fulfills the same requirements as a standard section of that course, but also fulfills the FY-SEMINAR/FY-LAUNCH First-Year Foundations requirement. Students can search for FY-Launch sections in ConnectCarolina using the FY-LAUNCH attribute.

¹ Fall course.

² Spring course.

³ Students are strongly encouraged to take BUSI 407.

⁴ ECON 101 (<https://catalog.unc.edu/search/?P=ECON%20101>) and one of BUSI 101, BUSI 102 (<https://catalog.unc.edu/search/?P=BUSI%20102>), or BUSI 107 (<https://catalog.unc.edu/search/?P=BUSI%20107>) are prerequisites for BUSI 408 (<https://catalog.unc.edu/search/?P=BUSI%20408>), but these prerequisites may be waived for students in the Quantitative Finance program.

⁵ Half-semester course.

Students must maintain a minimum cumulative GPA of at least 2.85. Students majoring in the quantitative finance option cannot pursue the minor in business.

Business Administration (BUSI) course descriptions (<https://catalog.unc.edu/undergraduate/schools-college/kenan-flagler-business-school/#coursestext>).

Mathematics (MATH) course descriptions (<https://catalog.unc.edu/undergraduate/departments/mathematics/#coursestext>).

Physics (PHYS) course descriptions (<https://catalog.unc.edu/undergraduate/departments/physics-astronomy/#coursestext>).

Physics Major, B.A. – Engineering Physics Option

Code	Title	Hours
Core Requirements		
PHYS 118	Introductory Calculus-based Mechanics and Relativity ^{H, F}	4
PHYS 119	Introductory Calculus-based Electromagnetism and Quanta ^{H, F}	4
PHYS 281L	Experimental Techniques in Physics	3
PHYS 331	Numerical Techniques for the Sciences I	4
PHYS 201	Basic Mechanics ²	3
or PHYS 401	Mechanics I	
PHYS 211	Intermediate Electromagnetism ¹	3
or PHYS 311	Electromagnetism I	
PHYS 231	Physical Computing ^H	4
PHYS 421	Introduction to Quantum Mechanics ²	3
PHYS 441	Thermal Physics	3

PHYS 451	Electronics I	4
PHYS 481L	Advanced Laboratory I	2
Six additional credits chosen from the following options ³		6
PHYS 395	Research with Faculty Mentor II ⁴	
PHYS 447	Quantum Computing	
PHYS 452	Electronics II	
PHYS 471	Physics of Solid State Electronic Devices or PHYS 573 Introductory Solid State Physics	
PHYS 515	Optics or APPL 430 Optoelectronics from Materials to Devices	
APPL 435	Nanophotonics	
APPL 463	Bioelectronic Materials	
BMME 365	Systems and Signals	
BMME 385	Bioinstrumentation	
BMME 575	Practical Machine Learning for Biosignal Analysis	
Additional Requirements		
MATH 231	Calculus of Functions of One Variable I ^{H, F}	4
MATH 232	Calculus of Functions of One Variable II ^{H, F}	4
MATH 233	Calculus of Functions of Several Variables ^{H, F}	4
MATH 383	First Course in Differential Equations ^H	3
Total Hours		58

^H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.

^F FY-Launch class sections may be available. A FY-Launch section fulfills the same requirements as a standard section of that course, but also fulfills the FY-SEMINAR/FY-LAUNCH First-Year Foundations requirement. Students can search for FY-Launch sections in ConnectCarolina using the FY-LAUNCH attribute.

¹ Fall course.

² Spring course.

³ With at least one PHYS course

⁴ With a research project in Engineering Physics

Mathematics (MATH) course descriptions (<https://catalog.unc.edu/undergraduate/departments/mathematics/#coursestext>).

Physics (PHYS) course descriptions (<https://catalog.unc.edu/undergraduate/departments/physics-astronomy/#coursestext>).

Sample Plan of Study

Sample plans can be used as a guide to identify the courses required to complete the major and other requirements needed for degree completion within the expected eight semesters. The actual degree plan may differ depending on the course of study selected (second major, minor, etc.). Students should meet with their academic advisor to create a degree plan that is specific and unique to their interests. The sample plans represented in this catalog are intended for first-year students entering UNC–Chapel Hill in the fall term. Some courses may not be offered every term.

Standard Option

First Year		
Fall Semester		Hours
First-Year Foundation Courses		
IDST 101	College Thriving	1
First-Year Seminar or First-Year Launch (https://catalog.unc.edu/undergraduate/ideas-in-action/first-year-seminars-launches/) ^F		3
Global Language through level 3 (https://catalog.unc.edu/undergraduate/ideas-in-action/global-language/)		varies
Major Courses		
MATH 231	Calculus of Functions of One Variable I ^{H, F}	4
CHEM 101	General Descriptive Chemistry I ^{H, F}	3
CHEM 101L	Quantitative Chemistry Laboratory I	1
Hours		12
Spring Semester		
First-Year Foundation Courses		
ENGL 105	English Composition and Rhetoric	3
or ENGL 105I	or English Composition and Rhetoric (Interdisciplinary)	
Triple-I and Data Literacy (https://catalog.unc.edu/undergraduate/ideas-in-action/triple-i/)		4
Major Courses		
MATH 232	Calculus of Functions of One Variable II ^{H, F}	4
Hours		11
Sophomore Year		
Fall Semester		
PHYS 118	Introductory Calculus-based Mechanics and Relativity ^{H, F}	4
MATH 233	Calculus of Functions of Several Variables ^{H, F}	4
Hours		8
Spring Semester		
PHYS 119	Introductory Calculus-based Electromagnetism and Quanta ^{H, F}	4
MATH 383	First Course in Differential Equations ^H	3
PHYS 331	Numerical Techniques for the Sciences I	4
Hours		11
Junior Year		
Fall Semester		
PHYS 281L	Experimental Techniques in Physics	3
PHYS 211	Intermediate Electromagnetism	3
or PHYS 311	or Electromagnetism I	
Hours		6
Spring Semester		
PHYS 201	Basic Mechanics	3
or PHYS 401	or Mechanics I	
PHYS 421	Introduction to Quantum Mechanics	3
Hours		6

Senior Year**Fall Semester**

Two courses (6 hours) chosen from ASTR (ASTR 202 or ASTR numbered above 300) and PHYS (numbered above 200) 6

Hours 6

Spring Semester

One course (3 hours) chosen from ASTR (ASTR 202 or ASTR numbered above 300) and PHYS (numbered above 200) 3


Hours 3

Total Hours 63

H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.

F FY-Launch class sections may be available. A FY-Launch section fulfills the same requirements as a standard section of that course, but also fulfills the FY-SEMINAR/FY-LAUNCH First-Year Foundations requirement. Students can search for FY-Launch sections in ConnectCarolina using the FY-LAUNCH attribute.

Astronomy Option**First Year****Fall Semester** **Hours****First-Year Foundation Courses**




IDST 101  College Thriving 1

Triple-I and Data Literacy (<https://catalog.unc.edu/undergraduate/ideas-in-action/triple-i/>) 4

Global Language through level 3 (<https://catalog.unc.edu/undergraduate/ideas-in-action/global-language/>) varies




Major Courses

MATH 231  Calculus of Functions of One Variable I^{H, F} 4

ASTR 101  Introduction to Astronomy: The Solar System & ASTR 100L  and  Astronomy with Skynet: Our Place in Space^H 4


Hours 13

Spring Semester**First-Year Foundation Courses**

ENGL 105  English Composition and Rhetoric 3
or
ENGL 105I  or  English Composition and Rhetoric (Interdisciplinary)

First-Year Seminar or First-Year Launch (<https://catalog.unc.edu/undergraduate/ideas-in-action/first-year-seminars-launches/>)^F 3


Major Courses

PHYS 118  Introductory Calculus-based Mechanics and Relativity^{H, F} 4

MATH 232  Calculus of Functions of One Variable II^{H, F} 4

Hours 14

Sophomore Year**Fall Semester**

PHYS 119  Introductory Calculus-based Electromagnetism and Quanta^{H, F} 4

MATH 233  Calculus of Functions of Several Variables^{H, F} 4

Hours 8

Spring Semester

PHYS 281L  Experimental Techniques in Physics 3

MATH 383 First Course in Differential Equations^H 3

PHYS 331 Numerical Techniques for the Sciences I 4

Hours 10

Junior Year**Fall Semester**

ASTR 202 Introduction to Astrophysics 3

PHYS 211 Intermediate Electromagnetism 3
or
PHYS 311 or Electromagnetism I

Hours 6

Spring Semester

PHYS 201 Basic Mechanics 3
or
PHYS 401 or Mechanics I

PHYS 421 Introduction to Quantum Mechanics 3

One course chosen from ASTR (numbered above 300) 3

Hours 9

Senior Year**Fall Semester**

One course chosen from ASTR (numbered above 300) 3

One additional elective course¹ 3

Hours 6


Total Hours 66

H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.

F FY-Launch class sections may be available. A FY-Launch section fulfills the same requirements as a standard section of that course, but also fulfills the FY-SEMINAR/FY-LAUNCH First-Year Foundations requirement. Students can search for FY-Launch sections in ConnectCarolina using the FY-LAUNCH attribute.

¹ Three credits chosen from ASTR (numbered above 300) and PHYS 231, PHYS 295, PHYS 395, PHYS 691H, PHYS 692H.

Computational Physics Option**First Year****Fall Semester** **Hours****First-Year Foundation Courses**


IDST 101  College Thriving 1

Triple-I and Data Literacy (<https://catalog.unc.edu/undergraduate/ideas-in-action/triple-i/>) 4

Global Language through level 3 (<https://catalog.unc.edu/undergraduate/ideas-in-action/global-language/>) varies

Major Courses



MATH 231  Calculus of Functions of One Variable I^{H, F} 4

COMP 110  Introduction to Programming and Data Science (if needed as prerequisite)^H 3

Hours 12


Spring Semester


First-Year Foundation Courses

ENGL 105  English Composition and Rhetoric 3
or
ENGL 105I  English Composition and Rhetoric (Interdisciplinary)

First-Year Seminar or First-Year Launch (<https://catalog.unc.edu/undergraduate/ideas-in-action/first-year-seminars-launches/>)^F 3

Major Courses


PHYS 118  Introductory Calculus-based Mechanics and Relativity^{H, F} 4


MATH 232  Calculus of Functions of One Variable II^{H, F} 4


Hours 14

Sophomore Year

Fall Semester

PHYS 119  Introductory Calculus-based Electromagnetism and Quanta^{H, F} 4

MATH 233  Calculus of Functions of Several Variables^{H, F} 4

COMP 283  Discrete Structures^H 3
or
MATH 381 or Discrete Mathematics

Hours 11

Spring Semester

MATH 383 First Course in Differential Equations^H 3

COMP 210 Data Structures and Analysis 3

PHYS 331 Numerical Techniques for the Sciences I 4

Hours 10

Junior Year

Fall Semester

PHYS 211 Intermediate Electromagnetism 3
or
PHYS 311 or Electromagnetism I

PHYS 281L  Experimental Techniques in Physics 3

Hours 6

Spring Semester

PHYS 201 Basic Mechanics 3
or
PHYS 401 or Mechanics I

PHYS 421 Introduction to Quantum Mechanics 3

Hours 6

Senior Year

Fall Semester

PHYS 332 Numerical Techniques for the Sciences II 4

Elective Course¹ 3

Hours 7

Spring Semester

Elective Course² 3

Hours 3

Total Hours 69

^H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.

^F FY-Launch class sections may be available. A FY-Launch section fulfills the same requirements as a standard section of that course, but also fulfills the FY-SEMINAR/FY-LAUNCH First-Year Foundations requirement. Students can search for FY-Launch sections in ConnectCarolina using the FY-LAUNCH attribute.

¹ Three credits chosen from ASTR 202, ASTR (numbered above 300), PHYS (numbered above 200), COMP (numbered above 420), MATH 347 or MATH 577, and STOR 435.

² Courses may be chosen from PHYS 447 or COMP 447 or COMP 301.


Energy Option

First Year

Fall Semester

Hours


First-Year Foundation Courses

IDST 101  College Thriving 1

Triple-I and Data Literacy (<https://catalog.unc.edu/undergraduate/ideas-in-action/triple-i/>) 4

Global Language through level 3 (<https://catalog.unc.edu/undergraduate/ideas-in-action/global-language/>) varies



Major Courses

MATH 231  Calculus of Functions of One Variable I^{H, F} 4

Hours 9


Spring Semester

First-Year Foundation Courses

ENGL 105  English Composition and Rhetoric 3
or
ENGL 105I  English Composition and Rhetoric (Interdisciplinary)

First-Year Seminar or First-Year Launch (<https://catalog.unc.edu/undergraduate/ideas-in-action/first-year-seminars-launches/>)^F 3

Major Courses


PHYS 118  Introductory Calculus-based Mechanics and Relativity^{H, F} 4


MATH 232  Calculus of Functions of One Variable II^{H, F} 4

Hours 14

Sophomore Year

Fall Semester

PHYS 119  Introductory Calculus-based Electromagnetism and Quanta^{H, F} 4

MATH 233  Calculus of Functions of Several Variables^{H, F} 4

ENEC 2-- ENEC 200-Level Elective 3

Hours 11

Spring Semester

PHYS 281L  Experimental Techniques in Physics 3

MATH 383 First Course in Differential Equations^H 3

PHYS 331 Numerical Techniques for the Sciences I 4

Hours 10

Junior Year**Fall Semester**

PHYS 211 or PHYS 311	Intermediate Electromagnetism or Electromagnetism I	3
PHYS 231 or PHYS 451	Physical Computing ^H or Electronics I	4
ENEC 3—	ENEC 300-Level Elective	3

Hours 10

Spring Semester

PHYS 201 or PHYS 401	Basic Mechanics or Mechanics I	3
PHYS 421	Introduction to Quantum Mechanics	3

Hours 6

Senior Year**Fall Semester**

PHYS 441	Thermal Physics	3
----------	-----------------	---

Hours 3

Spring Semester

PHYS 381	Renewable Electric Power Systems	3
ENEC ----	ENEC GENERAL ELECTIVE (At the 300 level or above)	3

Hours 6

Total Hours 69

H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.

F FY-Launch class sections may be available. A FY-Launch section fulfills the same requirements as a standard section of that course, but also fulfills the FY-SEMINAR/FY-LAUNCH First-Year Foundations requirement. Students can search for FY-Launch sections in ConnectCarolina using the FY-LAUNCH attribute.

Medical and Biological Physics Option**First Year****Fall Semester****First-Year Foundation Courses**

IDST 101	College Thriving	1
ENGL 105 or ENGL 105I	English Composition and Rhetoric or English Composition and Rhetoric (Interdisciplinary)	3
Triple-I and Data Literacy (https://catalog.unc.edu/undergraduate/ideas-in-action/triple-i/)		4
Global Language through level 3 (https://catalog.unc.edu/undergraduate/ideas-in-action/global-language/)		varies

Major Courses

MATH 231	Calculus of Functions of One Variable I ^{H,F}	4
BIOL 101	Principles of Biology ^{H,F}	3

Hours 15

Spring Semester**First-Year Foundation Courses**

First-Year Seminar or First-Year Launch (https://catalog.unc.edu/undergraduate/ideas-in-action/first-year-seminars-launches/) ^F	3
--	---

Major Courses

PHYS 118	Introductory Calculus-based Mechanics and Relativity ^{H,F}	4
MATH 232	Calculus of Functions of One Variable II ^{H,F}	4
CHEM 101 & 101L	General Descriptive Chemistry I and Quantitative Chemistry Laboratory I ^{H,F}	4

Hours 15

Sophomore Year**Fall Semester**

PHYS 119	Introductory Calculus-based Electromagnetism and Quanta ^{H,F}	4
MATH 233	Calculus of Functions of Several Variables ^{H,F}	4
CHEM 102	General Descriptive Chemistry II ^{H,F}	3

Hours 11

Spring Semester

PHYS 281L	Experimental Techniques in Physics	3
MATH 383	First Course in Differential Equations ^H	3
PHYS 331	Numerical Techniques for the Sciences I	4

Hours 10

Junior Year**Fall Semester**

PHYS 405	Biological Physics	3
Elective course ¹		3

Hours 6

Spring Semester

PHYS 201 or PHYS 401	Basic Mechanics or Mechanics I	3
PHYS 421	Introduction to Quantum Mechanics	3

Hours 6

Senior Year**Fall Semester**

PHYS 211 or PHYS 311	Intermediate Electromagnetism or Electromagnetism I	3
----------------------------	--	---

Hours 3

Spring Semester

PHYS 461 or PHYS 586	Introduction to Medical Physics or Introduction to Biomedical Imaging Science	3
----------------------------	--	---

Hours 3

Total Hours 69

H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.

F FY-Launch class sections may be available. A FY-Launch section fulfills the same requirements as a standard section of that course, but also fulfills the FY-SEMINAR/FY-LAUNCH First-Year Foundations requirement. Students can search for FY-Launch sections in ConnectCarolina using the FY-LAUNCH attribute.




¹ Courses may be chosen from BIOL (numbered above 200), CHEM 261, CHEM 262, CHEM 430, PHYS (numbered above 200).

Quantitative Finance Option


First Year

Fall Semester

First-Year Foundation Courses

	Hours
IDST 101  College Thriving	1
ENGL 105  English Composition and Rhetoric or ENGL 105I  English Composition and Rhetoric (Interdisciplinary)	3
Triple-I and Data Literacy (https://catalog.unc.edu/undergraduate/ideas-in-action/triple-i/)	4
Global Language through level 3 (https://catalog.unc.edu/undergraduate/ideas-in-action/global-language/)	varies

Major Courses



MATH 231  Calculus of Functions of One Variable I ^{H, F}	4
Hours	12

Spring Semester

First-Year Foundation Courses



First-Year Seminar or First-Year Launch (https://catalog.unc.edu/undergraduate/ideas-in-action/first-year-seminars-launches/) ^F	3
--	---

Major Courses


PHYS 118  Introductory Calculus-based Mechanics and Relativity ^{H, F}	4
MATH 232  Calculus of Functions of One Variable II ^{H, F}	4
Hours	11

Sophomore Year

Fall Semester



PHYS 119  Introductory Calculus-based Electromagnetism and Quanta ^{H, F}	4
MATH 233  Calculus of Functions of Several Variables ^{H, F}	4
Hours	8


Spring Semester

PHYS 281L  Experimental Techniques in Physics	3
PHYS 331 Numerical Techniques for the Sciences I	4
MATH 383 First Course in Differential Equations ^H	3
Hours	10

Junior Year



Fall Semester

PHYS 211  Intermediate Electromagnetism or Electromagnetism I or PHYS 311	3
PHYS 441  Thermal Physics or Physical Chemistry I or CHEM 481	3

BUSI 408  Corporate Finance	3
--	---

Hours 9




Spring Semester

PHYS 201  Basic Mechanics or Mechanics I or PHYS 401	3
PHYS 421 Introduction to Quantum Mechanics	3
BUSI 580  Investments ^H	3
Hours	9

Hours 9


Senior Year

Fall Semester

BUSI 588  Introduction to Derivative Securities and Risk Management ^H	1.5
BUSI 589  Fixed Income ^H	1.5
BUSI 688  Applied Trading Strategies ^H	1.5
Hours	4.5

Hours 4.5

Spring Semester

BUSI 600  Risk Management	1.5
Elective course ¹	3
Hours	4.5

Hours 4.5

Total Hours 68

H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.


F FY-Launch class sections may be available. A FY-Launch section fulfills the same requirements as a standard section of that course, but also fulfills the FY-SEMINAR/FY-LAUNCH First-Year Foundations requirement. Students can search for FY-Launch sections in ConnectCarolina using the FY-LAUNCH attribute.

¹ Courses may be chosen from BUSI 407, BUSI 410, BUSI 584, MATH (numbered above 200), PHYS (numbered above 200), or COMP (numbered above 200).


Engineering Physics Option

First Year

Fall Semester



	Hours
IDST 101  College Thriving	1
First-Year Seminar or First-Year Launch (https://catalog.unc.edu/undergraduate/ideas-in-action/first-year-seminars-launches/) ^F	3
Global Language through level 3 (https://catalog.unc.edu/undergraduate/ideas-in-action/global-language/)	varies








Major Courses

MATH 231  Calculus of Functions of One Variable I ^{H, F}	4
Hours	8

Hours 8

Spring Semester

	Hours
ENGL 105  English Composition and Rhetoric or ENGL 105I  English Composition and Rhetoric (Interdisciplinary)	3

Triple-I and Data Literacy (https://catalog.unc.edu/undergraduate/ideas-in-action/triple-i/)	4
Major Courses	
MATH 232  Calculus of Functions of One Variable II ^{H, F}	4
Hours	11
Sophomore Year	
Fall Semester	
PHYS 118  Introductory Calculus-based Mechanics and Relativity ^{H, F}	4
MATH 233  Calculus of Functions of Several Variables ^{H, F}	4
Hours	8
Spring Semester	
PHYS 119  Introductory Calculus-based Electromagnetism and Quanta ^{H, F}	4
MATH 383 First Course in Differential Equations ^H	3
PHYS 331 Numerical Techniques for the Sciences I	4
Hours	11
Junior Year	
Fall Semester	
PHYS 281L  Experimental Techniques in Physics	3
PHYS 211 Intermediate Electromagnetism or PHYS 311 or Electromagnetism I	3
PHYS 451 Electronics I	4
Hours	10
Spring Semester	
PHYS 201 Basic Mechanics or PHYS 401 or Mechanics I	3
PHYS 421 Introduction to Quantum Mechanics	3
PHYS 231  Physical Computing ^H	4
Hours	10
Senior Year	
Fall Semester	
PHYS 441 Thermal Physics	3
One course (3 hours) chosen from PHYS 452, PHYS 395, PHYS 447, PHYS 471 or PHYS 573, PHYS 515 or APPL 430, APPL 435, APPL 463, BMME 365, BMME 385, BMME 575	3
Hours	6
Spring Semester	
PHYS 481L  Advanced Laboratory I	2
One course (3 hours) chosen from PHYS 452, PHYS 395, PHYS 447, PHYS 471 or PHYS 573, PHYS 515 or APPL 430, APPL 435, APPL 463, BMME 365, BMME 385, BMME 575	3
Hours	5
Total Hours	69

H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.

F FY-Launch class sections may be available. A FY-Launch section fulfills the same requirements as a standard section of that course, but also fulfills the FY-SEMINAR/FY-LAUNCH First-Year Foundations requirement. Students can search for FY-Launch sections in ConnectCarolina using the FY-LAUNCH attribute.

Special Opportunities in Physics and Astronomy

Honors in Physics and Astronomy

The honors program offers exceptionally well-qualified students an opportunity to perform original research with a faculty member and graduate with honors or highest honors. It requires an overall grade point average of at least 3.3 and a grade point average of at least 3.4 for physics courses at the end of the junior year.

Students who wish to enter the honors program should consult with the departmental coordinator (<http://physics.unc.edu/undergraduate-program/undergraduate-research/>) for the program no later than the preregistration period in the spring semester of their junior year.

Undergraduate Research

More than half of our B.A. majors, alongside all B.S. majors, engage in at least one semester of research under the guidance of a faculty member. Many students find the experience so rewarding that they choose to continue for several semesters. PHYS 395 Research with Faculty Mentor II is a required course for all of our B.S. majors. In addition to PHYS 395, students have the option to enroll in PHYS 295 Research with Faculty Mentor I as many times as desired. These courses provide students with the opportunity to participate in cutting-edge research and acquire hands-on experience with various experimental tools and techniques, which can significantly enhance their resumes. Students may also earn course credit while pursuing internship opportunities in a physics-related industry by enrolling in PHYS 293. An approved learning contract is required prior to registering for PHYS 295, PHYS 395, and PHYS 293. Learning contracts and registration must be completed within the first week of classes.

Departmental Involvement

Within our department, two student-led organizations have their dedicated physical spaces. Both of these student organizations organize events throughout the year aimed at fostering social interaction within our student body, as well as facilitating connections between students and faculty.

The Society of Physics Students (<https://uncsps.com/>) is open to anyone interested in physics and is meant to build connections between undergraduates, graduate students, faculty, and alumni. Each year the society invites visitors to give talks and sponsors a number of events for students.

The Visibility in Physics (<https://physics.unc.edu/undergraduate/student-organizations/visibility-in-physics/>) is a student organization that aims to provide resources, advice, and a welcoming and encouraging social atmosphere for underrepresented minorities and allies in the field of physics.

Department Awards

The Physics and Astronomy department grants two annual awards to acknowledge academic excellence: the Shearin Award, for the most outstanding senior, and the Johnson Award, for the most outstanding junior. In addition, the Robert Sheldon Award for Undergraduate Research

is presented to the student who demonstrates the most remarkable research accomplishments in the major.

Department Advising Program

Within the Physics and Astronomy Department, all majors, alongside their primary academic advisor from the Academic Advising Program (<https://advising.unc.edu/>), are assigned a department advisor. A list of department advisors can be found on the Physics Department Undergraduate webpage (<https://physics.unc.edu/undergrad/>).

These advisors, who are faculty members of the Physics and Astronomy Department, provide guidance to students on physics course planning, facilitate undergraduate research opportunities, offer support through the honors program, assist with internships, explore career prospects, and provide guidance with graduate school and fellowship applications.

All physics majors are required to meet with their department advisor by appointment prior to registering for any semester beyond the fourth term in residence. Further information may be obtained from the department's website under the Undergraduate Program (<http://physics.unc.edu/undergraduate-program/>).

If you are interested in physics or astronomy and you are considering majoring in this field, you should contact one of our department advisors.

Department Programs

Majors

- Physics Major, B.A (p. 1).
 - Physics
 - Astronomy
 - Computational Physics
 - Energy
 - Engineering Physics
 - Medical and Biological Physics
 - Quantitative Finance
- Physics Major, B.S. (<https://catalog.unc.edu/undergraduate/programs-study/physics-major-bs/>)
 - Physics
 - Astrophysics

Minors

- Astronomy Minor (<https://catalog.unc.edu/undergraduate/programs-study/astronomy-minor/>)
- Physics Minor (<https://catalog.unc.edu/undergraduate/programs-study/physics-minor/>)

Graduate Programs

- M.S. in Physics (<https://catalog.unc.edu/graduate/schools-departments/physics-astronomy/>)
- Ph.D. in Physics (<https://catalog.unc.edu/graduate/schools-departments/physics-astronomy/>)

Contact Information

Department of Physics and Astronomy

Visit Program Website (<http://physics.unc.edu>)

Phillips Hall, CB# 3255

(919) 962-2078

Chair

Frank Tsui

ftsui@physics.unc.edu

Academic Affairs Coordinator

Jacob Hurst

hurstj@email.unc.edu

Director of Undergraduate Studies

Rene Lopez

rln@email.unc.edu

Associate Director of Undergraduate Studies

Jennifer Weinberg-Wolf

jweinber@physics.unc.edu