

CSI 661 / ASTR 530
Astrophysics
Syllabus

Spring 2009

Prerequisites: PHYS 303 (Classical Mechanics), PHYS 305 (Electromagnetic Theory), PHYS 308 (Modern Physics with Applications); MATH 214 (Elementary Differential Equations)

Credits: 3

Date: Wednesday

Time: 7:20 PM to 10:00 PM

Place: Innovation Hall 137

Instructors: Jie Zhang

Contact Info: (703)993-1998 (phone), jzhang7@gmu.edu (e-mail)

Office Hour: 3:00 PM to 4:00 PM, Thursday, or by appointment

Office: Room 351, Research Bldg 1

Description: The general purpose of this course is a survey of contemporary astrophysics. Topics include physical concepts, stellar spectra, Hertzsprung-Russell diagram, stellar atmospheres, stellar structure, interstellar matter, stellar evolution, high-energy phenomena, hydrodynamical processes in astrophysics, accretion disk formation, and shock formation. In this semester, it emphasizes stellar atmosphere, stellar structure and evolution.

Content:

- Basic Physical Principles
- Overview of Stellar Evolution
- Equation of State
- Radiative Heat Transfer
- Conductive Heat Transfer
- Convective Heat Transfer
- Stellar Energy Sources
- Stellar Modelling
- Overview of Stellar Atmosphere
- Continuous and Line Absorption Coefficient
- Model Photosphere

Homework: There will be 6 – 8 small assignments.

Project: There will be two projects. One is on the modeling of stellar structure, and the other is on the stellar atmosphere.

Exams: There will be one midterm and one final exam.

Grades: Homework (25%), Project (25%), Midterm (20%), Final Exam (30%)

Class URL: http://solar.gmu.edu/teaching/2008_CSI661/

Text Book (required): "Physical Principles, Structure and Evolution". by C.J. Hansen, S.D. Kawaler and V. Trimble, 2nd edition, Springer-Verlag 2004.

Supplemental Text Books:

1. "Stellar Atmosphere: The Observation and Analysis of Stellar Photospheres". By David F. Gray. Third Edition, Cambridge Press 2005