

# PHYS1160 NOTES

## MODULE 1

### Introduction to Astronomy:

- Scientific study of **celestial objects** i.e. planets, the universe or galaxies – everything outside the world's atmosphere
- **Astrology** – idea that positions of celestial bodies provide information on human affairs/personalities i.e. not a science
- **Astrophysics** – bulk of astronomy is now astrophysics
- **Astrobiology** – study of origin of evolution/distribution of universal life
- **Astrometry** – measuring positions of celestial bodies

### History of Astronomy:

- One of the oldest sciences going back to the ancient civilisations of **Mesopotamia**
- Developed firm form of writing, the cuneiform before 3000BC and the practice of dividing the circle in 360 and degree into 60 minutes
- Ancient cultures leaving structures with astronomical alignments (observatories, religious/ceremonial) e.g. Stonehenge
- **Philosophers of Ancient Greece developed ideas about universal structure that would be accepted for two millennia** e.g. Pythagoras and the round Earth (500BC)

### Geocentric model:

- **Earth in the centre of a number of geocentric circles carrying the planets** (Eudoxus)
- Outer circle carried fixed stars

### Circles on circles:

- Greek philosophers believed motions of planets must be circle (**considered the perfect figure by Plato**).
- Accepted a **retrograde or backwards motion** to the planets - complex system of spheres on spheres

### Ptolemaic system:

- Claudius Ptolemy (100-170 AD) developed a treatise on astronomy the Almagest
- Included a **star catalogue** based on the earlier work of Hipparchus
- Modelling planetary motions for predicting the position of the Sun, Moon and planets

### Copernican system:

- **Challenge to the system** in 1543 by Polish astronomer Nicolaus Copernicus in his book On the Revolutions of Celestial Spheres
- **Heliocentric System with the Sun at the centre of circular motions**

### Kepler's Laws:

- Johannes Kepler (1571-1630) providing the final solution to the problem of planetary motions
- Orbits of planets were **ellipses** not circles

Much simpler than Ptolemy/Copernicus