

ASTRONOMY 309N
Cosmic Catastrophes

Schedule

- Lecture 1 – Discussion of Syllabus
- Lecture 2 – The Universe is a strange place
- Lecture 3 – Red giants, white dwarfs, supernovae
- Lecture 4 – Historical supernovae
- Lecture 5 – Extragalactic supernovae, common elements forged in stars
- Lecture 6 – Categories of supernovae
- Lecture 7 – Categories of supernovae (continued)
- Exam 1**
- Lecture 8 – Gravity, thermal and quantum pressure
- Lecture 9 – Evolution of massive stars
- Lecture 10 – Evolution of massive stars, iron cores
- Lecture 11 – Collapse of iron cores of massive stars, neutrinos
- Lecture 12 – Formation of neutron stars, jets
- Lecture 13 – Formation of jets (continued)
- Lecture 14 – Physics of exploding white dwarfs
- Lecture 15 – Physics of exploding white dwarfs (continued)
- Exam 2**
- Lecture 16 – Evolution of stars in binary systems
- Lecture 17 – Accretion disks, cataclysmic variables
- Lecture 18 – Binary white dwarfs, gravitational radiation, light curves
- Lecture 19 – What makes supernovae shine? Radioactive decay
- Lecture 20 – SN 1987A
- Lecture 21 – SN 1987A (continued)
- Exam 3**
- Lecture 23 – Neutron stars in binary systems, soft gamma-ray repeaters
- Lecture 24 – Black holes, history, Newton versus Einstein, geometry
- Lecture 25 – Curved space and gravity
- Lecture 26 – Basic properties of black holes: event horizon and singularity
- Lecture 27 – Black holes and time
- Exam 4**
- Lecture 28 – Non-rotating, rotating black holes
- Lecture 29 – Quantum gravity, Hawking radiation, fundamental properties
- Lecture 30 – Observations of stellar-mass black holes
- Lecture 31 – Supermassive black holes
- Lecture 32 – Gamma-rays bursts and supernovae
- Lecture 33 – Dark ages, dark matter, the expanding Universe
- Lecture 34 – Supernovae and the Universe, the accelerating Universe, dark energy
- Lecture 35 – Dark energy, quantum gravity, worm holes
- Lecture 36 – Multiple dimensions, string theory
- Lecture 37 – String theory, large extra dimensions, branes
- Lecture 38 – String theory, brane worlds, string landscape, holographic universe
- Exam 5**