BA Phys AstroPhys
Bachelor of Arts in Physics and Astrophysics

Under Review | Fall 2024

Proposal Information

Status
Active

Workflow Status
In Progress

Faculty Senate Approval, Faculty Senate expand ▲
Waiting for Approval | Faculty Senate Approval

Rick Holmes
Nancy Middlebrook

Changes

- Program Description
- Requirements
- participants
- Admissions Requirements
- Graduation Requirements

Show All ▼

Proposal Information

Proposed
Sponsoring faculty/staff member
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Existing
Sponsoring faculty/staff member
Rouzbeh Allahverdi

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College
College of Arts & Sciences

Department
Physics & Astronomy

Campus
Main Campus

Effective Term and Year

Proposed
Proposed Effective Term and Year
Fall 2024

Existing
Proposed Effective Term and Year
Fall 2023

Justification

Proposed
Program Justification
Our undergraduate major program has remained largely the same over the last 30+ years, including a B.S. in Physics, B.S. in Astrophysics, and a B.A. in Physics and Astrophysics. New topics have been introduced through electives, and through concentrations in Biophysics, Earth and Planetary Sciences, and Optics. Over the years, the student body entering the physics and astrophysics programs has changed and is much more diverse. In addition, society and technology has developed and now graduates entering the workforce need a different skill set than 10-30 years ago. This includes, for example, computer and programming literacy. It is time for our program to be updated to reflect the skills needed for our students to be prepared for what comes after their graduation, may it be graduate school, industry, or non-STEM careers.

With the above realizations in mind, the primary goals of the proposed program changes are:

To allow a more flexible education with a more varied set of exit paths into the workforce.

To make the program more attractive to students aiding with recruitment, and to grow the number of undergraduates in our program.

Summary of proposed changes:

Update the course requirements for the B.S. in Physics, B.S. in Astrophysics, and B.A. in Physics and Astrophysics degrees to better reflect the skillsets needed for the respective career goals.

Remove the B.S. in Physics concentrations in Biophysics, Optics, and Earth and Planetary sciences and replace those with a single concentration in Applied Physics which contains a large degree of flexibility to allow student-focused career preparation.

For all degree programs, replace some of the fixed course requirements with electives to allow more flexibility.

Existing
Program Justification
Adding information about BSEE/BA in Physics and Astrophysics dual degree

Program Category and Level

Program Category
Program

Program Level
Undergraduate

Degree, Minor, or Certificate Name
Bachelor of Arts in Physics and Astrophysics

Degree Type
Bachelor of Arts

Degree/Certificate Level
Undergraduate

Proposed
Is this program also offered online?
No

Existing
Is this program also offered online?
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Associated Forms

Select any associated course forms that exist

Select any associated program forms that exist

Shared Credit and Dual Degree information

Interdepartmental Program
Yes

Program	Department	College
BS Elect/Engr BA Phys Astro Phys Dual Degree		

Program	Department	College
BS Elect Engr		

Program	Department	College
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Program	Department	College
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Program	Department	College
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Catalog Information

Proposed

Program Description

The B.A. in Physics and Astrophysics is designed for people interested in physics, astrophysics and science in general, but who are not seeking a career in scientific research. Students can use the flexibility within the program to build a broad educational portfolio across disciplines, including choosing minors or an additional major in other areas, such as management, law, education, communications, journalism, economics, history, political science, etc. This program is an excellent pre-professional education for careers within, for example, teaching, medicine, patent law, and science journalism.

The BSEE/BA in Physics and Astrophysics dual degree is designed for students who wish to combine the skill set of the engineer's applications focus with the physicist's scientific understanding and research-oriented background. Such students are in high demand by industry and positively viewed by graduate school admission committees.

Dual Degrees

Students in this program may earn a dual degree with a Bachelor of Science in Electrical Engineering. Consult the dual degree program listing for requirements.

Existing

Program Description

The B.A. in Physics and Astrophysics is designed for people interested in physics, astrophysics and science in general who are not seeking a career in scientific research. Rather, these students should use the flexibility within the program to choose minors or an additional major in other areas, such as management, education, communications, journalism, economics, history, political science, etc.

The BSEE/BA in Physics and Astrophysics dual degree is designed for students who wish to combine the skill set of the engineer's applications focus with the physicist's scientific understanding and research-oriented background. Such students are in high demand by industry and positively viewed by graduate school admission committees.

Dual Degrees

Students in this program may earn a dual degree with a Bachelor of Science in Electrical Engineering. Consult the dual degree program listing for requirements.

Proposed

Admissions Requirements

A minimum of 26 credit hours; 23 credit hours must be in courses acceptable toward graduation.

A cumulative grade point average of at least 2.00 on all work.

- Transfer students must have a 2.00 transfer GPA.
- Continuing UNM students must have a 2.00 institutional GPA.

Demonstrated academic achievement by satisfying the following:

- Completion of General Education Curriculum: Communication.
- Completion of General Education Curriculum: Mathematics and Statistics.
- Completion of General Education Curriculum: Second Language.

Completion of Department of Physics and Astronomy admission coursework with a grade of “C” or better

- PHYS1310, or a more advanced physics course.

Existing

Admissions Requirements

First year students planning to major or minor in physics or astrophysics, if they have the necessary mathematics, usually take PHYS 1310, 1310L and MATH 1512 in their first semester, and PHYS 1320, 1320L and MATH 1522 in their second semester. There is some flexibility in these prerequisites.

For admission to any degree program in the department, within the College of Arts and Sciences, in any given semester, it is required that the student have passed PHYS 1310, or a more advanced physics course, with a grade of "C" (not "C-") or higher.

Proposed

Graduation Requirements

Academic advisement is required **each semester** for students majoring in the B.A. Physics or and Astrophysics degree. Students in University College with an area of interest or a definite major in mind in this department should meet with a departmental advisor as soon as possible, to ensure that they obtain current curriculum and admissions policies as well as specific advice on how to meet the requirements for admission.

All coursework required for a B.A. in Physics and Astrophysics major completion (including supportive course work and pre-requisites) must be successfully completed within three attempts. An attempt includes receiving any letter grade (A through F), WP, WF, W, WNC, CR, NC, I or AUDIT. This includes courses offered by other departments at UNM or other institutions. Students will not be able to continue in the B.A. Physics and Astrophysics major or pre-major status if they do not successfully complete a required course within the three attempts. After that, students will be required to change their declared major.

Existing

Graduation Requirements

The basic courses PHYS 1310, 1310L, 1320, 1320, 2310, 2310L and MATH 1512, 1522 and 2531 are prerequisite to all 300-level and higher physics and astronomy courses, and are required for major and minor study in Physics and in Astrophysics for either the B.S. or the B.A. degree. For the B.S. in Astrophysics, ASTR 2110, 2110L, 2115 and 2115L are also required.

Academic advisement is required **each semester** for students majoring in physics or astrophysics. Students in University College with an area of interest or a definite major in mind in this department should meet with a departmental advisor as soon as possible, to ensure that they obtain current curriculum and admissions policies as well as specific advice on how to meet the requirements for admission.

All coursework required for a Physics/Astronomy major completion (including supportive course work and pre-requisites) must be successfully completed within three attempts. An attempt includes receiving any letter grade (A through F), WP, WF, W, WNC, CR, NC, I or AUDIT. This includes courses offered by other departments at UNM or other institutions. Students will not be able to continue in a Physics/Astronomy major or pre-major status if they do not successfully complete a required course within the three attempts. After that, students will be required to change their declared major.

Students are not allowed to receive credit for both PHYS 1230 and 1310, nor for both PHYS 1240 and 1320.

Professional Credential/Licensure Program Information

Proposed

License/Certification associated with program

No

Existing

License/Certification associated with program

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Degree Information

Degree Hours
120

Minimum Major Hours

Professional Accrediting Bodies

Degree Requirements

Requirements

- Complete all of the following
  - Complete the following:
    - **PHYS1310 - Calculus-Based Physics I (3)**
    - **PHYS1310L - Calculus-Based Physics I Laboratory (1)**
    - **PHYS1320 - Calculus-Based Physics II (3)**
    - **PHYS1320L - Calculus-Based Physics II Laboratory (1)**
    - **PHYS2310 - Calculus-Based Physics III (3)**
    - **PHYS2310L - Calculus-Based Physics III Laboratory (1)**
    - **ASTR2110 - General Astronomy I (3)**
    - **ASTR2110L - General Astronomy I Laboratory (1)**
    - ASTR2115 - General Astronomy II (3)
    - ASTR2115L - General Astronomy II Laboratory (1)
    - PHYS330 - Introduction to Modern Physics (3)
    - PHYS2415 - Computational Physics (3)
    - **PHYS306L - Junior Laboratory (3)**
    - **PHYS307L - Junior Laboratory (3)**
    - **PHYS493L - Contemporary Physics Laboratory (3)**
  - ~~Complete at least 1 of the following:~~
    - ~~PHYS301 - Thermodynamics and Statistical Mechanics (3)~~
    - ~~PHYS303 - Analytical Mechanics I (3)~~
    - ~~PHYS405 - Electricity and Magnetism I (3)~~
    - ~~PHYS491 - Intermediate Quantum Mechanics I (3)~~
  - Earn at least ~~12~~ **9** credits from the following types of courses:
    ~~four~~**Complete** ~~additional~~**9** ~~3~~ credit ~~hour~~**hours** ~~upper-level~~**of electives of STEM** courses ~~in~~**(excluding** ~~Physics~~**problems** or ~~Astronomy,~~**research** ~~one~~**courses), two** of which ~~must~~**should** be ~~in~~**Upper** ~~Astronomy~~**Division.** ~~and~~**All** ~~one~~**electives** ~~of~~**should** ~~which must~~ be ~~a~~**approved** ~~laboratory~~**in** ~~class,~~**consultation** ~~except~~**with** ~~for any one of~~ the ~~following~~**Physics** ~~problems~~**and** ~~courses:~~**Astronomy** ~~ASTR~~**faculty** ~~*455;~~**advisor.** ~~PHYS *451, *452.~~
  - Complete the following:
    - ~~MATH311 - Vector Analysis (3)~~
    - **MATH1512 - Calculus I (4)**
    - **MATH1522 - Calculus II (4)**
    - **MATH2531 - Calculus III (4)**
    - MATH316 - Applied Ordinary Differential Equations (3)
  - Earn at least ~~89~~ **61** credits from the following types of courses:
    ~~Completed at least 89 credits from the following types of courses:~~ In addition to the program-specific requirements outlined here, all undergraduate students are required to fulfill ~~UNM's~~**other** ~~General~~**general** ~~Education Program requirements. In some instances, courses included in an~~ undergraduate degree ~~program's~~**requirements** ~~requirement may also fulfill a General Education requirement. Please review the General Education Program in this Catalog~~ for ~~General~~**UNM** ~~Education~~**and** ~~information. Students within~~ the College of Arts and Sciences ~~must~~**to** ~~also~~**earn** ~~complete 1)~~ a ~~major~~**minimum** ~~and a minor; or 2) two majors; or 3) one~~ of ~~the~~**120** ~~special~~**credits,** ~~curricula~~**including** ~~of~~**UNM's** ~~the~~**General** ~~College~~**Education** ~~that~~**Program** ~~requires~~**requirements.** ~~no minor.~~
  - **In lieu of a specific minor, a student in the B.A. program may obtain a distributed minor. The plan for the distributed minor should be prepared in consultation with the Physics and Astronomy faculty advisor and approved by the department.**

Grand Total Credits: 120

Concentrations

Program Concentrations

Code	Title

Concentration Required
No

Emphases

Emphasis required
N/A

Emphasis Hours

Emphasis Rules

No Rules

Sample Degree Plan

Proposed
Sample Degree Plan Upload

- Proposed BA PhysicsAstrophysics Four Year RoadMap.10.22.23.pdf

Existing
Sample Degree Plan Upload

Program Learning Outcomes

Proposed

Learning Outcomes

1. Students will demonstrate an understanding of concepts of physics.
2. Students will demonstrate the ability to analyze problems.
3. Students will demonstrate the ability to apply computing tools to problems.
4. Students will demonstrate the ability to communicate, orally and in writing, in a scientific context.
5. Students will demonstrate the ability to carry out experiments to arrive at scientific results.

Existing

Learning Outcomes