

ASTR 1023 Lecture Topics

These are the headings of the paragraphs into which ASTR 1023 lectures are divided. Use them to check your notes for completeness, and to see how the course is organized. It is also a good idea to cross-check these topics with your reading assignments, because some topics are not in the textbook.

Lecture 1

Basic Units / Sizes of Astronomical Objects / Characteristic Speeds / Nature of Science

Lecture 2

University Science / Pseudoscience / Religion / Astrology / UFOs

Lecture 3

The Terrestrial Globe / Apparent Magnitudes / Metric System and Powers of Ten / Practice with Big Numbers / Percentages / Law of 72

Lecture 4

The Celestial Sphere / Altazimuth Coordinates / Equatorial Coordinates / The Fanciful, Earliest Universes / The Geometric Greek Universes / Stagnation in Europe During the Dark Ages / The Heliocentric Revival in Europe / Our Milky Way as the Universe / Our Milky Way as One of Many

Lecture 5

Aristotle's Physics: Wrong! / Galileo Galilei / Sir Isaac Newton / Newton and Orbits / Special Relativity

Lecture 6

Consequences of Special Relativity / General Relativity / Consequences of General Relativity

Lecture 7

Tests of Special Relativity / Tests of General Relativity / Electromagnetic (EM) Radiation

Lecture 8

Optical Telescopes / Telescope Properties / Binoculars / Naked-eye Observing

Lecture 9

UV, Optical, and IR Instruments / Radio Telescopes / Radio Interferometers / Flying Telescopes / Atoms and Light / Continuous Spectra

Lecture 10

Line Spectra

Lecture 11

Spectra in Stellar & Galactic Astronomy / The Sun in General / The Layered Solar Atmosphere

Lecture 12

The Solar Wind / Solar Activity / Distances to Nearby Stars / Stellar Velocities in the Milky Way / Stellar Proper Motions

Lecture 13

Luminosity / Observed (Apparent) Brightness of Stars / Apparent Magnitudes of Stars / Absolute Magnitudes / Determination of Stellar Radii / Classification of Stellar Spectra

Lecture 14

The Hertzsprung-Russell Diagram / Finding Stellar Distances via Spectroscopic "Parallax" / Stellar Populations / Visual Binaries / Stellar Mass Determination

Lecture 15

Spectroscopic Binaries / Eclipsing Binaries / Stellar Mass Patterns / Stellar Density Patterns / Constituents of the Interstellar Medium

Lecture 16

The ISM's Interactions with Light / Stars and Nebulae / Star Formation

Lecture 17

Energy Production in Normal Stars / The Proton-Proton Chain / Energy Flow from Stellar Core to Surface / Hydrostatic Equilibrium / Main Stellar Evolution Phases / Main-Sequence Star Characteristics

Lecture 18

Giant Phase Phenomena / Testing of Predictions / Birth Mass Determines Stellar Evolution / Degeneracy / White Dwarfs / MS Stars Lighter Than the Sun / MS Stars Similar to the Sun

Lecture 19

MS Stars Somewhat Heavier Than the Sun / MS Stars Much Heavier Than the Sun / Supernova Remnants

Lecture 20

Novae and Supernovae in Binary Star Systems / Neutron Stars / Pulsars / Binary Pulsars

Lecture 21

Escape Velocity / Schwarzschild Black Holes / Characteristics of the Milky Way Galaxy / The MWG's Disk

Lecture 22

The MWG's Halo / The MWG's Nuclear Bulge / Chemical Composition Patterns in the MWG / Galaxy Types / Galaxy Properties / Galactic Distance Measurement

Lecture 23

Galactic Distance Measurement (cont.) / Galactic Size Measurement / Galactic Mass Measurement / Clusters of Galaxies / Superclusters, Walls, and Voids / Collisions of Galaxies

Lecture 24

Galaxy Formation Hypotheses

Lecture 25

Characteristics of Active Galaxies / Main Types of Active Galaxies / Extreme Conditions in AGNs / What is an AGN?

Lecture 26

Review of Kinematic Redshifts / Cosmological Redshift-Distance Relationship / Discovery of Quasars / Quasar Puzzles / The Quasar-Galaxy Connection / Quasars Described / Selected Ancient Creation Stories

Lecture 27

Fundamental Cosmological Questions and Assumptions / Observational Basis of Cosmology / Big Bang Cosmology: Best-Understood Aspects / Allowed Shapes for the Universe

Lecture 28

Ages of the Universe / Dimensions of the Universe / The Very Early Universe: Many Questions / Allowed Futures of the Universe / Observational Results / Is This True?

Lecture 29

Why Seek Life Beyond the Solar System? / Planetary Requirements for Life / The Drake Equation / The Search for Extraterrestrial Intelligence

Lecture 30

Interstellar Space Probes / Human Travel to the Stars / Plausible Starship Engine Technologies