

UNIVERSITY OF CALGARY
DEPARTMENT OF PHYSICS and ASTRONOMY
COURSE OUTLINE

1. **Astrophysics 401, Galactic Astrophysics**

Lecture Section **L01**: MWF, 12:00-12:50, SS 117

Instructor, D. Leahy Office SB517 Tel. No., 403-220-7192 e-mail address leahy@ucalgary.ca Office Hours: MWF 13:00-13:50

Blackboard course name: Asph401

Departmental Office SB605, telephone no. 220-5385

2. **PREREQUISITES**: Astronomy 213 or Astrophysics 213, Physics 325, and Mathematics 349 or 351 or Applied Mathematics 307.

3. **GRADING**: The University policy on grading and related matters is described sections F.1 and F.2 of the online University Calendar. In determining the overall grade in the course the following weights will be used:

Assignments	40%
In-class tests (2)	20%
Final Examination	40% (To be scheduled by the Registrar)]

There will be a final examination scheduled by the Registrar's Office. A passing grade on the final examination is required in order to pass the course.

In Asph 401: Percentage grades will be given for all elements of term work and examinations. A weighted course percentage will be calculated for each student after the final exam is written. A table of conversion from final course percentage to final course letter grade will be given on the Asph 401 Blackboard site later in the term.

4. **Missed Components of Term Work**. The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in section 3.6: <http://www.ucalgary.ca/pubs/calendar/current/sc-3-6.html>. It is the student's responsibility to familiarize himself/herself with these regulations. See also <http://www.ucalgary.ca/pubs/calendar/current/e-3.html>.

5. **TEXTBOOK**: "Galaxies in the Universe: an Introduction", Sparke & Gallagher, Cambridge

6. **EXAMINATION POLICY**: Students are encouraged to read the Calendar, Section G, on Examinations: <http://www.ucalgary.ca/pubs/calendar/current/g.html>.

Department Approval _____ Date _____

7. **OTHER IMPORTANT INFORMATION FOR STUDENTS:**

(a) **ACADEMIC MISCONDUCT** (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under K. Student Misconduct (<http://www.ucalgary.ca/pubs/calendar/current/k.html>) to inform yourself of definitions, processes and penalties

(b) **ASSEMBLY POINTS in case of emergency during class time**. Be sure to **FAMILIARIZE YOURSELF** with the information at <http://www.ucalgary.ca/emergencyplan/assemblypoints>.

(c) **ACADEMIC ACCOMMODATION POLICY**. Students with documentable disabilities are referred to the following links:
Calendar entry on students with disabilities: <http://www.ucalgary.ca/pubs/calendar/current/b-1.html>
Disability Resource Centre: <http://www.ucalgary.ca/drc/>

(d) **SAFEWALK**: Campus Security will escort individuals day or night (<http://www.ucalgary.ca/security/safewalk/>). Call 220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.

(e) **FREEDOM OF INFORMATION AND PRIVACY**: This course will be conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). As one consequence, **students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page**. For more information see also <http://www.ucalgary.ca/secretariat/privacy>.

- (f) **STUDENT UNION INFORMATION:** VP Academic **Phone:** 220-3911 **Email:** suvpaca@ucalgary.ca.
SU Faculty Rep. **Phone:** 220-3913 **Email:** sciencerep@su.ucalgary.ca Website <http://www.su.ucalgary.ca/home/contact.html>.
Student Ombudsman: <http://www.su.ucalgary.ca/services/student-services/student-rights.html>
- (i) **INTERNET and ELECTRONIC COMMUNICATION DEVICE Information.** You can assume that in all classes that you attend, **your cell phone should be turned off.** Also, communication with other individuals, via laptop computers, Blackberries or other devices connectable to the Internet is not allowed in class time unless specifically permitted by the instructor. If you violate this policy you may be asked to leave the classroom. Repeated abuse may result in a charge of misconduct.

DETAILED COURSE SYLLABUS

Topics to be covered:

Stars and stellar spectra
Stellar photometry and magnitude system
The Milky Way
Coordinate systems
Galaxy photometry
Galaxies in the expanding universe
The pregalactic era
Mapping the Milky Way
The solar neighborhood
Luminosity functions and mass functions
Distances from kinematics
Distances to star clusters
Galactic rotation
Gas in the disk
Gas in the inner Galaxy
Gravitational lensing
The orbits of stars
Two body relaxation
Collisionless Boltzmann equation
Mass density in the Galactic disk
The local group
Satellites of the Milky Way
Dwarf spheroidals
Local group spirals
Formation of the local group
Origin of heavy elements
Dwarf galaxies in the local group
Spiral and S0 galaxies
Surface photometry of disk galaxies
Observing the gas
Gas motions and the masses of galaxies
Tully-Fisher relation
Spiral arms and galactic bars
Bulges and centers of disk galaxies
Groups of disk galaxies
Galaxy collisions and mergers
Elliptical galaxies
Faber-Jackson relation
Stellar populations and gas in ellipticals
Dark matter and black holes
Galaxy clusters
Active galactic nuclei