CSU Channel Islands

PROPOSAL TO INITIATE A NEW MINOR

SIGNATURE PAGE

Name of Proposed Minor:	Astronomy
Date of Submission:	9/30/15, 03.30.16
Faculty Proposing New Program:	Geoff Dougherty, Ph.D., Clint D. Harper, Ph.D., Greg Wood, Ph.D.

Review and Approval Signatures:

1. Proposer:		Date:	
2. Program Chair (if applicable)		Date:	
3. Curriculum Chair:		Date:	
4. Academic Senate Chair:		Date:	
5. AVP Academic Programs and Planning		Date:	
6. Provost:		Date:	
7. President or Designee:		Date:	

Internal Note: Please return this document to the Curriculum Committee. Due by October 1st for consideration for the following academic year.

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PROPOSAL TO INITIATE A NEW MINOR

This form is to be used when the proposed new minor is in a field where no major exists, or where a current major does not have a minor field. (If academic minors are developed as part of a new major proposal, this *Proposal for a New Minor* does not have to be completed.)

Senate Resolution 2-01 requires that minor must have a minimum of fifteen (15) units, nine (9) of which must be upper division.

1. Program Identification

   a. Name of the Minor **Astronomy**

   b. Academic Program(s) Proposing the Minor

      Math & Applied Physics

2. Program Description

   a. Provide a description of the Minor and its Student Learning Outcomes.

      The minor in Astronomy affords students the opportunity to acquire a foundation in the subject with a stress on astronomy's multidisciplinary nature and contributions to the development of scientific thought and the scientific method. This curriculum is well-suited to those students who have a general interest in the subject and particularly to those science majors considering a career in secondary education. After completion of the minor in Astronomy student will be able to:

      - Describe the basic steps involved in the scientific method and give specific examples of its application in astronomy;
      - Understand the basic steps in cosmic evolution as described by current cosmological theory;
      - Explain the overall large-scale structure of the universe as currently understood;
      - Describe Earth's location in the universe including our place in: the Virgo Super Cluster, the Local Group, the Milky Way Galaxy, and our local Solar System;
      - Differentiate the various methods used to measure astronomical distances;
      - Explain the conditions necessary for a planet to be habitable;

- Rate the potential habitability of planets and satellites in our solar system and in systems around other stars;
- Summarize the methods used to identify and study exoplanets;
- Understand the function and basic operation of instruments commonly used in astronomy;
- Be able to navigate the night sky and find astronomical objects using a variety of tools including: printed sky charts, computer-based planetarium software, and handheld device applications;
- Apply the facts and principles from astronomy and astrobiology to assess the short and long-term issues affecting the habitability of planet Earth.

b. How does the Minor support the University's Mission and Strategic Goals?

The minor in Astronomy:

- Facilitates learning in a multidisciplinary environment by demonstrating that astronomy is closely related to other areas of study such as mathematics, physics, biology, and Earth science;
- Encourages students to apply the facts and principles learned in astronomy to analyzing issues affecting the planet Earth;
- Demonstrates the principles of the scientific method with specific examples from astronomy and related disciplines;
- Encourages students to apply critical thinking skills by comparing and contrasting alternate hypotheses and theories.

c. Provide a catalog description of the Minor. Use the format in which it will appear in the catalog, including a program description, careers associated with the minor, and faculty names and titles.

The Minor in Astronomy affords interested students the opportunity to obtain a fundamental background in astronomy, including astrobiology. This program, which is open to students enrolled in all majors, is particularly well-suited to science and mathematics majors who are contemplating a career in secondary education.

Faculty: Geoff Dougherty, Ph.D. Professor, Physics
Clint D. Harper, Ph.D. Lecturer, Physics
Gregory Wood, Ph.D., Associate Professor, Physics

3. Curriculum

a. Lower and Upper Division Course Requirements (including pre- and co-requisites.) Identify required elective courses. Identify currently available course in the catalog, and separately identify newly developed courses.

Lower Division Requirements (18-30 Units)

Choose one of the sequences:

PHYS 100	Introduction to Physics I (4)
PHYS 101	Introduction to Physics II (4)
ASTR/BIOL/PHYS 110	Life in the Universe (3)

or

MATH 150	Calculus I (4)
MATH 151	Calculus II (4)
MATH 250	Calculus III (3)
PHYS 200	General Physics I (4)
PHYS 201	General Physics II (4)
PHYS 202	General Physics III: Light, Relativity and Modern Physics (4)

And

ASTR/PHYS 105	Introduction to the Solar System (3)
ASTR/PHYS 107	The Stars and Beyond (3)*
ASTR/PHYS 112	Introduction to Observational Astronomy (1)

Upper Division Requirements (9 Units)

PHYS/MATH/COMP 345	Digital Image Processing (3)
ASTR 390	Frontiers of Astronomy (3)*
ASTR 490	Topics in Astronomy (3)*

*Catalog entries:

We will request that the current PHYS 107 be cross-listed as ASTR 107.

PHYS 107
A tour through the stars and galaxies will uncover some major mysteries of the Universe. Topics include: the historical development of astronomy; the laws that govern the behavior of the Universe; the birth, life and death of stars; the collision of galaxies; and evidence for the birth and end of the entire Universe.

ASTR 390
An introduction and overview of current topics at the leading-edge of research in astronomy, astrophysics, and astrobiology. Specific topics covered will vary depending on recent developments in research. Approximately half of the course will consist of an introductory overview by the instructor of current topics and trends in research. The second half of the course will be devoted to student literature research and student presentations to the class on a particular topic of interest.

ASTR 490
In-depth analysis of current topics in astronomy, astrophysics, or astrobiology. Topics will vary by semester. Students will be required to research and present to the class a specific topic in both written and oral form. Utilization of laboratory research methods and equipment may be integrated into the course. Repeatable by topic.

b. Total number of units in the Minor (including pre- and co-requisites).

27-39

4. Academic Structure and Enrollment

- Identify the program area and persons responsible for program management and oversight.

Program area: Mathematics and Applied Physics
Department Chair: Ivona Grzegorczyk, Ph.D.
Program Coordinator: Geoff Dougherty, Ph.D.

- Estimate of number of students enrolling in the minor, in the initial year and after three (3) and five (5) years. Provide a brief justification for this projection.

	Number of Students in the Minor
Initiation Year:	5
Third Year:	10
Fifth Year:	15

Justification: There has been a growing student demand for a Minor in Astronomy, and LD courses in Astronomy are well enrolled. Program will be particularly marketed to students enrolled in the secondary credential program and should show steady growth.

5. Faculty and Staff Resources

   a. Existing faculty and staff qualified to teach in and support the minor, including the percent of their work assignment contributing to the minor.

      Gregory Wood, Ph.D., Associate Professor, Applied Physics (10%)
      Clint D. Harper, Ph.D., Lecturer, Applied Physics (10%)
      Brian Rasnow, Ph.D., Lecturer, Applied Physics (10%)
      David Nelson, Ph.D., Lecturer, Applied Physics (10%)
      David Bennett, M.S., Lecturer in Math & Applied Physics (10%)
      Dale Capewell, Ph.D., Lecturer in Applied Physics (10%)

   b. Additional faculty and staff needed for the minor and the areas of expertise needed. If no new faculty or staff are needed, please explain briefly.

      None required. All courses required for the Minor can be currently taught by existing tenure-track faculty and/or lecturers.

6. Facilities, Equipment, Financial, and Information Resources

   a. Existing facilities, equipment, and information resources available to support the minor.

      The new Sierra Hall building includes the necessary laboratory space, including computer resources, needed to support the Minor in Astronomy. Telescopes, and other equipment donated to the University, are adequate to support the laboratory component of the Minor.

   b. External funding already in progress or anticipated.

      None anticipated or required.

   c. Facilities, Equipment and Information Resources Needed to Support the Minor. If no new resources are needed, please explain briefly.

      Existing facilities (including Sierra Hall) and equipment are adequate to support the Minor in Astronomy.