ORIGINAL COURSE IMPLEMENTATION DATE: June 1994
REVISED COURSE IMPLEMENTATION DATE: January 2019
COURSE TO BE REVIEWED: (six years after UEC approval) October 2020
Course outline form version: 09/15/14

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: ASTR 103	**Number of Credits:** 4 Course credit policy (105)
Course Full Title: Astronomy: The Solar System **Course Short Title (if title exceeds 30 characters):**	
Faculty: Faculty of Science	**Department (or program if no department):** Physics

Calendar Description:

A brief history of astronomy, Newton's laws, gravity, orbits, eclipses, seasons, light, and astronomical instruments. Attributes of the Sun and the planets, their moons, and other solar system objects are investigated, and finally planetary system origins.

Note: Students with credit for ASTR 101 cannot take this course for further credit. Labs will be used to deepen the understanding of the course material.

Prerequisites (or NONE):	None.
Corequisites (if applicable, or NONE):	None.
Pre/corequisites (if applicable, or NONE):	None.

Equivalent Courses (cannot be taken for additional credit)
Former course code/number: **PHYS 103**
Cross-listed with:
Equivalent course(s): **PHYS 103, ASTR 101**
Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.

Transfer Credit
Transfer credit already exists: ☒ Yes ☐ No
Transfer credit requested (OReg to submit to BCCAT):
☐ Yes ☒ No (if yes, fill in transfer credit form)
Resubmit revised outline for articulation: ☐ Yes ☒ No
To find out how this course transfers, see **bctransferguide.ca**.

Total Hours: 70
Typical structure of instructional hours:

Lecture hours	45
Seminars/tutorials/workshops	
Laboratory hours	30
Field experience hours	
Experiential (practicum, internship, etc.)	
Online learning activities	
Other contact hours:	
Total	**75**

Special Topics
Will the course be offered with different topics?
☐ Yes ☒ No
If yes, different lettered courses may be taken for credit:
☐ No ☐ Yes, repeat(s) ☐ Yes, no limit
Note: The specific topic will be recorded when offered.

Maximum enrolment (for information only): 36

Expected frequency of course offerings (every semester, annually, every other year, etc.): every year

Department / Program Head or Director: Dr. Jeff Chizma	**Date approved:**	February 2018
Faculty Council approval	**Date approved:**	March 2, 2018
Campus-Wide Consultation (CWC)	**Date of posting:**	April 13, 2018
Dean/Associate VP: Dr. Lucy Lee	**Date approved:**	March 2, 2018
Undergraduate Education Committee (UEC) approval	**Date of meeting:**	May 18, 2018

Learning Outcomes

Upon successful completion of this course, students will be able to:

1. Describe, in general terms, the history and progress in astronomy from Lithic cultures to the present day.
2. Investigate indigenous world-views and their relationship with the Universe.
3. Explore the ramifications and ethics of explaining scientific truth to power through historical examples in astronomy.
4. Relate the progress in our understanding of the Universe to experimental observations and measurement.
5. Distinguish between the two main systems for plotting positions on the celestial sphere.
6. Solve simple orbital problems using Kepler's and Newton's Laws.
7. Identify the different parts and processes of the Sun.
8. Outline the major differences between the terrestrial and giant planets.
9. Explain the differences between the gas giants and the ice giants.
10. Describe the important properties of the other components of our solar system.
11. Investigate exoplanets and theories of planetary system formation.
12. Write a basic lab report, including organized data tables, graphs, sample calculations, simple error analysis etc.
13. Build a simple Keplerian and a simple Galilean telescope, and understand the ray optics underpinning their operation.
14. Calculate the mass of Jupiter and the rotation rate of the Sun using computer simulations.
15. Incorporate the experience of labwork into an understanding of the difficulties of scientific investigation and determining scientific truth.
16. Discuss the ethical considerations which must be taken into account when humans send spacecraft to other planetary bodies.

Prior Learning Assessment and Recognition (PLAR)

☒ Yes ☐ No, PLAR cannot be awarded for this course because

Typical Instructional Methods (guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion)

Lecture, demonstration, small group practice, discussion, audiovisual presentation, use of models and charts, and laboratory experiments.

Grading system: Letter Grades: ☒ Credit/No Credit: ☐ Labs to be scheduled independent of lecture hours: Yes ☒ No ☐

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Text(s) and Resource Materials (if more space is required, download Supplemental Texts and Resource Materials form)

	Author (surname, initials)	Title (article, book, journal, etc.)	Current ed.	Publisher	Year
1.	Fix, J.D.	Astronomy: Journey to the Cosmic Frontier, 6th ed.	☒	McGraw-Hill, N.Y.	2011
2.	Freedman, R., et al.	Universe,10th ed.	☒	Freeman & Co., N.Y.	2014
3.	OpenStax	Astronomy	☒	Houston, TX	2016

Required Additional Supplies and Materials (software, hardware, tools, specialized clothing, etc.)

Calculator, lab manual.

Typical Evaluation Methods and Weighting

Final exam:	45%	Assignments:	10%	Midterm exam:	20%	Practicum:	%
Quizzes/tests:	10%	Lab work:	15%	Field experience:	%	Shop work:	%
Other:	%	Other:	%	Other:	%	Total:	100%

Details (if necessary):

Typical Course Content and Topics

Week 1.	Celestial Sphere and Celestial Clockwork
Week 2.	Early Astronomy
Week 3.	Renaissance Astronomy - Copernicus, Brahe, Kepler and Galileo
Week 4.	Gravitation & Newton
Week 5.	Light and Telescopes
Week 6.	Solar System Overview and the Sun
Week 7.	Earth
Week 8.	Moon and Mercury
Week 9.	Venus and Mars
Week 10.	Gas Giants: Jupiter and Saturn
Week 11.	Rings and Satellites
Week 12.	Ice Giants: Uranus and Neptune
Week 13.	Origin Remnants: Asteroids, TNOs, Comets, KBOs and the Oort Cloud
Week 14.	Origin of the solar system, exoplanets, astrobiology and SETI.

Laboratory Experiments

Eight experiments will be performed. (One of them takes two lab periods.) It is anticipated that the other lab periods will be used for sky observing should the weather allow.

0. Introduction and Math Review (week 1)
1. Inverse Square Law (week 2)
2. Trigonometry and Parallax (week 3)
3. Mirrors, Lenses, Telescopes and Binoculars (week 4)
4. Orbits and Universal Gravitation (computer simulation - week 5)
5. Rotation of the Sun (computer simulation - week 6)
6. Comparative Planetology – 2 lab periods (weeks 7 & 8)
7. Planetary System Formation (computer simulation - week 9)
8. Observation/Take-home experiment
   (The Take-home experiment is selected from a list of 20+ procedures).