Astronomy 9603B - Star Formation

Star Formation:	Astronomy 9603B (Winter 2012)
Lecturer:	Prof. Martin Houde mhoude2@uwo.ca http://www.astro.uwo.ca/~houde
Location:	University College, Room 201
Lectures:	Monday, Wednesday, and Friday, 10:30 to 11:20 am
Recommended text:	**The Formation of Stars**, by Steven W. Stahler and Francesco Palla (John Wiley and Sons).
Useful references:	See the bibliography below.

Contact information:

Martin Houde
Associate Professor
Department of Physics and Astronomy
Room 207, Physics and Astronomy Building
E-mail: mhoude2@uwo.ca
Phone: (519) 661-2111 x: 86711 (office)
Fax: (519) 661-2033

I can be reached at my office, especially after class where I will do my best to reserve time to answer your questions. I can also be reached during the week through e-mail for simple inquiries, or to make an appointment. I will try to reply to e-mails within two working days of reception.

Students should regularly check my website to find out about course material or announcements (at http://www.astro.uwo.ca/~houde/courses/astronomy9603b.html).

Evaluation: The course will contain regular assignments, a mid term exam, and a final paper/presentation, worth 30%, 35%, and 25% of your final mark, respectively. The remaining, up to 10%, will be awarded according to the level of participation in class. *The exam will be closed book and no electronics equipment (e.g., calculators, computers, etc.) will be allowed unless explicitly authorized ahead of time*. Students absent on examination day may be allowed to take a make-up exam if they present a note from a medical doctor within a reasonable amount of time. Similar consideration may be given under other exceptional circumstances.

The final paper will consist of review article of 10 to 20 pages in length on a pertinent subject chosen by the student, and a priori agreed to by the instructor. This paper should be written using the styles and templates required for submission to top astronomy and astrophysics journals (e.g., The Astrophysical Journal, The Astronomical Journal, Astronomy & Astrophysics, or the Monthly Notices of the Royal Astronomy Society). Each student will be required to present the contents of her/his review article during a 20-minute talk to the class at the end of the semester; a question period (from the class) of 10 minutes will follow the presentation. Every student will be required to attend to, and participate during the question period of, the presentation of her/his colleagues.

Assignments: You will receive three or four lists of suggested problems during the semester. I will indicate, for each list, which ones should be turned in for your assignments. Some of these problems may be chosen as material for the exam. Students will be allowed to discuss the material amongst them. Assignments must be turned in at the requested date. However, a student may miss a due date *once* during the semester, and hand in the late assignment on the following lecture day without incurring any penalty. Otherwise, for *every day* for which they are late, assignments will automatically have a third of the maximum number of points subtracted from their total.

Plagiarism: Students must write their assignments on their own. Whenever students take an idea, or a passage, or a solution to a problem from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar)

Description

This course will focus on the processes involved in the different stages leading to the formation of stars within our Galaxy. The basic physics and chemistry of the interstellar medium and the current models for low and high mass star formation will be discussed. Special attention will be paid to the observational evidence that support these models or point to their shortcomings.

Course Outline

1. Star formation in our Galaxy: stellar nurseries, the interstellar medium, molecular clouds, and young stellar systems.
2. Physical processes: molecular transitions, heating and cooling, and cloud thermal structure.

3. From clouds to stars: cloud equilibrium and stability, collapse of dense cores, protostars, and multiple star formation.
4. Young stars and their environment: jets and molecular outflows, masers, and effects of massive stars.
5. Pre-main sequence stars: quasi-static contraction, T Tauri stars, and Herbig Ae/Be stars.
6. Star formation on the Galactic scale.

Bibliography

1. **The Formation of Stars**, S. W. Stahler and F. Palla, (John Wiley and Sons). *This is the main textbook for this course.* ***It is strongly recommended that each student procure a copy of this book, as its contents will be closely followed for the material covered in this course.***

2. **Physics and Chemistry of the Interstellar Medium**, S. Kwok, (University Science Books).

3. **The Physics and Chemistry of the Interstellar Medium**, A. G. G. M. Tielens, (Cambridge).

4. **The Interstellar Medium**, J. Lequeux, E. Falgarone, and C. Ryter, (Springer, A&A Library).

5. **From Dust to Stars**, N. S. Shulz, (Praxis).

6. **Astrochemistry**, A. M. Shaw, (Wiley).