

PROPOSAL BRIEFS FOR MAJOR MODIFICATIONS OF ACADEMIC PROGRAMS

Faculty: Science

Program: Physics

MOTION: That CPRC recommends to Academic Council the approval of a new minor program in Astronomy.

1. INTRODUCTION

(a) BRIEF BACKGROUND ON EXISTING PROGRAM

Astronomy is a popular subject, with high interest amongst Science students at UOIT. As part of our Astrophysics specialization within our B.Sc. in Physics, we offer four courses in astronomy and astrophysics: PHY 2900U Astronomy I, PHY 3900U Astronomy II, PHY 4910U Techniques of Modern Astrophysics, and PHY 4920U Cosmology. The first two of these courses has seen a large enrollment since their introduction, with over 100 Science students taking Astronomy I, and more than 30 taking the more advanced Astronomy II. The majority of the students in these two courses are from outside of the Physics program; clearly interest in the field of astronomy is quite high. We would therefore like to propose the creation of a new Astronomy minor.

(b) OVERVIEW OF NEW PROGRAM COMPONENT(S)

The Astronomy minor would consist of the following courses:

- PHY 1010U Physics I or PHY 1030U Introductory Physics
- PHY 1020U Physics II or PHY 1040U Physics for Biosciences
- PHY 2030U Mechanics I
- PHY 2900U Astronomy I
- PHY 3900U Astronomy II
- One of PHY 4910U Techniques of Modern Astrophysics or PHY 4920U Cosmology.

(c) DESCRIPTION OF FIT WITH EXISTING OFFERINGS

The Faculty of Science currently offers minors in Biology, Chemistry, Mathematics, Physics, and Computational Science. Within Physics, we offer a specialization in Astrophysics, which includes four courses in astronomy and astrophysics. The creation of a new minor in astronomy would complement the existing physics minor by leveraging the already available courses within the field of astronomy.

The Astronomy minor differs from the currently offered Physics minor in a two important ways:

- It does not include PHY 2010U Electricity and Magnetism I.

- It includes PHY 2900U Astronomy I, not currently available for complete the Physics minor given its 2000 level. This then precludes a student interested in pursuing Astronomy within the Physics minor from taking the 3000 and 4000 level courses since it is a prerequisite.

Given that many Science students now already take PHY 2900U Astronomy I and PHY 3900U Astronomy II, and will also have the first year courses, the addition of PHY 2030U Mechanics I and one 4000 level Astronomy course would complete the minor. This makes it an attractive option for students with interest in Astronomy and could potentially increase our enrollment in those upper level courses.

2. DEGREE REQUIREMENTS

(a) PROGRAM LEARNING OUTCOMES

1. Depth and breadth of knowledge

- Describe and explain the basic concepts and ideas in the field of astronomy, including modern telescopes, the solar system and extra solar planets, stars, galaxies, and the universe itself.
- Demonstrate knowledge of astronomy, physics, mathematics, and computer science by solving problems in the field of astronomy.

2. Knowledge of Methodologies

- Calculate the evolution of the solar system, stars, galaxies, and the universe using a broad range of modern techniques, including analytical and computational modelling.
- Utilize knowledge and software to identify, retrieve, and analyze modern telescope data.

3. Application of Knowledge

- Apply knowledge of astronomy to prepare in-depth research projects.

4. Communication Skills

- Discuss topics in astronomy accurately and effectively, in both written and oral form, with members of academia as well as the general public.

5. Awareness of Limits of Knowledge

- Some of the largest unsolved problems in physics are in the field of astrophysics (such as the theories of dark matter and dark energy). Students will recognize the limitations of the current state of knowledge in astrophysics, explain the motivations for new theories, and to be able to criticize them.

6. Autonomy and Professional Capacity

- Student is expected to become an active member of multidisciplinary and multicultural teams and appreciate the importance of academic integrity, professional ethical conduct, and social responsibility.

(b) ADMISSION REQUIREMENTS

Any Science student can take the proposed Astronomy minor.

(c) PROGRAM STRUCTURE

Calendar copy:

14.13 Science minor programs

14.13.3 Astronomy minor

Astronomy is the branch of physics that studies the universe and its major components, including planets, stars, and galaxies. Students with this minor will develop comprehensive knowledge of the universe and our place within it. A cumulative GPA of at least 2.0 in the following courses is required to successfully complete this minor program.

Course Requirements

- PHY 1010U Physics I or PHY 1030U Introductory Physics
- PHY 1020U Physics II or PHY 1040U Physics for Biosciences
- PHY 2030U Mechanics I
- PHY 2900U Astronomy I
- PHY 3900U Astronomy II
- One of PHY 4910U Techniques of Modern Astrophysics or PHY 4920U Cosmology

3. RESOURCE REQUIREMENTS

(a) FACULTY MEMBERS

No additional faculty members are required; all courses are already offered.

(b) ADDITIONAL ACADEMIC AND NON-ACADEMIC HUMAN RESOURCES

None.

(c) PHYSICAL RESOURCE REQUIREMENTS

None.

4. BUSINESS PLAN

(a) STATEMENT OF FUNDING REQUIREMENTS

No new funding is required.

(b) STATEMENT OF RESOURCE AVAILABILITY

The required courses for the proposed Astronomy minor are all currently offered; no new resources are required.