



**School of Arts & Science**  
**DEPARTMENT OF PHYSICS & ASTRONOMY**

**Astronomy 102: Stars, Galaxies and Cosmology**

**Winter Semester 2007**

**ASTRONOMY 102 COURSE OUTLINE**

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**1. Instructor Information**

- (a) Instructor: Dr. James Nemec
- (b) Office Hours (M,T,W,Th): 1:45-2:30 pm
- (c) Office location: Fisher 346d
- (d) Office phone: 370-3460
- (e) E-mail: nemec@camosun.bc.ca

**2. Intended Learning Outcomes**

*(No changes are to be made to this section, unless the Approved Course Description has been forwarded through EDCO for approval.)*

Upon completion of this course the student will be able to:

1. Describe how the Sun works, its structure (interior, atmosphere, corona), its evolution and its future (as a red giant and then a white dwarf).
2. Outline the concepts of radiation (light) and energy, the different states of matter (solid, liquid, gas), and temperature scales.
3. Compare the properties of stars (single, binary and in clusters), including their distances, motions, temperatures (from spectra), masses, flux densities and luminosities.
4. Describe interstellar matter and the formation of stars from gas and dust.
5. Comment on the interiors and evolution of many different kinds of stars (such as red giants, planetary nebulae, novae, Cepheid and RR Lyrae variable stars, etc.) and why mass is the main factor controlling the evolution of stars.
6. Describe and explain the different kinds of stellar deaths and end products, including supernovae, black holes, white dwarfs, and neutron stars.
7. Describe the Milky Way Galaxy, its contents, the massive black hole at its centre, and its evolution.
8. Describe the properties of the different kinds of galaxies, from ordinary elliptical and spiral galaxies to dwarf galaxies and quasars.
9. Outline ideas about the origin of the Universe and how it evolved to its present state (galaxy clusters, voids) as a result of physical laws, with reference to Hubble's Law, the Big Bang model, Einstein's special and general theory of relativity, the creation of elements, dark matter and dark energy.

**Course Description and Prerequisites**

Astronomy 102 is one of two Introductory Astronomy courses offered at Camosun College. Astr102 concerns Stars, Galaxies and Cosmology, while Astr101 deals with the Night Sky and the Solar System. The courses can be taken in any order, and students that take both obtain transfer credit for Astronomy 120 at the University of Victoria. Both courses satisfy the University of Victoria Education requirement for a science lab course.

The topics that are studied in Astr102 include: the Sun; properties of stars; star formation; the evolution and death of stars; our Galaxy; normal and active galaxies; the expanding universe; quasars; the Big Bang model of the universe; relativity and cosmology.

The only prerequisite is English 11. Astr101 is not a prerequisite.

### 3. Required Materials

- (a) Course textbook: THE UNIVERSE REVEALED by Chris Impey and W.K.Hartmann
- (b) Astr 102 Lab Notes (available from the Lansdowne Campus bookstore)
- (c) Scientific calculator (any pocket calculator is acceptable)

### 4. Course Content (Chapter Headings in “The Universe Revealed”)

Chapter:

- 04. **Matter and Energy in the Universe**
- 10. **Detecting Light from Space**
- 11. **Our Sun, the Nearest Star**
- 12. **Properties of Stars**
- 13. **Star Birth, Evolution and Death**
- 14. **The Milky Way Galaxy**
- 15. **Galaxies**
- 16. **The Expanding Universe**
- 17. **Cosmology**

### 5. Department Policies Regarding Testing and Labs

- (a) Students must write review-quizzes, midterm-tests, etc. on the date and time assigned by the instructor. Instructors are not required to provide make-up tests. At their discretion, instructors may waive a test or provide a make-up test only in the event of documented illness or other extenuating circumstances.
- (b) All assigned laboratory exercises must be completed with an overall grade of 60% or better to obtain credit for this course. A lab may be waived or made up at a later time only in the case of documented illness or other extenuating circumstances.
- (c) A student who is repeating an Astronomy course does not have to complete the laboratory exercises a second time if an average lab grade of 70% or better was obtained.

### 6. Study time and Basis of Student Assessment

*It is recommended that between five and 10 hours per week (or more for students with a weak background) be spent studying for this course outside of class time.*

- (a) Labs, Assignments and Homework. [30%]
- (b) Review Quizzes will be given at the beginning of most classes. These will be closed-book tests consisting of several questions/problems that can be done with work-groups of any size. They will be marked immediately after doing the test and a score assigned. You will then have one week to correct any mistakes you may have made and hand in the Quiz for remarking and an upgraded score. After one week no up-grading will be done. [10%]
- (c) Midterm Exams – there will be two midterm exams, the first on Monday **Feb.5, 2007**, and the second on Wednesday **March 7, 2007**. [2 x 15% = 30%]
- (d) Final Exam – a comprehensive final exam will take place in the Examination period for Winter '07, which runs **from Apr.16 to 24, 2007**. [30%]

### 7. Grading System

The following percentage conversion to letter grade will be used:

Percentage	Grade	Description	Grade Point Equivalency
90-100	A+		9
85-89	A		8
80-84	A-		7
77-79	B+		6
73-76	B		5
70-72	B-		4
65-69	C+		3
60-64	C		2
50-59	D	Minimum level of achievement for which credit is granted; a course with a "D" grade cannot be used as a prerequisite.	1
0-49	F	Minimum level has not been achieved.	0

## 8. Recommended Materials or Services to Assist Students to Succeed Throughout the Course

### LEARNING SUPPORT AND SERVICES FOR STUDENTS

There are a variety of services available for students to assist them throughout their learning. This information is available in the College Calendar, Registrar's Office or the College web site at <http://www.camosun.bc.ca>

### ACADEMIC CONDUCT POLICY

There is an Academic Conduct Policy **which includes plagiarism**. It is the student's responsibility to become familiar with the content of this policy. The policy is available in each School Administration Office, Registration, and on the College web site in the Policy Section.

[www.camosun.bc.ca/divisions/pres/policy/2-education/2-5.html](http://www.camosun.bc.ca/divisions/pres/policy/2-education/2-5.html)