

PHYSICS MAJOR, B.A.

Everything around you is influenced or governed by physics — the study of matter, energy, and their interactions with one another. Physics seeks to understand the way the universe “works,” from the smallest neutrinos to the structure of the cosmos. It is the foundation of all other natural sciences, including chemistry, biology, oceanography, geography, and radiography.

The Department of Physics and Astronomy offers six B.A. and two B.S. degree tracks:

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

Consider a B.A. degree if you're interested in physics but want to apply your training toward a wider variety of career paths after graduation. Students who completed this program have launched careers as lab researchers, application engineers, data scientists, and financial analysts, among other occupations. Some have also pursued an advanced degree in physics, medical physics, business, law, or computer science.

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
- Apply knowledge of physics and mathematics to solve problems — Critical Thinking and Problem Solving
- Effectively conduct research under guidance of faculty member — 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 apply 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 (<http://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 (numbered above 300) and PHYS (numbered above 200)		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 & 101L	 General Descriptive Chemistry I and  Quantitative Chemistry Laboratory I ^{H, F}	4
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.

Astronomy (ASTR) and Physics (PHYS) course descriptions (<http://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 585	Imaging Science: From Cells to Stars	
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 (<http://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 (<http://catalog.unc.edu/undergraduate/departments/physics-astronomy/#coursestext>).

Computer Science (COMP) course descriptions (<http://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 or PHYS 401	Basic Mechanics ² Mechanics I	3
PHYS 211 or PHYS 311	Intermediate Electromagnetism ¹ Electromagnetism I	3
PHYS 231	 Physical Computing ^{2, H}	4
PHYS 331	Numerical Techniques for the Sciences I	4
PHYS 351	Electronics I ¹	4
PHYS 421	Introduction to Quantum Mechanics ²	3
PHYS 441	Thermal Physics ¹	3
PHYS 131	Energy: Physical Principles and the Quest for Alternatives to Dwindling Oil and Gas	3
PHYS 131L	Energy: Physical Principles and the Quest for Alternatives to Dwindling Oil and Gas	1
PHYS 581 or PHYS 582	Renewable Electric Power Systems Decarbonizing Fuels	3
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		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.

Physics (PHYS) course descriptions (<http://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 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
PHYS 405	Biological Physics	3
PHYS 461 or PHYS 586	Introduction to Medical Physics Introduction to Biomedical Imaging Science	3
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 (<http://catalog.unc.edu/undergraduate/departments/biology/#coursestext>).

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

Physics (PHYS) course descriptions (<http://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 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
PHYS/BMME 441 or CHEM 481	Thermal Physics ¹ Physical Chemistry I	3
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 and one of BUSI 101, BUSI 102, or BUSI 107 are prerequisites for BUSI 408, 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 (<http://catalog.unc.edu/undergraduate/schools-college/kenan-flagler-business-school/#coursestext>).

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

Physics (PHYS) course descriptions (<http://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

First-Year Foundation Courses

	Hours
IDST 101  College Thriving	1
First-Year Seminar or First-Year Launch (http://catalog.unc.edu/undergraduate/ideas-in-action/first-year-seminars-launches/) ^F	3
Global Language through level 3 (http://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 & 101L  General Descriptive Chemistry I and  Quantitative Chemistry Laboratory I ^{H, F}	4

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 (<http://catalog.unc.edu/undergraduate/ideas-in-action/triple-i/>) 4


Major Courses

MATH 232	 Calculus of Functions of One Variable II ^{H, F}	4
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Hours 11

Sophomore Year


Fall Semester

PHYS 118	 Introductory Calculus-based Mechanics and Relativity ^{H, F}	4
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MATH 233	 Calculus of Functions of Several Variables ^{H, F}	4
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Hours 8

Spring Semester

PHYS 119	 Introductory Calculus-based Electromagnetism and Quanta ^{H, F}	4
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MATH 383	First Course in Differential Equations ^H	3
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PHYS 331	Numerical Techniques for the Sciences I	4
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Hours 11

Junior Year

Fall Semester

PHYS 281L	 Experimental Techniques in Physics	3
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PHYS 211	Intermediate Electromagnetism or Electromagnetism I	3
PHYS 311		

Hours 6

Spring Semester

PHYS 201	Basic Mechanics or Mechanics I	3
PHYS 401		

PHYS 421	Introduction to Quantum Mechanics	3
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One course (3 hours) chosen from ASTR (numbered above 300) and PHYS (numbered above 200) 3

Hours 9

Senior Year

Fall Semester

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

Hours 3

Spring Semester

One course (3 hours) chosen from 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
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Triple-I and Data Literacy (<http://catalog.unc.edu/undergraduate/ideas-in-action/triple-i/>) 4

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

Major Courses

MATH 231	 Calculus of Functions of One Variable I ^{H, F}	4
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ASTR 101 & ASTR 100L	 Introduction to Astronomy: The Solar System and  Astronomy with Skynet: Our Place in Space ^H	4
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Hours 13

Spring Semester


First-Year Foundation Courses

ENGL 105	 English Composition and Rhetoric	3
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or ENGL 105I	or  English Composition and Rhetoric (Interdisciplinary)	
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First-Year Seminar or First-Year Launch (<http://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
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MATH 232	 Calculus of Functions of One Variable II ^{H, F}	4
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Hours 14

Sophomore Year

Fall Semester

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

Spring Semester

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

Junior Year

Fall Semester

ASTR 202	Introduction to Astrophysics	3
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PHYS 211	Intermediate Electromagnetism or Electromagnetism I	3
PHYS 311		

Hours 6

Spring Semester

PHYS 201 or PHYS 401	Basic Mechanics or Mechanics I	3
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 course ¹		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 585, 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 (http://catalog.unc.edu/undergraduate/ideas-in-action/triple-i/)		4
Global Language through level 3 (http://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 or ENGL 105I	English Composition and Rhetoric or English Composition and Rhetoric (Interdisciplinary)	3
First-Year Seminar or First-Year Launch (http://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 or MATH 381	Discrete Structures ^H or Discrete Mathematics	3

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 or PHYS 311	Intermediate Electromagnetism or Electromagnetism I	3
PHYS 281L	Experimental Techniques in Physics	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 332	Numerical Techniques for the Sciences II	4
Elective Course ¹		3

Hours 7

Spring Semester

Elective Course ²		3
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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		Hours
Fall Semester		
First-Year Foundation Courses		
IDST 101	College Thriving	1
Triple-I and Data Literacy (http://catalog.unc.edu/undergraduate/ideas-in-action/triple-i/)		4
Global Language through level 3 (http://catalog.unc.edu/undergraduate/ideas-in-action/global-language/)		varies
Major Courses		
MATH 231	Calculus of Functions of One Variable I	4 ^{H, F}
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 (http://catalog.unc.edu/undergraduate/ideas-in-action/first-year-seminars-launches/) ^F		3
Major Courses		
PHYS 118	Introductory Calculus-based Mechanics and Relativity	4 ^{H, F}
MATH 232	Calculus of Functions of One Variable II	4 ^{H, F}
Hours		14
Sophomore Year		
Fall Semester		
PHYS 119	Introductory Calculus-based Electromagnetism and Quanta	4 ^{H, F}
MATH 233	Calculus of Functions of Several Variables	4 ^{H, F}
PHYS 131	Energy: Physical Principles and the Quest for Alternatives to Dwindling Oil and Gas	3
PHYS 131L	Energy: Physical Principles and the Quest for Alternatives to Dwindling Oil and Gas	1
Hours		12
Spring Semester		
PHYS 281L	Experimental Techniques in Physics	3
MATH 383	First Course in Differential Equations	3 ^H
PHYS 331	Numerical Techniques for the Sciences I	4
Hours		10
Junior Year		
Fall Semester		
PHYS 211	Intermediate Electromagnetism or Electromagnetism I	3
or PHYS 311		
PHYS 351	Electronics I	4
Hours		7
Spring Semester		
PHYS 201	Basic Mechanics or Mechanics I	3
or PHYS 401		
PHYS 231	Physical Computing	4 ^H

PHYS 421	Introduction to Quantum Mechanics	3
Hours		10
Senior Year		
Fall Semester		
PHYS 441	Thermal Physics	3
Hours		3
Spring Semester		
PHYS 581	Renewable Electric Power Systems or Decarbonizing Fuels	3
or PHYS 582		
Hours		3
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.

Medical and Biological Physics Option

First Year		Hours
Fall Semester		
First-Year Foundation Courses		
IDST 101	College Thriving	1
ENGL 105	English Composition and Rhetoric	3
or ENGL 105I	English Composition and Rhetoric (Interdisciplinary)	
Triple-I and Data Literacy (http://catalog.unc.edu/undergraduate/ideas-in-action/triple-i/)		4
Global Language through level 3 (http://catalog.unc.edu/undergraduate/ideas-in-action/global-language/)		varies
Major Courses		
MATH 231	Calculus of Functions of One Variable I	4 ^{H, F}
BIOL 101	Principles of Biology	3 ^{H, F}
Hours		15
Spring Semester		
First-Year Foundation Courses		
First-Year Seminar or First-Year Launch (http://catalog.unc.edu/undergraduate/ideas-in-action/first-year-seminars-launches/) ^F		3
Major Courses		
PHYS 118	Introductory Calculus-based Mechanics and Relativity	4 ^{H, F}
MATH 232	Calculus of Functions of One Variable II	4 ^{H, F}
CHEM 101 & 101L	General Descriptive Chemistry I and Quantitative Chemistry Laboratory I	4 ^{H, F}
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	Basic Mechanics or or Mechanics I	3
PHYS 421	Introduction to Quantum Mechanics	3

Hours 6**Senior Year****Fall Semester**

PHYS 211	Intermediate Electromagnetism or or Electromagnetism I	3
PHYS 311		

Hours 3**Spring Semester**

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

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** **Hours****First-Year Foundation Courses**

IDST 101	College Thriving	1
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ENGL 105	English Composition and Rhetoric	3
or		
ENGL 105I	English Composition and Rhetoric (Interdisciplinary)	

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

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

Major Courses

MATH 231	Calculus of Functions of One Variable I ^{H, F}	4
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Hours 12**Spring Semester****First-Year Foundation Courses**

First-Year Seminar or First-Year Launch (<http://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 or Electromagnetism I	3
PHYS 311		
PHYS 441	Thermal Physics or or Physical Chemistry I	3
CHEM 481		

BUSI 408	Corporate Finance	3
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Hours 9**Spring Semester**

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

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
Spring Semester		
BUSI 600	Risk Management	1.5
Elective course ¹		3
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).

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

All majors conduct at least one semester of research under the supervision of a faculty member. Many enjoy the experience so much that they continue for several semesters. PHYS 395 Research with Faculty Mentor II is a required course for all of our BS majors. In addition to PHYS 395, students may also take PHYS 295 Research with Faculty Mentor I as an elective as many times as desired. These courses give students the opportunity to participate in leading-edge research and to gain hands-on experience with a variety of experimental tools and techniques that will enhance their resume. An approved learning contract is required prior to registering for PHYS 295 and PHYS 395, and students must be registered within the first week of classes.

Departmental Involvement



The Society of Physics Students (<https://physics.unc.edu/undergraduate/student-organizations/society-of-physics-students/>) is open to anyone interested in physics and is meant to build connections between undergraduates, graduate students, faculty, and alumni. The society invites visitors to give talks and sponsors a number of events for students each year.

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.

UNC-BEST

The UNC Baccalaureate Education in Science and Teaching (UNC-BEST) Program is a collaboration between the School of Education and the College of Arts and Sciences and is designed to allow undergraduate science majors interested in teaching high school science the opportunity to earn their science degree and obtain licensure as a North Carolina high school science teacher in four years. UNC-BEST students also fulfill teaching licensure coursework requirements as well as many General Education and elective requirements as they complete courses in teaching and learning.

Code	Title	Hours
Pedagogy Course		
EDUC 760	Methods and Materials for Teaching Secondary/K-12 Subjects I	3
Educational Foundations		
EDUC 532	 Human Development and Learning	3
EDUC 615	Schools and Community Collaboration	3
EDUC 689	Foundations of Special Education	3
Student Teaching		
EDUC 593	 Internship/Student Teaching (final semester)	12
Seminar		
EDUC 601	Education Workshops (must be completed during student teaching semester)	1
Total Hours		25

Undergraduate Awards

The department gives awards each year to the senior (Shearin Award) and junior (Johnson Award) who demonstrate the greatest academic achievement. In addition, the department awards the major with the most research achievement the Robert Sheldon Award for Undergraduate Research.

Department Programs

Majors

- Physics Major, B.A. (p. 1)
- Physics Major, B.S. (<http://catalog.unc.edu/undergraduate/programs-study/physics-major-bs/>)

Minors

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

Graduate Programs

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

Contact Information

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