Astronomy 301 Course Syllabus
Spring Term 2001

Section	Contents	Number of Lectures	Chapters in Textbook
I.	Introduction	Total of 2	
	A) Course Organization	1	1, 2
	a) description of the course		
	b) course requirements		
	c) math review		
	B) Contents of the Universe	1	1, 2
	a) overview of astronomy		
	b) distance scale of the universe		
II.	Planetary Motion and Gravity	Total of 3	
	A) Overview of the Solar System	1	3
	a) contents of the solar system		
	b) motions of the planets		
	B) Kepler's Laws of Planetary Motion	1	3
	C) Newton's Law of Gravity	1	3
	a) force, acceleration, inertia		
	b) Newton's Law of Gravity		
	c) orbital motion		
	d) Kepler's third law revised		
III.	The Solar System	Total of 4	
	A) The Earth	1	5
	a) interior of the Earth		
	b) tectonic activity		
	c) age of the Earth		
	B) The Inner Planets	1	6
	a) Mars		
	b) properties of the terrestrial planets		
	C) The Outer Planets	1	7
	a) Jupiter		
	b) properties of the Jovian planets		
	D) Comets, Meteors, Asteroids	1	8
	EXAM NUMBER 1	1	

Section	Contents	Number of Lectures	Chapters in Textbook
IV.	The Properties of Stars	Total of 9	
	A) The Distances of Stars	1	12
	a) annual parallax		
	b) other ways to measure distance		
	c) the nearest stars		
	d) brightness and luminosity		
	B) The Nature of Light	2	4, 10
	a) the wave nature of light		
	b) speed, wavelength, frequency		
	c) temperature and black body radiation		
	d) The temperatures of stars		
	C) The Hertzsprung-Russell Diagram	1	12
	a) the H-R diagram		
	b) numbers, radii, density of stars		
	D) The Chemical Composition of Stars	3	12
	a) the nature of atoms		
	b) the particle nature of light		
	c) Kirchhoff's laws		
	d) the spectra of stars		
	e) the composition of stars		
	E) The Masses of Stars	1	12, 14
	a) binary and multiple stars		
	b) the Doppler shift		
	c) spectroscopic and eclipsing binaries		
	c) the masses of stars		
	F) Variable Stars	1	12
	a) eclipsing and spotted stars		
	b) pulsating variables		
	c) supernovae		
	EXAM NUMBER 2	1	

Section	Contents	Number of Lectures	Chapters in Textbook
V.	The Structure and Evolution of Stars	Total of 11	
	A) Physics of Stellar Interiors	2	11
	a) nuclear energy; fusion		
	b) temperature		
	c) normal and degeneracy pressure		
	B) The Structure of Main-Sequence Stars	2	11
	a) gravity and pressure balance		
	b) energy and energy flow		
	c) the structure of the sun – a typical main-sequence star		
	C) Interstellar Matter and Star Formation	1	13
	a) interstellar gas and dust		
	b) star formation		
	c) open clusters and associations		
	D) Origin of the Solar System	1	9
	a) origin and evolution of the solar system		
	b) search for other solar systems		
	E) Evolution up to the AGB	2	13, 14
	b) main-sequence evolution		
	c) evolution up the Giant Branch		
	a) the H-R diagram of clusters		
	b) Open and Globular clusters		
	c) cluster ages		
	d) cluster distances		
	F) The Old Age and Death of Stars	3	13
	a) low mass stars; white dwarfs		
	b) stars of intermediate mass; supernovae, neutron stars		
	c) high mass stars; black holes and relativity		
	EXAM NUMBER 3	1	

Section	Contents	Number of Lectures	Chapters in Textbook
VI.	Normal Galaxies	Total of 5	
	A) The Milky Way	1	14
	a) structure and contents: disk, halo, and spiral arms		
	b) rotation and mass of the Galaxy		
	c) history of the Galaxy: age, metallicity, and populations		
	B) Normal Galaxies	2	15
	b) properties of elliptical galaxies		
	c) properties of spiral galaxies		
	d) dwarf and starburst galaxies		
	e) evolution of galaxies		
	C) Galaxies and Their Environment	1	15, 16
	a) collisions and interactions		
	b) clusters and large scale structure		
	c) effect of environment on evolution		
	D) Distances and Hubble's Law	1	16
	a) measurement of distances		
	b) the radial velocity of galaxies		
	c) Hubble's Law and its meaning		
VII.	Violent Galaxies and Cosmology	Total of 5	
	A) QSOs and Active Galactic Nuclei	2	16
	a) distance and luminosity of QSOs		
	b) jets and radio lobes		
	c) spectra of QSOs		
	d) active galactic nuclei and host galaxies		
	e) structure and evolution of QSOs		
	B) Cosmology	3	17
	a) principles of cosmology		
	b) the expansion of the universe		
	c) the age of the universe		
	d) the Big Bang model: the cosmic microwave background and primordial chemical composition		
	e) the geometry of the universe		
	f) the future of the universe		
VIII.	Utility Lecture	1	None
	EXAM NUMBER 4	1	
	Total Number of Classes	44	