Prerequisites may be waived at the discretion of the course instructor. Diagonal Moves are possible (for example P2217 after P1112).

Courses need not be taken in listed semester. For example, you can complete the physics major even if your first physics course is during your sophomore year. Similarly, outside concentrators sometimes spread the core over 4 years rather than 3.

Outside concentrators are not permitted to "double count": ie. courses used to fulfill the physics major cannot fulfill requirements for other majors, unless the student is an inside concentrator.

Students from any college may take courses from any of the Math streams, and can freely mix streams.

7 credits must be at 3000+ level

No formal CS requirement. Recommend CS 1110 or 1112 or ASTRO 3340.
More information about Concentrations

1. The Concentration must complement the Core. The narrative behind this can vary. Some examples include:
   a. Astronomy: Applying physical concepts to study astrophysical phenomena
   b. Public Policy: Working on issues such as nuclear proliferation or sustainability requires a technical background

2. The Concentration must have internal coherence.

3. There are no set courses. The student should develop a sensible program of study in consultation with their advisor and the director of undergraduate studies. Two students with the same concentration may have very different course sets. For example a life sciences concentrator may be interested in applying physics to medical instrumentation. Such a student may use the biology and chemistry classes needed for medical school as their concentration. Another life science student may be interested in biophysics research, and hence focus on courses which develop biophysics lab skills.

Partial list of Courses with Physics Content

Physics – The physics department offers a full range of undergraduate and graduate classes. As a supplement to their introductory sequence, freshmen may enjoy PHYS 1117 Concepts of Modern Physics. Upperclassmen interested in becoming research physicists would benefit from supplementing the core with PHYS 3341 Statistical Physics (typically taken in the spring of your junior or senior year). PHYS 4443 Quantum Mechanics (typically taken in the spring of your junior or senior year). Other advanced courses include: Lab courses (PHYS 3310/3360/4410), PHYS 4444 Particle Physics, PHYS 4454 Solid-State Physics, PHYS 4455 Geometric Concepts in Physics, PHYS 4456/4487/4489 Accelerator Physics, PHYS 4480 Computational Physics, and PHYS 4481 Quantum Information Processing. Students often perform research for course credit by taking PHYS 4490 or PHYS 4491, the latter is a formal course on Data Analysis in Particle Physics requiring introductory mechanics as a prerequisite. Advanced undergraduate students occasionally enroll in graduate courses (typically, but not limited to, PHYS 6572 or 6599).

Applied Physics – Cornell’s applied physics department offers a number of courses which complement those offered by physics. These include AEP 1100 Lasers and Photonics, AEP 1200 Nanoscience, AES 3240 Maple Supplement to Mathematical Physics, AEP 3330 Mechanics of Particles and Solid Bodies, AEP 4230 Statistical Thermodynamics, AEP 4340 Continuum Physics, AEP 4440 Quantum and Nonlinear Optics, AEP 4840 Fusion, and the AES course list below under “Biology.”

Astronomy – Introductory astronomy courses particularly appropriate to physics majors: ASTRO 2212 Extrastellar, ASTRO 2212, Solar, ASTRO 2233 Special Topics, ASTRO 2290 Relativity. Any astronomy course labelled 300+ should also be considered (many have no astronomy prerequisites).

Applied Mathematics – Physics heavily draws on applied mathematics such as Calculus, Differential Equations, Complex Analysis, and Differential Geometry. In addition to looking at courses offered by the Mathematics department, students may find it useful to look at courses offered by Theoretical and Applied Mechanics. Please see an advisor for help on selecting mathematics courses.

Abstract Mathematics – Students with an interest in abstract mathematics should consider taking courses in real analysis and abstract algebra. Other major branches of abstract mathematics include Differential Geometry, Topology, and Number Theory.

Biophysics – Physics is important in understanding micro and macro biology, and has application in areas such as bioinformatics. Physics is also a major part of bio-instrumentation. Biology related courses some physics flavor include: AEP 2520/5520 Physics of Life, AEP 4700/5710 Biophysical methods, BEE 3310 Bio-Fluid Mechanics, BEE 4500 Biostatistics, and ECE 4060 Biomedical Engineering, BME 5030 Biomedical Instrumentation, BIONB 4960 Bioacoustic Signals in Animals and Man. Introductory Biology (BIOG 1101-1104) are naturally incorporated into a well-rounded science education.

Computing/Communication – Technical writing skills are essential to success in physics. General technical writing courses: ENGL 2880/2900, ENGL 3850/3900, and ENGR 3530/3560. Science journalism courses: COMM 3520/3530. Computer programming is essential for success in many areas of physics. Physics students are encouraged to consider an introductory computer science course such as CS 1112, as well as more targeted courses such as PHYS 4480 Computational Physics, AEP 4380 Computational Engineering Physics, CS 3220 Scientific Computing, CS 3230 Engineering Computation, and MATH 4250/4260 Numerical Analysis.

Chemistry – Quantum physics forms the basis of most chemical processes. Chemistry related courses with some physics flavor include: CHEM 3890-3900, CHEM 4840 Microfluidic Systems. Introductory chemistry (CHEM 2070/2080/2090) and organic chemistry (CHEM 3590/3600) are naturally incorporated into a well-rounded science education.

Earth and Atmospheric Sciences – Physics can be applied to understanding the Earth and its Atmosphere. Of particular interest to physics students are EAS4470 Physical Meteorology and EAS 4850 Inverse Methods in Natural Sciences.

Education – PHYS 4844 Teaching and Learning Physics, EDUC 4040/50 Learning and Teaching

Engineering – ECE courses of interest to Physics students include: ECE 4300 Lasers, ECE 4330 Microwave Devices, ECE 4370 Fiber

Food Science – FDS 2000 Physicochemical and Biological Aspects of Food, FDS 4200 Physical Principles of Food Preservation, NS 3310 Physiological and Biochemical Bases of Human Nutrition

Government – PHYS 2210 Weapons of Mass Destruction, GOVT 3091 Science in the American Polity, GOVT 4293 Politics of Science

History, Art History, and Archaeology – HIST 2810/2820 Science in Western Civilization, HIST 3290 Physical Sciences in the Modern Age HIST 4975/4976/4980/4981/4990 Seminars, ARTH 6220 Research Methods in Archaeology, ARKED 4370 Geophysical Field Methods

Law – LAW 6742 Patent Law

Material Science – Physics can be applied to understanding the properties of materials. Possible courses include ENGRD 2610 Mechanical Properties of Materials, ECE 3710-20 Structural Modeling, MSE 4101 Physical Metallurgy, MSE 4890 Colloids