DEPARTMENT OF PHYSICS, ENGINEERING AND ASTRONOMY

COURSE OUTLINE

ASTR 112
INTRODUCTORY ASTRONOMY:
Stars and Galaxies

INSTRUCTOR: Greg Arkos
OFFICE: Building 315, Room 209
OFFICE HOURS: TR 1:00 pm - 2:30 pm *or by appointment*
PHONE: (250) 753-3245 Local 2207
EMAIL: gregory.arkos@viu.ca
WEBSITE: https://wordpress.viu.ca/arkosg/
VIULEARN: https://learn.viu.ca

LECTURE:	TR	2:30 pm – 4:00 pm	Bldg 315, Rm 216
LAB:	R (bi-weekly)	4:30 pm – 6:30 pm	Bldg 315, Rm 216/113

TEXT: Universe: Stars & Galaxies by R. Freedman & W.J. Kaufmann (5th Ed, WH Freeman & Co.) is *optional*. Planetarium software is *required*.

CALENDAR DESCRIPTION: Introduction to the fundamental principles of astronomy. Topics include telescopes, properties of the Sun, general properties of stars (stellar birth, evolution, death), black holes/relativity, the interstellar medium, the Milky Way and other galaxies, extraterrestrial life, and theories of the origin and evolution of the universe. Includes a bi-weekly lab and observing sessions, weather permitting. (3:0:1)

OBJECTIVES & LEARNING OUTCOMES: Astronomy 112 explores the nature of light, telescopes, our Sun, stars, stellar development, black holes, and galaxies. The course aims to provide students with an appreciation of the universe and our place within it, stressing conceptual understanding with minimal mathematical derivation. Quizzes and exams emphasize descriptive material and an understanding of (and connections between) course concepts. By the end of the course students should understand the fundamental nature of scientific investigation, understand how a telescope functions and be able to use one, discuss the life cycle of stars in detail, characterize stars using an H-R diagram, calculate stellar distances by a variety of methods, discuss the evolution of stars of varying mass, specify the processes by which stars die and identify the resulting stellar corpses, distinguish the components of a typical spiral galaxy, and categorize the major types of galaxies based on their visible light morphology. Completing the observing project and outdoor observing sessions should enable students to identify asterisms, constellations & other significant celestial objects and navigate the night sky.

PREREQUISITES: *Principles of Physics 12 or min "C+" in Principles of Physics 11 or Applications of Physics 12; min "C+" in Principles of Math 12 or Math 152.*

**** Please read ALL of the important course details & policies which follow. ****

CLASSES & OFFICE HOURS: During the formal office hours listed above I will be available in my office for face-to-face meetings on a drop-in or by-appointment basis. You may also reach me via the provided email and phone number both during and outside of my office hours. It is also possible to arrange individual or small-group meetings via ZOOM (see the link on the course website).

LABS & OBSERVING SESSIONS: The science of astronomy has grown as a result of theoretical reasoning constantly tested by the results of observations performed in the real worl Students in astronomy will be expected to perform several laboratory experiments over the course of the term; some of these will be computer based. Observing sessions take place (weather permitting) during the semester. Dates and time for observing sessions are TBD.

OBSERVING PROJECT: The observing project is done individually and utilizes computer simulations & TBD VIU rooftop observation sessions. Details are available on the course website. ** **Late projects will NOT be accepted**. **

EVALUATION:
Term Test #1 (in class) ……30%
Term Test #2 (exam period) ……30%
Quizzes (best 5 of 6) ……10%
Laboratory (5) ……..20%
Observing Project ……10%

GRADES: Final grades are assigned using the *VIU Institutional Grade Scale*:

A+	*90-100%*	***B+***	*76-79%*	***C+***	*64-67%*	***D***	*50-54%*
A	*85-89%*	***B***	*72-75%*	***C***	*60-63%*	***F***	*0-49%*
A-	*80-84%*	***B-***	*68-71%*	***C-***	*55-59%*		

FAILING GRADES: Students worried about poor grades should see me as soon as possible. Do not drop the class before speaking with me! Please see the online Vancouver Island University Calendar regarding policies on registration. ** The last day for academic penalty-free withdrawal from courses is listed below. **

ACADEMIC INTEGRITY & POLICIES Academic misconduct can have ***significant*** repercussions on your academic career and is taken ***very seriously*** at VIU. Details of VIU's General Regulations, Policy 96.01 and Procedure 96.01.001 are available from: https://learningmatters.viu.ca/ready-set-go/academic-integrity, https://www.viu.ca/registration/general-regulations, https://www.viu.ca/registration/general-regulations#codeofconduct

STUDENT RESPONSIBILITIES: Read the course outline *carefully*; it is assumed that you are **fully aware** of its contents with regards to dates & deadlines, evaluation and policies. You are responsible for keeping up with material presented in lecture and monitoring your progress in the course. *Please speak with me **immediately** if you are having difficulties which might impact your grade in the course.*

EDI & CODE OF CONDUCT: VIU values human diversity in all its dimensions and is committed to achieving and ensuring learning and working environments that are equitable, diverse and inclusive. *It is expected that students will treat one another and the instructor with respect and dignity at all times, without exception*.

ACCESSIBILITY SERVICES: VIU's Accessibility Services provides information, support services and reasonable accommodation to students with documented permanent and temporary disabilities, such as mental health conditions, ADHD, learning disabilities, chronic health issues, hearing and visual impairments, physical disabilities and temporary impairments due to accident, illness or injury.

If you have a disability requiring academic accommodations for this course please contact Accessibility Services at AccessibilityServices@viu.ca or visit them in BLDG 255. *If you are already registered with AS please provide me with your accommodation letter, either in person or by email*.

TENTATIVE QUIZ, EXAM & OBSERVING PROJECT DATES:

Quiz 1	**Intro, Navigating the Spring Sky**	**Jan 18**
Quiz 2	**Light, Atoms, Spectra, Telescopes**	**Feb 1**
Quiz 3	**Sun, Stars**	**Feb 15**
Term Test #1	**Intro – Stars**	**Feb 29**
Quiz 4	**Blackbodies, HR, Distance Ladder**	**Mar 7**
Observing Project	**due**	**Mar 15**
Quiz 5	**Protostars, Low mass stars, wd's, plan nebulae**	**Mar 21**
Quiz 6	**Supernovae, BH's, Milky Way**	**Apr 4**
Term Test #2	**Stars - Quasars, AGN**	**Final Exam period**

TENTATIVE LAB DATES:

Lab 1: Skycharts	**Jan 18**
Lab 2: Spectra	**Feb 1**
Lab 3: Photometry of the Pleiades	**Feb 15**
Lab 4: Distance to the Galactic Core	**Mar 21**
Lab 5: Galaxy Classification	**Apr 4**

ASTR 112 VANCOUVER ISLAND UNIVERSITY SPRING 2024

TOPICS: The following is a *tentative* list of topics that will be covered in this course.
**** NOTE: Circumstances may require modifications to the dates & topics in this outline. ****

Subject	**Chapter(s) in text**
Introduction, Navigating the sky	1, 2
Light, Atoms, Spectra & Telescopes	5, 6
The Sun	16
The Nature of Stars	17
Birth, Evolution, and Death of Stars	18 – 20
Black Holes	21
The Milky Way	22
Galaxies	23
Quasars, AGN	24

IMPORTANT DATES:

FIRST DAY OF CLASSES: January 8, 2024
WITHDRAWAL DEADLINE: April 2, 2024
LAST DAY OF CLASSES: April 12, 2024
FINAL EXAMINATIONS: April 15 – 24, 2024

HOLIDAYS: (No classes, labs or exams)

FAMILY DAY: February 19, 2024
STUDY DAYS: February 20 – 23, 2024
GOOD FRIDAY: March 29, 2024
EASTER MONDAY: April 1, 2024

**** IMPORTANT course policies – READ CAREFULLY ****

1 Concerns regarding graded material MUST be raised within a week of its return.
2 Late submissions will NOT be accepted for grading WITHOUT prior approval.
3 There are NO deferred or make-up quizzes for this course.
4 There will be NO "extra" or "make-up" work for this course.
5 Requests for exam deferments REQUIRE official supporting documentation.
6 Students MUST be available for the entire term, eg. the ENTIRE final exam period.
7 There will be NO accommodation of non-university related travel, eg. vacations.
8 There is ZERO tolerance for academic dishonesty, including plagiarism.