

**UNIVERSITY OF CALGARY
DEPARTMENT OF PHYSICS AND ASTRONOMY
COURSE INFORMATION SHEET**

Course: Astrophysics 403, Stellar Structure & Evolution – Fall 2011

Instructor:

Dr. Phil Langill

L01 : TR 12:30 - 13:45 : EEEL151

Coordinates: SB 507, 220-5402, pplangil@ucalgary.ca

Main Physics Office: SB 605, 220-5385 **Course Website:** <https://blackboard.ucalgary.ca/webapps/login>

Prerequisites: ASTR 213 or ASPH 213 and PHYS 325.

Note: The Faculty of Science policy on pre- and co-requisite checking is outlined in the 2010-2011 Calendar. A student may not register in a course unless a grade at least "C-" has been obtained in each pre-requisite course; it is the responsibility of students to ensure that their registrations are in order. See <http://www.ucalgary.ca/pubs/calendar/current/sc-3-5.html> for details.

The University policy on grading and related matters is also found in the UofC Calendar. Details can be found at; <http://www.ucalgary.ca/pubs/calendar/current/f.html>

Grading: In determining the overall grade in the course the following weights will be used;

Assignments: 30%

Projects: 25%

Midterm Exam: 15%

Final Exam: 30%

There will be a final exam scheduled by the Registrar's Office. A failure on the final exam will normally result in a course grade no higher than a D+.

Missed Components of Term Work: The regulations of the Faculty of Science pertaining to this matter are outlined in the UofC Calendar at; <http://www.ucalgary.ca/pubs/calendar/current/sc-3-6.html>
It is each student's responsibility to familiarize himself or herself with these regulations.

Out-of-class-time activities: An important component of this course is observational laboratory experiments. Trips to the Rothney Astrophysical Observatory will be arranged, from time to time, to collect data. Regularly scheduled classes take precedence over this activity. Students should inform the course instructor about possible conflicts in a timely manner, so that appropriate accommodations can be arranged.

TEXTBOOK: *"Stellar Interiors: Physics Principles, Structure, and Evolution" 2nd Ed.*,
CJ Hansen, SD Kawaler, V Trimble. Springer 2004.

IMPORTANT/SAFEWALK: Campus Security will escort individuals day or night. Call 220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.

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. For more details, please carefully read this information; <http://www.ucalgary.ca/pubs/calendar/current/k-2.html>

FOIPP: 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.

STUDENT UNION INFORMATION: VP Academic **Phone:** 220- 3911 **Email:** suypaca@ucalgary.ca
SU Faculty Rep. **Phone:** 220 3913 **Email:** sciencerep@su.ucalgary.ca

**UNIVERSITY OF CALGARY
DEPARTMENT OF PHYSICS AND ASTRONOMY
COURSE INFORMATION SHEET**

Course: Astrophysics 403, Stellar Structure & Evolution – Winter 2010

Instructor:

Dr. Phil Langill

L01 : MWF 12:00 - 12:50 : SS 117

Coordinates: SB 507, 220-5402, pplangil@ucalgary.ca

Main Physics Office: SB 605, 220-5385 **Course Website:** <https://blackboard.ucalgary.ca/webapps/login>

Prerequisites: ASTR 213 or ASPH 213 and PHYS 325.

Note: The Faculty of Science policy on pre- and co-requisite checking is outlined in the 2010-2011 Calendar. A student may not register in a course unless a grade at least "C-" has been obtained in each pre-requisite course; it is the responsibility of students to ensure that their registrations are in order. See <http://www.ucalgary.ca/pubs/calendar/current/sc-3-5.html> for details.

The University policy on grading and related matters is also found in the UofC Calendar. Details can be found at; <http://www.ucalgary.ca/pubs/calendar/current/f.html>

Grading: In determining the overall grade in the course the following weights will be used;

Assignments: 30%

Projects: 25%

Midterm Exam: 15%

Final Exam: 30%

There will be a final exam scheduled by the Registrar's Office. A failure on the final exam will normally result in a course grade no higher than a D+.

Missed Components of Term Work: The regulations of the Faculty of Science pertaining to this matter are outlined in the UofC Calendar at; <http://www.ucalgary.ca/pubs/calendar/current/sc-3-6.html>
It is each student's responsibility to familiarize himself or herself with these regulations.

Out-of-class-time activities: An important component of this course is observational laboratory experiments. Trips to the Rothney Astrophysical Observatory will be arranged, from time to time, to collect data. Regularly scheduled classes take precedence over this activity. Students should inform the course instructor about possible conflicts in a timely manner, so that appropriate accommodations can be arranged.

TEXTBOOK: *"Stellar Interiors: Physics Principles, Structure, and Evolution" 2nd Ed.*,
CJ Hansen, SD Kawaler, V Trimble. Springer 2004.

Department Approval: _____ Date: _____

Associate Dean's Approval for out of regular
class-time activity: _____ Date: _____

IMPORTANT/SAFEWALK: Campus Security will escort individuals day or night. Call 220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.

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. For more details, please carefully read this information; <http://www.ucalgary.ca/pubs/calendar/current/k-2.html>

FOIPP: 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.

STUDENT UNION INFORMATION: VP Academic **Phone:** 220- 3911 **Email:** suypaca@ucalgary.ca
SU Faculty Rep. **Phone:** 220 3913 **Email:** sciencerep@su.ucalgary.ca

Astrophysics 403 Topics – Fall 2011

Topics which are slated be discussed in this course include:

The Virial Theorem, and its relation via thermodynamics, to principals of stellar gravitational, kinetic, and thermal energy.

Equations of stellar structure for static stars, including: mass conservation, hydrostatic equilibrium, radiative and convective energy transport, opacities, and the many equations-of-state appropriate to stars in various phases of their evolution. The dependence of all these on mass and composition will be emphasized throughout.

We will also discuss in some detail nuclear processes and derive reaction rates, and their dependence on composition. This leads into topics of stellar evolution, on and off the main sequence.

Polytropic solutions to stellar structure, for stars in various evolutionary phases, will also be discussed. If time permits we will touch on helioseismology and pulsating stars.

One student project will employ stellar structure and stellar evolution codes provided with the textbook. These programs incorporate all the physics we will cover in lecture.