

# Planetary Mechanics

## Kepler's Law

1. elliptical orbits
2. Sweep equal areas in equal times.
3.  $K = \frac{r^3}{T^2}$  (unique for a central body)  
 $K_{\text{sun}} = 3,35 \times 10^{18} \frac{\text{m}^3}{\text{s}^2}$

## Newton's Law of Universal Gravitation

$$F_g = \frac{G m_1 m_2}{r^2} \quad \left( \text{like } F_g = m g \right)$$

## Newton's Hypothesis:

$$F_g = F_c$$

$$\frac{G m_1 m_2}{r^2} = m_2 a_c$$

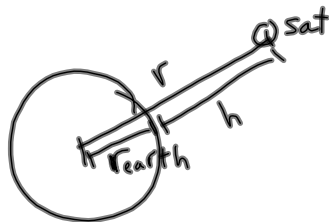
$m_2$  is the orbiting object

where

$$a_c = \frac{v^2}{r} = \frac{4\pi^2 r}{T^2}$$

## Geosynchronous / Geostationary

$$\rightarrow T = 1 \text{ day} = 24 \text{ h}$$



### TO DO:

- ① All PP are done (Chapter 12)
- ② Assignment
- ③ Labs
- ④ Models of Gravity