

Syllabus and course plan*

PHYS2052: STELLAR PHYSICS, DU

Spring 2010

4 credits, can counts toward your Astronomy or Physics minor.

GOALS: To bring the student to a modern level of understanding about the origin and evolution of stars in the galaxy and the universe, using principle of physics and computation to explore stellar structure and internal/external dynamical changes.

Class meets: Mon & Wed 2-345pm, SpaceSciLab room 323; office hour = 4pm Mon.

Instructor: Prof. Stencel, rstencel@du.edu, 303-871-2135, SSL room 409

Textbook: Carroll & Ostlie, Introduction to Astrophysics, Addison-Wesley 2006 or 1996 ed
Reference books*: Kutner, Astronomy: A Physical Perspective, 2nd ed., Cambridge 2003;
Zeilik & Gregory, Intro. Astron.Astrophys., 4th ed. Saunders 1998; Shu, Intro Astro. etc.

*Available at Penrose Library: QB461.C35; QB801.O885 & QB 400s-800s

PHYS 2052 - STELLAR PHYSICS – SCHEDULE PLAN**

WEEK	TOPIC	READING	HOMEWORK Due, Monday class	PROJECT
1	First stars	Ch.3&5 - Light	--	Orientation
2	Binaries	Ch.7	Prob.Set One	
3	Spectra	Ch.8	Prob.Set 2	Proj. 1 due
4	Atmospheres	Ch.9	Prob.Set 3	
5	Interiors	Ch.10	& Quiz one	
6	The sun	Ch.11	Prob.Set 4	Proj. 2 due
7	Evolution	Ch.13	Prob.Set 5	
8	Pulsation	Ch.14	Prob.Set 6	
9	Remnants	Ch.15	& Quiz 2	Proj. 3 due
10	Close binaries	Ch.17	Prob.Set 7	
Final	Wed Jun. 2 nd			

**Subject to change as conditions require.

Choice of observational or computational projects, described in class.

Guarantee: If you will invest 2-3 hours studying, for each hour in class, you can master this subject!

Grading will be based on combination of attendance, participation, problem sets, quizzes and final exam. Scale and breakpoints nominally are:

A-/B+ @90%, B-/C+ @80%, C-/D+ @70% etc.

Grades will be posted/updated at Blackboard6.du.edu

Late papers lose 10% of max value per day overdue.

Honor code in effect, see website www.du.edu/honorcode

Please turn off your cell phone during class.

Over...

PROJECT OPTIONS: OBSERVATIONAL OR COMPUTATIONAL ASTROPHYSICS

COMPUTATIONAL PROJECTS – appropriate for physics majors, astronomy minors or anyone familiar with programming (C, IDL, fortran, other). Choice of 3 topics includes comet tails, meteor dynamics, 3 body problem, polytropes, stellar models, stellar atmospheres, white dwarf structure and more...

http://www.scholarpedia.org/article/Category:Computational_Astrophysics

Articles in category "Computational Astrophysics" includes: Accretion Discs; Betelgeuse; Computational Astrophysics; Core-collapse Supernova Simulations; Coronal Loops; Eta Carinae; Fast dynamos; Flux Transport Dynamos; Galactic Magnetic Fields; Hydromagnetic Dynamo Theory; MHD Reconnection; Magneto-Convection; Magnetohydrodynamics; Magnetorotational Instability; N-body Simulations; Nonlinear Dynamos; Petersen Diagram for Pulsation Variable Stars; Planetary Nebulae; Quark Stars; Radiative Transfer; Shock Structures; Solar Dynamo; Solar Flare Simulations; Solar Granulation; Starspots; Stellar Atmosphere Models; Stellar Convection Sims; Stellar Wind Models; Stellar dynamos; Supernova Type Ia Simulations; Type Ia Supernovae, etc.

OBSERVATIONAL PROJECTS-

Appropriate for other majors or those interested in discovering the contents of the universe using remote control telescopes:

- A. Go to this link to sign up: <http://portal.tzecmaun.org/student/signup.php>
- B. Join the University of Denver team.
- C. Use this password to access the sign-up page: **pioneer**
- D. Video tutorials: http://www.tzecmaun2.org/video/sky_chart/sky_chart.html

To log in and schedule telescopes: <http://www.tzecmaun2.org/?q=node/170>

[PROJECT TOPICS – see list at:](#)

http://www.du.edu/~rstencil/stn_proj.htm

Additional important planning tool: www.calsky.com