AST1002 Glossary

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Ch 2: OBSERVING THE SKY: THE BIRTH OF ASTRONOMY

accelerate: to change velocity; to speed up, slow down, or change direction.

Apparent Magnitude: apparent magnitude a measure of how bright a star looks in the sky; the larger the number, the dimmer the star appears to us

Astrology: the pseudoscience that deals with the supposed influences on human destiny of the configurations and locations in the sky of the Sun, Moon, and planets

celestial equator: a great circle on the celestial sphere 90° from the celestial poles; where the celestial sphere intersects the plane of Earth's equator

celestial poles: a great circle on the celestial sphere 90° from the celestial poles; where the celestial sphere with Earth's polar axis

celestial sphere: the apparent sphere of the sky; a sphere of large radius centered on the observer; directions of objects in the sky can be denoted by their position on the celestial sphere

circumpolar zone: those portions of the celestial sphere near the celestial poles that are either always above or always below the horizon

cosmology: the study of the organization and evolution of the universe

ecliptic : the apparent annual path of the Sun on the celestial sphere

epicycle: the circular orbit of a body in the Ptolemaic system, the center of which revolves about another circle (the deferent)

geocentric: centered on Earth

heliocentric: centered on the Sun

horizon (astronomical) : a great circle on the celestial sphere 90° from the zenith; more popularly, the circle around us where the dome of the sky meets Earth

horoscope: a chart used by astrologers that shows the positions along the zodiac and in the sky of the Sun, planets at some given instant and as seen from a particular place on Earth—usually corresponding to the time and place of a person's birth

parallax: the apparent displacement of a nearby star that results from the motion of Earth around the Sun

planet: today, any of the larger objects revolving about the Sun or any similar objects that orbit other stars; in ancient times, any object that moved regularly among the fixed stars

precession (of Earth): the slow, conical motion of Earth's axis of rotation caused principally by the gravitational pull of the Moon and Sun on Earth's equatorial bulge

retrograde motion: the apparent westward motion of a planet on the celestial sphere or with respect to the stars

year: the period of revolution of Earth around the Sun

zenith: the point on the celestial sphere opposite the direction of gravity; point directly above the observer

zodiac: a belt around the sky about 18° wide centered on the ecliptic

Ch 3: ORBITS AND GRAVITY

angular momentum: the measure of the motion of a rotating object in terms of its speed and how widely the object's mass is distributed around its axis

aphelion: the point in its orbit where a planet (or other orbiting object) is farthest from the Sun

apogee : the point in its orbit where an Earth satellite is farthest from Earth

asteroid belt: the region of the solar system between the orbits of Mars and Jupiter in which most asteroids are located; the main belt, where the orbits are generally the most stable, extends from 2.2 to 3.3 AU from the Sun

astronomical unit (AU): the unit of length defined as the average distance between Earth and the Sun; this distance is about $1.5*10^8$ kilometers

density: the ratio of the mass of an object to its volume

eccentricity: in an ellipse, the ratio of the distance between the foci to the major axis

ellipse: a closed curve for which the sum of the distances from any point on the ellipse to two points inside (called the foci) is always the same

escape speed: the speed a body must achieve to break away from the gravity of another body

focus: (plural: foci) one of two fixed points inside an ellipse from which the sum of the distances to any point on the ellipse is constant

gravity: the mutual attraction of material bodies or particles

Kepler's first law: each planet moves around the Sun in an orbit that is an ellipse, with the Sun at one focus of the ellipse

Kepler's second law: the straight line joining a planet and the Sun sweeps out equal areas in space in equal intervals of time

Kepler's third law: the square of a planet's orbital period is directly proportional to the cube of the semimajor axis of its orbit

major axis: the maximum diameter of an ellipse

momentum: the measure of the amount of motion of a body; the momentum of a body is the product of its mass and velocity; in the absence of an unbalanced force, momentum is conserved

Newton's first law: every object will continue to be in a state of rest or move at a constant speed in a straight line unless it is compelled to change by an outside force

Newton's second law: the change of motion of a body is proportional to and in the direction of the force acting on it

Newton's third law: for every action there is an equal and opposite reaction (or:the mutual actions of two bodies upon each other are always equal and act in opposite directions)

orbit: the path of an object that is in revolution about another object or point

orbital period (P): the time it takes an object to travel once around the Sun

orbital speed: the speed at which an object (usually a planet) orbits around the mass of another object; in the case of a planet, the speed at which each planet moves along its ellipse

perigee: the point in its orbit where an Earth satellite is closest to Earth

perihelion: the point in its orbit where a planet (or other orbiting object) is nearest to the Sun

perturbation: a small disturbing effect on the motion or orbit of a body produced by a third body

satellite: an object that revolves around a planet

semimajor axis: half of the major axis of a conic section, such as an ellipse

velocity: the speed and direction a body is moving—for example, 44 kilometers per second toward the north galactic pole

Ch 4: EARTH, MOON, AND SKY

apparent solar time: time as measured by the position of the Sun in the sky (the time that would be indicated by a sundial)

declination: the angular distance north or south of the celestial equator

great circle: a circle on the surface of a sphere that is the curve of intersection of the sphere with a plane passing through its center

International Date Line: an arbitrary line on the surface of Earth near longitude 180° across which the date changes by one day

lunar eclipse: an eclipse of the Moon, in which the Moon moves into the shadow of Earth; lunar eclipses can occur only at the time of full moon

mean solar time: time based on the rotation of Earth; mean solar time passes at a constant rate, unlike apparent solar time

meridian: a great circle on the terrestrial or celestial sphere that passes through the poles

phases of the Moon: the different appearance of light and dark on the Moon as seen from Earth during its monthly cycle, from new moon to full moon and back to new moon

right ascension: the coordinate for measuring the east-west positions of celestial bodies; the angle measured eastward along the celestial equator from the vernal equinox to the hour circle passing through a body

sidereal day: Earth's rotation period as defined by the positions of the stars in the sky; the time between successive passages of the same star through the meridian

sidereal month: the period of the Moon's revolution about Earth measured with respect to the stars

solar day: Earth's rotation period as defined by the position of the Sun in the sky; the time between successive passages of the Sun through the meridian

solar eclipse: an eclipse of the Sun by the Moon, caused by the passage of the Moon in front of the Sun; solar eclipses can occur only at the time of the new moon

solar month: the time interval in which the phases repeat—say, from full to full phase

synchronous rotation: when a body (for example, the Moon) rotates at the same rate that it revolves around another body

tides: alternate rising and falling of sea level caused by the difference in the strength of the Moon's gravitational pull on different parts of Earth