

**COLUMBIA UNIVERSITY
DEPARTMENT OF PHYSICS
UNDERGRADUATE PROGRAMS**

INTRODUCTORY PHYSICS SEQUENCES

Physics for Pre-Meds (1201-1202)

Physics for Engineers (1401-1402-1403)

Physics for Physical Science Majors (1601-1602-2601)

Accelerated Physics (2801-2802)

TYPICAL PHYSICS MAJOR PROGRAMS

Track I

Year 1		Year 2		Year 3		Year 4	
Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
Physics for Physical Science Majors			Classical Mechanics	Electricity and Magnetism	Electromagnetic Waves	Elective	Elective
				Quantum Mechanics I	Quantum Mechanics II	Thermal Physics	Elective
	First Year Seminar			Laboratory	Laboratory	Laboratory	Senior Seminar

↑
Declaration of Major

Track II

Year 1		Year 2		Year 3		Year 4	
Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
Accelerated Physics		Electricity and Magnetism	Electromagnetic Waves	Elective	Elective	Senior Thesis	Senior Thesis
			Classical Mechanics	Quantum Mechanics I	Quantum Mechanics II	Thermal Physics	Elective
	First Year Seminar	Laboratory		Laboratory		Laboratory	Senior Seminar

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Declaration of Major

Note: the above schedules are for guidance only, and may be tailored to individual student schedules.

REQUIREMENTS FOR THE PHYSICS MAJOR

INTRODUCTORY SURVEY SEQUENCES All courses from one of the sequences are required. Sequence B is the standard one. Students with high school advanced placement in physics and mathematics may take sequence C. Sequence A is for students with very limited background in high school physics. Students who take UN1401 and UN1402 usually take UN2601 for the third semester.

SEQUENCE A

UN1401 (Year 1, Fall)
"Introduction to Mechanics
and Thermodynamics"

UN1402 (Year 1, Spring)
"Introduction to Electricity,
Magnetism and Optics"

UN2601 (Year 2, Fall)
"Physics III: Classical and
Quantum Waves"

SEQUENCE B

UN1601 (Year 1, Fall)
"Physics I: Mechanics and
Relativity"

UN1602 (Year 1, Spring)
"Physics II: Thermodynamics,
Electricity and Magnetism"

UN2601 (Year 2, Fall)
"Physics III: Classical and
Quantum Waves"

SEQUENCE C

UN2801 (Year 1, Fall)
"Accelerated Physics I"

UN2802 (Year 1, Spring)
"Accelerated Physics II"

ADVANCED COURSES IN CLASSICAL PHYSICS (All three courses are required.)

UN3003 (Year 2, Spring)
"Mechanics"

UN3007 (Year 3, Fall; for Seq. C: Year 2, Fall)
"Electricity and Magnetism"

UN3008 (Year 3, Spring; for Seq. C: Year 2, Spring)
"Electromagnetic Waves and Optics"

ADVANCED COURSES IN MODERN PHYSICS (All three courses are required.)

GU4021 (Year 3, Fall)
"Quantum Mechanics I"

GU4022 (Year 3, Spring)
"Quantum Mechanics II"

GU4023 (Year 4, Fall)
"Thermal and Statistical Physics"

ADVANCED ELECTIVE COURSES (Two elective courses are required. Not all are offered in a given year.)

GU4003
"Advanced Mechanics"

GU4011
"Particle Astrophysics"

GU4012
"String Theory"

GU4018
"Solid State Physics"

GU4019
"Math. Methods of Physics"

GU4040
"General Relativity"

GU4050
"Particle Physics"

GU4080
"Scientific Computing"

LABORATORY COURSES (The requirement is either: (a) three semesters of UN3081, or (b) two semesters of UN3081 plus one semester of UN3083.) (Taken in Years 3 and 4; for Seq. C: taken in Years 2, 3 and 4.) Approved experimental research with a faculty research group may substitute for one semester of the lab requirement.

UN3081
"Intermediate Laboratory Work"

UN3083
"Electronics Laboratory"

SENIOR SEMINAR

UN3072 (Year 4, Spring)
"Seminar in Current Research Problems"

OPTIONAL

UN3500
"Supervised Readings in Physics"

UN3900
"Supervised Individual Research"

Summer Research Projects

Graduate Ph.D. courses

MATHEMATICAL BACKGROUND COURSES Students should complete either the four semesters of the calculus sequence or the two semesters of the honors mathematics sequence in the first two years. In addition, students should take ordinary differential equations.

COMPUTER SCIENCE BACKGROUND COURSES Students are strongly encouraged to take a programming course in their first year