

PHYSICS - BACHELOR OF SCIENCE

A Bachelor of Science degree in physics at NMSU prepares a student well for graduate study in physics, geophysics, or engineering or for a variety of careers in research and teaching. Students who plan to seek employment at the B.S. level are advised to take the concentration area curricula as part of their electives in addition to the general and departmental requirements. The program of study should be chosen by the student in consultation with an advisor.

Students must complete all University degree requirements, which include: General Education requirements, Viewing a Wider World requirements, and elective credits to total at least 120 credits with 48 credits in courses numbered 300 or above. Developmental coursework will not count towards the degree requirements and/or elective credits, but may be needed in order to take the necessary English and Mathematics coursework. The Bachelor of Science degree in physics is accredited by the Applied and Natural Science Accreditation Commission (ANSAC) of ABET, Inc.

| Prefix | Title | Credits |
|------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|---------|
| General Education | | |
| <i>Area I: Communications</i> | | 10 |
| | <i>English Composition - Level 1</i> ¹ | |
| | <i>English Composition - Level 2</i> ¹ | |
| | <i>Oral Communication</i> ¹ | |
| <i>Area II: Mathematics</i> | | |
| MATH 1511G | Calculus and Analytic Geometry I ² | 4 |
| <i>Area III/IV: Laboratory Sciences and Social/Behavioral Sciences</i> | | 10-11 |
| <i>Area III: Laboratory Sciences Course (4 credits)</i> ^{1,3} | | |
| <i>Area IV: Social/Behavioral Sciences Course (3 credits)</i> ¹ | | |
| Either an Area III/IV: Laboratory Sciences Course or Social/Behavioral Sciences Course (4 or 3 credits) ^{1,3} | | |
| <i>Area V: Humanities</i> ¹ | | 3 |
| <i>Area VI: Creative and Fine Arts</i> ¹ | | 3 |
| <i>General Education Elective</i> | | |
| MATH 1521G | Calculus and Analytic Geometry II | 4 |
| | or MATH 1521H Calculus and Analytic Geometry II Honors | |
| Viewing A Wider World ⁴ | | 6 |
| Departmental Requirements ⁵ | | |
| PHYS 1111 | Introductory Computational Physics | 3 |
| PHYS 2110 & 2110L | Mechanics and Experimental Mechanics | 4 |
| PHYS 2140 & 2140L | Electricity and Magnetism and Electricity & Magnetism Laboratory | 4 |
| PHYS 2120 & 2120L | Heat, Light, and Sound and Heat, Light, and Sound Laboratory | 4 |
| PHYS 315 | Modern Physics | 3 |
| PHYS 325 | Intermediate Experimental Physics | 3 |
| PHYS 395 | Intermediate Mathematical Methods of Physics | 3 |
| PHYS 451 | Intermediate Mechanics I | 3 |
| PHYS 454 | Intermediate Modern Physics I | 3 |
| PHYS 455 | Intermediate Modern Physics II | 3 |
| PHYS 461 | Intermediate Electricity and Magnetism I | 3 |
| PHYS 462 | Intermediate Electricity and Magnetism II | 3 |
| PHYS 480 | Thermodynamics | 3 |

Select an additional 6 credits in physics or geophysics numbered 300 or above 6

Advanced Laboratory

Select 3 credits from the following: 3

| | |
|----------|---------------------------------------------|
| PHYS 471 | Modern Experimental Optics |
| PHYS 475 | Advanced Laboratory Practices for Materials |
| PHYS 493 | Experimental Nuclear Physics |

Non-Departmental Requirements (in addition to Gen.Ed/VWW)⁵

| | | |
|------------|-------------------------------------------------|---|
| MATH 2530G | Calculus III | 3 |
| MATH 3160 | Introduction to Ordinary Differential Equations | 3 |

Select one of the following: 8

| | | |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------|--|
| CHEM 1215G & CHEM 1225G | General Chemistry I Lecture and Laboratory for STEM Majors and General Chemistry II Lecture and Laboratory for STEM Majors | |
| CHEM 1216 & CHEM 1226 | General Chemistry I Lecture and Laboratory for CHEM Majors and General Chemistry II Lecture and Laboratory for CHEM Majors | |

Second Language Requirement: (required - see below) 0-8

Electives, to bring the total credits to 120^{5,6} 6-15

Total Credits 120

¹ See the General Education (<https://catalogs.nmsu.edu/nmsu/general-education-viewing-wider-world/>) section of the catalog for a full list of courses.

² MATH 1511G Calculus and Analytic Geometry I is required for the degree but students may need to take any prerequisites needed to enter MATH 1511G first.

³ See alternatives for meeting General Education requirements.

⁴ See the Viewing a Wider World (<https://catalogs.nmsu.edu/nmsu/general-education-viewing-wider-world/#viewingawiderworldtext>) section of the catalog for a full list of courses

⁵ May not be taken S/U and must earn a grade of C- or better.

⁶ Approved physics and technical electives are decided by Physics Advisors.

Students who plan to pursue graduate study in physics or geophysics are strongly advised to take one or more senior-level courses in optics, nuclear physics, space physics, condensed matter physics, geophysics, or computational physics. Students who plan to seek employment at the B.S. level are advised to select one of the following emphasis areas: Applied Physics, Computational Physics, Geophysics, Materials Science, or Optics. The program of study should be chosen by the student in consultation with a Physics Advisor. Some recommended courses are listed below.

Applied Physics: 12 credits of upper division E E, M E, or C S courses;

Computational Physics: C S 111, C S 171G, MATH 1531, and PHYS 476;

Geophysics: GEOL 1110G, GPHY 450, and two upper-division GPHY/GEOL courses;

Materials Science: 12 credits of upper-division courses selected from CHME 361, PHYS 450, PHYS 471, PHYS 475, PHYS 488, and PHYS 489.

Second Language Requirement

For the Bachelor of Science in the Physics there is a one year second language requirement, the options to complete this requirement are listed below. The number of credits that a student needs to take may vary depending on what level they come in with. Please speak with an advisor

for more information as to which courses you will need to take to fulfill the second language requirement for this degree.

Option 1:

| Prefix | Title | Credits |
|-------------------------------------------------|-----------------------------------------------------------------------|---------|
| Complete one of the following sequences: | | |
| FREN 1110 & FREN 1120 | French I and French II | 8 |
| GRMN 1110 & GRMN 1120 | German I and German II | 8 |
| JAPN 1110 & JAPN 1120 | Japanese I and Japanese II | 8 |
| SPAN 1110 & SPAN 1120 | Spanish I and Spanish II | 8 |
| <i>For Heritage Speakers:</i> | | |
| SPAN 1220 or SPAN 2210 | Spanish for Heritage Learners II Spanish for Heritage Learners III | 3 |
| PORT 1110 or PORT 1120 | Portuguese I Portuguese II | 3 |

Option 2:

| Prefix | Title | Credits |
|------------------------------------------------------------------------------------------|---------------------------|---------|
| Complete the following sequence for American Sign Language (with a C- or better): | | |
| SIGN 1110 | American Sign Language I | 3 |
| SIGN 1120 | American Sign Language II | 3 |

Option 3:

| Prefix | Title | Credits |
|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|---------|
| Challenge the 1120 level for the following courses: | | |
| FREN 1120 or GRMN 1120 or JAPN 1120 or SPAN 1120 | French II German II Japanese II Spanish II | 4 |
| <i>OR</i> | | |
| Challenge the 1110/1120/1220/2210 level for the following courses: | | |
| PORT 1110 or PORT 1120 or SPAN 1220 or SPAN 2210 | Portuguese I Portuguese II Spanish for Heritage Learners II Spanish for Heritage Learners III | 3 |

Option 4:

Pass a three-credit, upper-division course (numbered 300 or above) taught in a second language by the department of Languages and Linguistics.

Option 5:

Obtain college certification of completion of two years of a second language at the high school level with a grade of C- or higher in the second-year level.

Option 6:

By obtaining certification of a working knowledge of a Native American language from the American Indian program director.

Option 7:

By obtaining, from the head of the Department of Languages and Linguistics, certification of a working knowledge of a second language if such language is not taught at NMSU.

Option 8:

In the case of a foreign student who is required to take the TOEFL exam admission, the dean will automatically waive the second language requirement.

Dual Degree (BS/MS) Program

This program option is designed to provide a means for PHYS undergraduates to obtain both a BS and an MS degree with 138 credits (normally: BS=120 credits, MS=30 credits). Students electing this option will follow the regular undergraduate BS in physics curriculum, except that they take the advanced laboratory course at the 5XX level to meet their BS requirements. They also apply nine other credits of their undergraduate courses numbered 450 and higher towards their MS degree, requiring only an additional 18 credits for the MS. These 18 credits can be obtained in two semesters (and perhaps one summer term to write and defend an MS thesis). Students interested in this dual degree must be admitted to the MS in Physics graduate program and must fulfill all degree requirements for the MS in Physics.