

# Bachelor of Science with Major in Physics

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES guidelines and course listings).

II. The Following Curriculum:

Each track leads to a Bachelor of Science with Major in Physics, awarded through the College of Arts and Sciences. A total of 120 credits is required for graduation. In addition to other University Graduation Requirements and the courses specified for one of the five options listed below, all Physics majors must complete successfully the following set of core courses:

Code	Title	Credits
PHYS 251	University Physics I	4
PHYS 252	University Physics II	4
PHYS 253	University Physics III	4
PHYS 317 & PHYS 318	Mechanics I and Mechanics II	6
PHYS 324	Thermal Physics	3
PHYS 325	Optics	3
PHYS 325L	Optics Laboratory	1
PHYS 327 & PHYS 328	Electricity and Magnetism I and Electricity and Magnetism II	6
PHYS 415	Undergrad Research Experience	3
PHYS 428	Advanced Physics Laboratory	2
PHYS 431 & PHYS 432	Quantum Mechanics I and Quantum Mechanics II	6
CHEM 121 & CHEM 122	General Chemistry I and General Chemistry II	6
CHEM 121L & CHEM 122L	General Chemistry I Laboratory and General Chemistry II Laboratory	2
MATH 165 & MATH 166 & MATH 265	Calculus I and Calculus II and Calculus III	12
MATH 266	Elementary Differential Equations	3
MATH 352	Introduction to Partial Differential Equations	3
MATH 207	Introduction to Linear Algebra	2
<b>Total Credits</b>		<b>70</b>

To provide proper advisement, the Department of Physics and Astrophysics requires its majors to meet with their physics adviser prior to registration each semester. This ensures each student is enrolled in appropriate classes and helps the department schedule certain courses in a timely manner. A hold is placed on registration for physics majors until this advisement session takes place. It is the student's responsibility to schedule the advisement session.

Beyond completion of the core listed above and the general education requirements, all physics majors must complete one of the following options together with additional electives for a total of 120 credits.

I. General Physics option: This is a general physics degree offering maximum flexibility. It is appropriate for students who may seek advanced degrees, for instance, or who are interested in medical school. Beyond the core, the student must complete an additional 9 credits of PHYS numbered above 300. No more than 3 credits of these 9 may be in PHYS 492 Special Problems.

II. Applied Physics track: This choice will provide interdisciplinary training in applied physics and applied electronics with emphasis on instrumentation and measurement technique. The aim is to prepare the student to work as part of a

research team in an industrial, government or academic setting. In addition to the core, the student must complete:

Code	Title	Credits
EE 206	Circuit Analysis	3
EE 206L	Circuits Laboratory I	1
EE 313	Linear Electric Circuits	3
EE 313L	Circuits Laboratory II	1
EE 321	Electronics I	3
EE 321L	Electronics Laboratory I	1
PHYS 402	Computational Physics	3
<b>Total Credits</b>		<b>15</b>

In addition, students electing the applied physics track should select an instrumentation project as a means of satisfying the research core requirement, PHYS 415 Undergrad Research Experience.

III. Astrophysics track: This option is for students with special interest in astronomy, astrophysics, space exploration or aerospace applications. The following are required.

Code	Title	Credits
PHYS 110	Introductory Astronomy	3
PHYS 110L	Introductory Astronomy Lab	1
PHYS 434	Nuclear Physics	3
PHYS 460	Introduction to Astrophysics	3
PHYS 461	Introduction to Astrophysics II	3
<b>Total Credits</b>		<b>13</b>

To satisfy the research requirement, PHYS 415 Undergrad Research Experience, students in the astrophysics track should select an approved astrophysics project.

IV. Computers in Physics track: This choice provides extensive experience using computers for running experiments, analyzing data, doing computer simulations and calculations in physics. The student should be prepared to learn programming languages. The following are required.

Code	Title	Credits
CSCI 160	Computer Science I	4
CSCI 161	Computer Science II	4
PHYS 402	Computational Physics	3
<b>Total Credits</b>		<b>11</b>

For the Computers in Physics track, students should seek out computational research projects for PHYS 415 Undergrad Research Experience, or laboratory projects involving computer instrumentation

V. Materials Science track: This option provides the strongest foundation in solid state and materials science. Required are:

Code	Title	Credits
PHYS 320	Introduction to Materials Science	3
PHYS 420	Semiconductor Devices	3
PHYS 437	Introductory Solid State Physics	3
<b>Total Credits</b>		<b>9</b>

Students in this track should select approved research projects in materials science as a means of satisfying the PHYS 415 Undergrad Research Experience requirement.