(AST 462) Physics of Astrophysics 2: Astrophysical Fluid and Plasma Dynamics

Professor: Eric Blackman, B&L 417A, 5-0537

Texts: F. Shu, Gas Dynamics, A. Choudhuri, Physics of Fluids and Plasmas

Course work:

1. Study notes/text
2. Several Problem Sets
3. Class Discussions

Topics Selected From the Following (time permitting):

Single Fluid Hydrodynamics

Distinguishing Kinetic Theory from Fluid Mechanics

Basics of Fluid Mechanics

Transport Theory

Self-Gravitating Fluid Masses

Inviscid Flows

Fluid Instabilities

Hydrodynamic Turbulence

Mixing Length Theory of Convection

Magnetohydrodynamics, Plasmas and Related Phenomena

Basic MHD

Accretion

Magnetorotational Instability

MHD Turbulence

Magnetic Dynamos

MHD shocks

Basics of Plasmas

Magnetic Reconnection

Landau Damping

Waves and Shocks

Spiral Density Waves

Waves and Shocks

Blast waves and Supernovae

Gravitational Collapse and Star Formation

MHD Shocks

Raditative Shocks

Ionization Fronts

Paricle Acceleration