

Bachelor of Science with a Major in Physics

Students following the physics major program will gain a basic broad understanding of the concepts of physics. The program requires completion of 60 science credits total.

Physics as a Second Major is an option for students in the Colleges of Engineering, Arts & Letters, or Business. These students are only required to take the following Physics courses and any courses that are pre-requisites for Physics courses (such as Calculus I, II, & II).

Requirements for the Core Physics Major (41.5 Credits)

Course Title	Course Number	Credits	Semester Offered	Check (Year)
Physics A Lab: Mechanics	10411/11411 (10310/11310)	4	Fall	FY
Physics B Lab: Electricity & Mag	10422/11422 (10320/11320)	4	Spring	FY
Physics C: Thermo & Relativity	20433	3	Fall	Soph
Intro Circuits and Electronics	20430	1.5	Fall	Soph
Math Methods in Phys I/Tutorial	20451/22451	3.5	Fall	Soph
Sophomore Seminar	23411	1	Fall	Soph
Math Methods in Phys II/Tutorial	20452/22452	3.5	Spring	Soph
Intermediate Mechanics	20454	3	Spring	Soph
Physics D: Modern	20444	3	Spring	Soph
Thermal Physics	30461	3	Fall	Jr
Electricity & Magnetism	30471	3	Fall	Jr
Quantum Mechanics I	40453	3	Fall	Jr/Sr.
Modern Physics Elective	50501, 50602, or 50701	3	Fall	Sr
Modern Physics I Laboratory	41441	3	Fall	Sr

*Intro Circuitry and Electronics is considered a co-requisite of Physics C: Thermo & Relativity. General Physics C-M and Physics D: Modern are a continuous 1-year sequence and have to be started fall of sophomore year.

*Thermal Physics must be taken in the fall semester of junior year if student wishes to complete the Astrophysics concentration or to take Intro to Solid State elective.

Non-Physics Courses (18.5 Credits)

Course Title	Course Number	Credits	Semester Offered	Check (Year)
Intro Chemical Principles/ Lab	CHEM 10171/11171 (CHEM 10181)	4	Fall	FY
Calculus I/Tutorial	MATH 10550/12550 (MATH 10850)	4	Fall	FY
Biol Chemistry for Engineers	CHEM 10122 (CHEM 10172 or 10182)	3	Spring	FY
Calculus II/Tutorial	MATH 10560/12560 (MATH 10860)	4	Spring	FY
Calculus III/Tutorial	MATH 20550/22550 (MATH 20850 & 20860)	3.5	Fall	Soph
Language Requirement	Variable			

*Courses in parentheses may substitute as indicated, though students are encouraged not to mix and match (for example, if you start with the math sequence you should stay with it if possible).

Concentration Programs

Depth is gained through the optional addition of one or more *concentration programs* offered through the department. Two of these concentration programs, **Advanced Physics** and **Astrophysics**, help to prepare the student for graduate work in physics, astronomy, or astrophysics. The **Applied Physics** concentration allows the student to combine the physics major with a sequence of courses in a particular engineering discipline. Completion of these concentrations is indicated on the student's final transcript. While no supplemental concentration is required of Physics majors, interested students are allowed and encouraged to add as many concentrations as their schedules and interests allow.

Advanced Concentration – 14 Credits

Course Title	Course Number	Credits	Semester Offered	Check
Junior Seminar	33411	1	Fall	Jr
Senior Seminar	43411	1	Fall	Sr
Electromagnetic Waves	30472	3	Spring	Jr/Sr.
Quantum Mechanics II	40454	3	Spring	Jr/Sr.
Modern Physics Lab II	41442	3	Spring	Jr/Sr.
Physics Electives*	*See Dept. Brochure	3	Fall/Spring	

**Elective must be different than the core and can be fulfilled by research.*

Astrophysics Concentration – 14 Credits

Course Title	Course Number	Credits	Semester Offered	Check
Junior Seminar	33411	1	Fall	Jr
Senior Seminar	43411	1	Fall	Sr
Intro Astronomy & Astrophysics	20481	3	Fall	Soph
Mod Observation Techniques (<i>odd yrs</i>)	50481	3	Fall	Jr/Sr.
Physics of Astrophysics	50201	3	Fall	Jr/Sr.
Relativity: Special & General	50472	3	Spring	Jr/Sr.

Applied Physics Concentration

Students complete at least 15 credits hours of courses in the College of Engineering, chosen with the aid of the Director of Undergraduate Studies. As shown in the examples to the right, the student is expected to complete a five-course sequence with two of the courses at the 20000 level and remaining three courses (9 credits) at the 30000/40000 level. At least six of these nine credit hours must be engineering credits. Three of the credit hours may come from a 30000/40000 level physics course appropriate in the selected course of study. Specific curricula can be generated to meet the student's particular interests.

Course Title	Course Number	Credits	Semester Offered	Check
Aeronautics Sequence (AME) – 16 Credits				
Mechanics I	AME 20221	3	Fall	
Fluid Mechanics	AME 30331	3	Fall	
Gas Turbines & Propulsion	AME 40431	3	Fall	
Thermodynamics	AME 20231	3	Spring	
Theory/Experimental Aerodynamics	AME 30333	4	Spring	

Computer Engineering Sequence (CSE) – 16 Credits*				
Fund Computing	CSE 20311	4	Fall/Spring	
Data Structures	CSE 20312	3	Fall/Spring	
Database Concepts	CSE 30246	3	Fall	
Computer Engineering Elective	30000/40000	6		

**Additional courses necessary to meet minimum of 15 credit hours required.*

Science Requirements

Not all science courses will count toward degree credit or science elective credit for science majors. The survey science courses offered as options for non-science majors for their University science requirement will not count as a science elective or toward the minimum science credit hour requirement.

All College of Science courses offered by a major program must be taken at the University of Notre Dame. If a student wants to take a course outside Notre Dame for credit toward the Notre Dame degree, prior approval of the dean's office must be obtained. This does not apply to the courses taken by a transfer student prior to attending Notre Dame.

Language Requirements

The College of Science requires language proficiency through intermediate level in one of the following languages: Arabic, Chinese, French, German, Greek, Irish, Italian, Japanese, Korean, Latin, Portuguese, Russian and Spanish. Students may complete the language requirement by either completing a course taught at intermediate level or by demonstrating proficiency through placement examination.

Study Abroad

The spring semester of the Junior year is the preferred time for a semester abroad or for taking Literature and Fine Arts electives.