Introduction to Astronomy
A113

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Class meets
MWF 3:00 to 3:50
Thaw 102

Office Hours
Monday 11:00 - 12:00pm
Friday 11:00 - 12:00pm
(or by appointment)
• **Goals of the Course:**
  – To understand what makes the Universe so ordered.
  – To learn about how stars and galaxies form, age and die.
  – To learn about the expanding Universe and its fate.
  – Most of all to have fun - astronomy is uncovering new discoveries all the time.

• **Text Book:**
  – **UNIVERSE (5th Edition)**
    • by Kaufmann and Freedman (W. H. Freeman and Company)
  – **Other Useful textbooks**
    • Astronomy -- The Cosmic Perspective by M. Zelik and J Gaustad
    • Exploration of the Universe by Abell, Morrison and Wolf
    • Explorations: An Introduction to Astronomy by T. T. Arny (A0089 text)
    • Astronomy: From the Earth to the Universe by J.M. Paschoff (A0089 text)
• **Course Description**
  – A self contained course designed to introduce students to the basics of astrophysics. Course has a high descriptive content extensive use of math and geometry. Minimal calculus is required.

  Allergic to math? You may prefer A089 (much more descriptive).

• **Major topics:**
  – **Fundamentals of Astronomy**
    • Positions and motions of stars, the moon and the planets on the sky.
  – **Birth and Evolution of Stars**
    • Formation of stars and black holes
  – **Galaxies and Cosmology**
    • How the Universe evolved and what is its ultimate fate.

• **Research Opportunities**
  – New discoveries can be made by you
• **Assigned Reading:**
  – A: Introduction, Chapters 1 -- 7
  – B: Chapters 18 -- 24
  – C: Chapters 25 --29

• **NB:**
  – 1. Chapters 8-17 (which deal with the solar system in detail) will not be covered in the course (or examined).

• **Study Technique:**
  – Read Chapter BEFORE lesson.
  – Note taking in class.
  – Copies of the transparencies will be given out at the end of each Chapter.
  – Review the core ideas at the end of each chapter - revise notes.
  – Do the review and advanced questions (exams will be similar to these)

• **Overheads will be on the web**
  http://www.phyast.pitt.edu/~ajc/teaching/a113.html
Exam Policy

• Students MUST bring their ID cards to exams.

• Two exams will be given.
  – 75% of the grade will be based on the exams.
  – All exams are compulsory
    • If an exam cannot be taken I must be told prior to the exam.
    • If a valid excuse (given in writing) is made arrangements will be made to give an exam on an alternate day (if possible).

• First exam (Mid term)
  – will cover the first half of the course.
  – will count for 25% of the grade.

• Second exam (Final)
  – will cover all the course but will focus on the second half.
  – will count for 50% of the grade.
Exam Questions

- Exam questions will vary in style, and may consist of
  - 1. Short questions examining key ideas, concepts, and definitions.
  - 2. Essay questions: These may be short (for example, an explanation of a scientific term) or may require a detailed discussion of some astronomical theme.
  - 3. Mathematical problems requiring formulation of the problem, and its solution. With these problems the working must be shown to gain credit.

- I will confirm the examinable material the week before the exam.
Homework

• **Regular assignments**
  - Every 2 weeks.
  - They are due back the following week.
  - For every day late 14% of the grade will be deducted.

• **Homework: a learning experience**
  - It helps you and I gauge how you are doing with the classes.
  - Don't copy someone else’s work. If you have a problem come and see me.
  - **No** marks will be deducted for discussing the problem with me.
  - Points will be deducted for untidy work.

• **Exam questions will be similar to homeworks**
  - It is important that you understand the problems and not just the answers.

• **Show how you came to an answer**
  - Don't just write the answer show the workings (workings must be shown for credit to be given).
  - Write you answers in pen.
• **Grading Summary**
  
  – **Exam 1:** 25%
  – **Final Exam:** 50%
  – **Homework:** 25%

• **Holidays**
  
  – **Monday Sep 6 -- Labor day**
  – **Nov 24-Nov 28 (Wed-Sun) -- Thanksgiving holiday**
Section A (Chapters 1 -- 7)

• **Introduction [Ch. 1]**

• **Knowing the Heavens [Ch 2]**

• **Eclipses and Motion of the Moon [Ch 3.]**

• **Gravity and Motions of Planets[Ch.4]**
• **The Nature of Light and Matter [Ch. 5]**

• **Optics and Telescopes [Ch 6]**

• **Our Solar System [Ch. 7] (not covered in class)**
  – Private reading (& homework)
  – Types of planets (Terrestrial and Jovian). Basic properties (order from Sun, relative sizes, densities, composition). Formation of solar system.
Section B: (Chapters 18 -- 24)

• **Our Star - The Sun [Ch. 18]**

• **Nature of Stars [Ch. 19]**

• **Birth of Stars [Ch. 20]**
• **After The Main Sequence [Ch. 21]**

• **The Death of Stars [Ch. 22]**

• **Neutron Stars [Ch. 23]**

• **Black Holes [Ch. 24]**
Section C: ( Chapters 25-29):

• Our Galaxy [Ch. 25]

• Galaxies [Ch. 26]

• Quasers and Active Galaxies [Ch. 27]
  – Quasars, Seyfert and Radio galaxies. Discovery, properties, and models. Massive black holes.
• **Cosmology: The Creation and Fate of the Universe [Ch 28]**
  - Evidence for expanding Universe.
    Cosmological principle. Olber’s paradox.
  - Microwave background -- its origin.
  - Cosmological models (Steady State, Big Bang). Geometry of Universe. Dark matter.

• **Exploring the Early Universe [Ch 29]**
    Galaxy formation. Unification of the fundamental forces. Cosmic strings and other oddities.

The above is a guide only: