Senate Reference No. 11-28

TO: Kathy Pollock, Chair, Senate Executive Committee
FROM: Carol Lawton, Acting Chair, Curriculum Review Subcommittee
DATE: March 23, 2012
SUBJECT: Proposal for Minor in Astronomy

Curriculum Review Subcommittee members support the proposal for a Minor in Astronomy and find that the proposal requires no Senate review.

Approving	Not Approving	Absent
R. Duchovic		A. Livschiz (sabbatical)
I.-H. Kim		B. Resch (leave)
C. Lawton		
B. Salmon		
S. Skekloff		
L. Stanchev		
N. Suntornpithug		

IPFW
Request for a New Minor

Proposed Title of Minor: Minor in Astronomy
Department Offering the Minor: Physics

Projected Date of Implementation: Spring 2012

I. Why is this minor needed? (Rationale)

For a university the size of IPFW, the lack of any form of astronomy program is glaring. The IPFW Physics Department would like to correct this gap by offering a Minor in Astronomy. The physics department believes that this lack has also had an impact upon the physics program since astronomy is a course that can inherently interest students (more so than Newtonian Mechanics!).

We are aware that physics (and engineering) students are interested in Astronomy and that we have lost several promising students to IU because of our lack of an astronomy program.

Many of our students have gone to work in the aerospace industry and this course work would give them a better foundation for that industry.

The minor will build upon the first three semesters of physics and provide a four course sequence in astronomy.

II. List the major topics and curriculum of the minor.

PHYS 15200 Mechanics (Calculus based Introductory Physics, and its co-requisite (MA 16600 Calculus II)) -	5 Credit Hours.
ASTR 36400 Stars and Galaxies –	3 Credit Hours
PHYS 25100 Heat Electricity and Optics -	5 Credit Hours
PHYS 34200 Modern Physics –	3 Credit Hours
ASTR 37000 Cosmology –	3 Credit Hours
ASTR 40100 Introduction to Astrophysics –	3 Credit Hours
Total Core	22 Credit Hours

The inclusion of 3 physics courses from the major program is an important recognition of the hierarchical nature of physics. To understand astronomy you have to understand basic mechanics (152), thermal physics and light (251), and some basic quantum mechanics (342). The removal of any of these would harm the integrity of the minor.

Electives (Optional courses that provide conceptual background information.)
AST 100 The Solar System (Taught by Geoscience) to give an introduction to planetary astronomy. 3 Credit Hours
PHYS 13500 The First Three Minutes – to provide an introduction to cosmology. 3 Credit Hours

Students who start may not be able to immediately take PHYS 15200 may take AST100 and PHYS 135. Courses such as AST 100 and PHYS 13500 provide students with the valuable opportunity to learn background information at a conceptual level. However, it is important to note that AST100 and PHYS 135 do not have the same mathematical complexity as other courses within the minor which is why they are left as electives.

III. What are the admission requirements?

Open to all IPFW students who are eligible for PHYS 152

IV. Describe student population to be served.

Principally, the program will serve physics majors, engineering majors, chemistry majors, and math majors. These are the students who typically will take the calculus based introductory physics course. This sequence will provide the students with a new field of study.

V. How does this minor complement the campus or departmental mission?

Part of the Physics Department mission mission is to "provide physical and scientific knowledge to the greater community". Astronomy is a part of physics and it is an important opportunity to provide to the students, and an opportunity for education in region served by IPFW.

IPFW's mission is to meet the higher education needs of northeast Indiana. Providing this new minor fits within that mission.

VI. Describe any relationship to existing programs within the university.

Clearly, this is very close to the physics degrees. Half of the required courses for the minor are required by the physics major (and some chemistry and engineering majors). This minor complements the physics program by offering a new application of physics.

VII. List and indicate the resources required to implement the proposed minor. Indicate sources (e.g., reallocations or any new resources such as personnel, library holdings, equipment, etc.).

There will be some supplies necessary to be purchased such as images and "demonstration" materials. Existing department funds will be adequate for these purchases. We will probably reassign faculty from present general education courses to astronomy courses. We envision offering them on a 18 month rotating schedule at first.

Please see the attached statement from the Library.

VIII. Describe any innovative features of the program (e.g., involvement with local or regional agencies, or offices, cooperative efforts with other institutions, etc.).

Walter E. Helmke Library

Resources in Support of Proposed Minor in Astronomy

November 3, 2011

This review provides an overview of the Helmke Library resources available to students and faculty in the proposed minor in Astronomy.

The physical and electronic collection at the Helmke Library in the subject areas of astronomy and physics are substantial. In addition, the library collection at IU Bloomington which supports the Astronomy and Astrophysics program (offering a BA, MA and PhD) and the Physics program (offering a BA, BS MAT, MS and PhD) is very strong and augments the resources available to IPFW students and faculty via Helmke's Document Delivery Services.

This review consists of three areas: I. Monographic Materials, II. Journals and Databases and III. Professional Support.

I. Monographic Materials

IPFW monographic materials by subject (print and electronic format)

Astronomy	706
Cosmology	217
Astrophysics	163
Stars	146
Galaxies	138
Biophysics	39
Physics, astronomy and astrophysics	8

II. Journals and Databases

Helmke Library's collection of astronomy and biophysics journals includes many of the prominent journals in these specialty areas. A recent Sci-Bytes report on *Highlighted Journals: Astronomy & Astrophysics* from August 2011 listed prominent journals in the field by three metrics found in Journal Citation Reports®: the field's prolific journals, journals 2010 Impact Factor and the Eigenfactor™ score for journals. The weekly *Sci-Bytes - What's New in Research* reports are provided by *ScienceWatch.com* from Thomson Reuters. Several of the journals highlighted are available in the Helmke collection:

Annual review of astronomy and astrophysics [electronic resource]
The astronomy and astrophysics review [electronic resource]
Annual review of earth and planetary sciences [electronic resource]
Physical review. D [electronic resource]
The Astronomical Journal [electronic resource]

The journal collection at Helmke also includes a number of titles addressing various aspects of an astronomy minor.

IPFW journals by subject (print and electronic format)

Astronomy	60
Biophysics	27
Astrophysics	20
Cosmology	7
Stars	5

Helmke Library offers a strong selection of databases and indexes providing access to full text journals, including the major databases of *Web of Science*, *Physical Review Online Archive (PROLA), SciFinder Scholar, MathSciNet, Compendex* and the *Wiley Online Library*. Additional broader coverage needed to support the needs of faculty and students is provided through databases such as *Dissertations and Theses* and *Conference Papers Index*.

III. Professional Support

Helmke Library has a satisfactory collection of available materials to support the proposed astronomy minor. As the program grows, more materials for the library's collections will need to be purchased. Along with continuing collection development efforts, students and faculty will also have the support of the excellent Document Delivery Services offered by Helmke Library.

The subject liaison librarian, Florence Mugambi, will continue to provide expert research advice and assistance to students and faculty. The liaison librarian can provide support through involvement in Blackboard-supported classes, one-on-one research consultations, in-class instructional sessions on selecting and searching databases, or tailored course guides to guide students through particular research assignments. Librarians can also assist in doing cited reference searches and help students and faculty take advantage of current awareness services offered by library databases or journals. However, in the future, it may be necessary to support Library efforts to recruit a librarian with a strong science background.