

## ECO101 Economics

## Lecture 3 Notes

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direction using RHR later. Thus,  $H_o = mrv\sin\phi$

In a polar coordinate system,  $H_o = mrv_\theta$

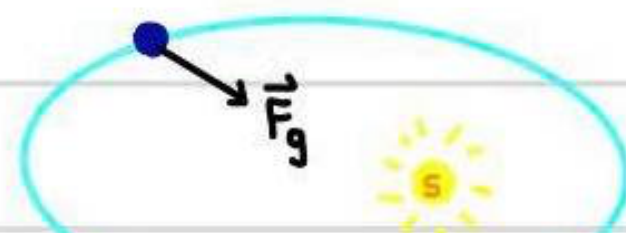
## ANGULAR IMPULSE

$$\frac{d\vec{H}_o}{dt} = \frac{d}{dt}(\vec{r}_o \times m\vec{v}) = \frac{d\vec{r}_o}{dt} \times m\vec{v} + \vec{r}_o \times m\frac{d\vec{v}}{dt} = \cancel{\vec{v} \times m\vec{v}} + \vec{r}_o \times m\vec{a} = \vec{r}_o \times \vec{F} = \vec{M}_o!$$

$$\int_{\vec{H}_{o1}}^{\vec{H}_{o2}} d\vec{H}_o = \int_{t_1}^{t_2} \vec{M}_o dt \Rightarrow \underbrace{\Delta\vec{H}_o}_{\text{change in angular momentum}} = \underbrace{\int_{t_1}^{t_2} \vec{M}_o dt}_{\text{angular impulse}}$$

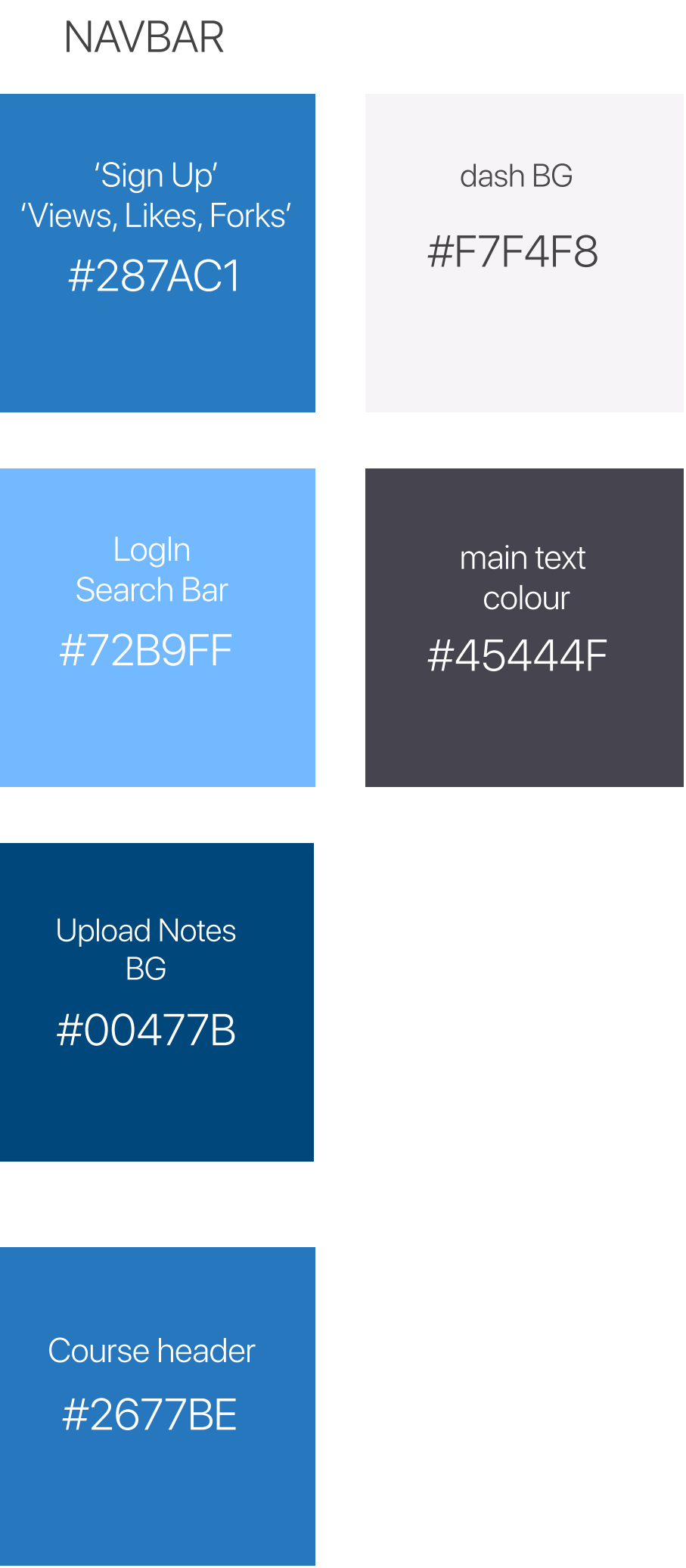
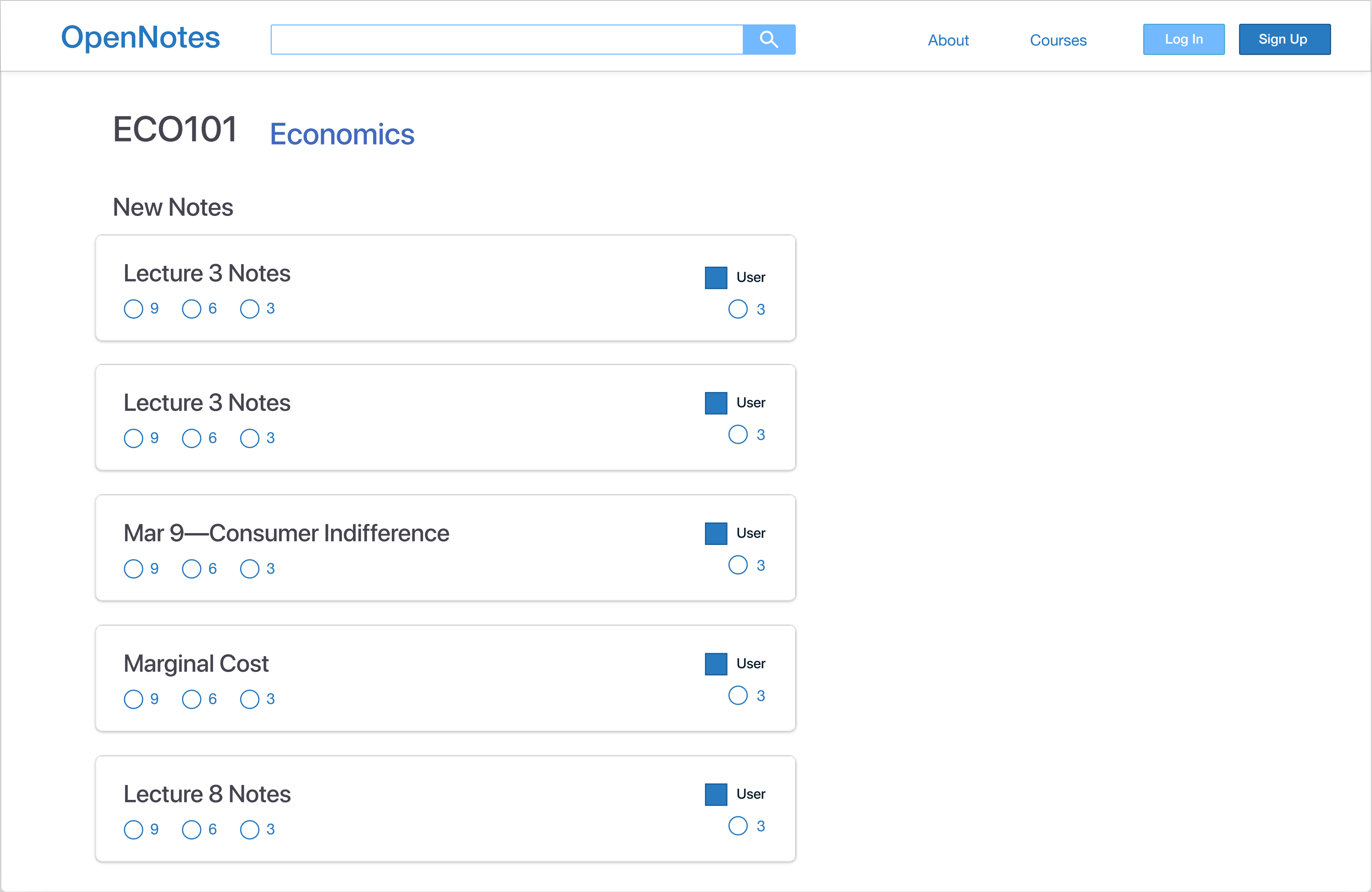
change in angular momentum = angular impulse

**EXAMPLE:** As a planet orbits a star...



Central Force acts radially inward  $\rightarrow$  no moment.

$$\sum \vec{M}_s = \vec{r}_c \times \vec{L} = 0 \Rightarrow \vec{H}_o \text{ is conserved} \Rightarrow m_e r v_\theta$$



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