

# Astronomy 202: Astrophysical Fluid Dynamics

Spring 2011

11:00 am -12:30 pm Tuesday, Thursday  
501 Campbell

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Office Hours: 1-2 pm Thursday, or by appointment

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Text (required): *Principles of Astrophysical Fluid Dynamics*, Clarke & Carswell (Cambridge, 2007)

Supplemental Texts (on one-day reserve in Physics & Astronomy Library, 351 LeConte)

*Astrophysical Flows*, Pringle & King

*Physical Fluid Dynamics*, Tritton

*Album of Fluid Motion*, Van Dyke

*Fluid Dynamics*, Landau & Lifshitz

Lecture	Date	Topic	Reading: Chapter
1	1/18	Overview	1
2	1/20	Mass and Momentum Conservation	2
3	1/25	Virial Theorem	3
4	1/27	Isothermal vs Adiabatic Changes	4
5	2/1	Waves in Fluids	6
6	2/3	Hydrostatic Equilibrium: Atmospheres	5
7	2/8	Hydrostatic Equilibrium: Clouds	
8	2/10	Bernoulli's Theorem	9
9	2/15	Viscous Flows	11
10	2/17	Insights from Kinetic Theory	
11	2/22	Drag	

12	2/24	Shocks	7
13	3/1	Vorticity	
14	3/3	Shear and Buoyancy Instability	10
15	3/8	Thermal Instability and Convection	
16	3/10	Gravity Waves	
17	3/15	Gravitational Instability	
18	3/17	Spiral Density Waves	
	3/22	<b>Spring Break</b>	
	3/24	<b>Spring Break</b>	
19	3/29	Turbulence: Theory	
20	3/31	Turbulence: Observations	
21	4/5	Accretion Flows	
22	4/7	Viscous Disks	12
23	4/12	Hydrodynamic Winds	
24	4/14	Blast Waves	8
25	4/19	Ideal MHD	13
26	4/21	Magnetostatic Equilibria	
27	4/26	MHD Waves	
28	4/28	Magnetic Instabilities and Shocks	
29	5/3	Hydromagnetic Winds	
30	5/5	Ambipolar Diffusion	