ECO101 Economics

Lecture 3 Notes

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

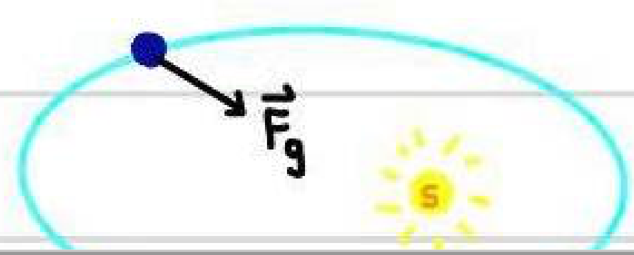
· In a polar coordinate system, $H_o = mrv_\theta$

ANGULAR IMPULSE

$$\cdot\ \frac{d\vec{H}_o}{dt} = \frac{d}{dt}(\vec{r}_o \times m\vec{v}) = \frac{d\vec{r}_o}{dt} \times m\vec{v} + \vec{r}_o \times m\frac{d\vec{v}}{dt} = \cancelto{0}{\vec{v} \times m\vec{v}} + \vec{r}_o \times m\vec{a} = \vec{r}_o \times \vec{F} = \vec{M}_o!$$

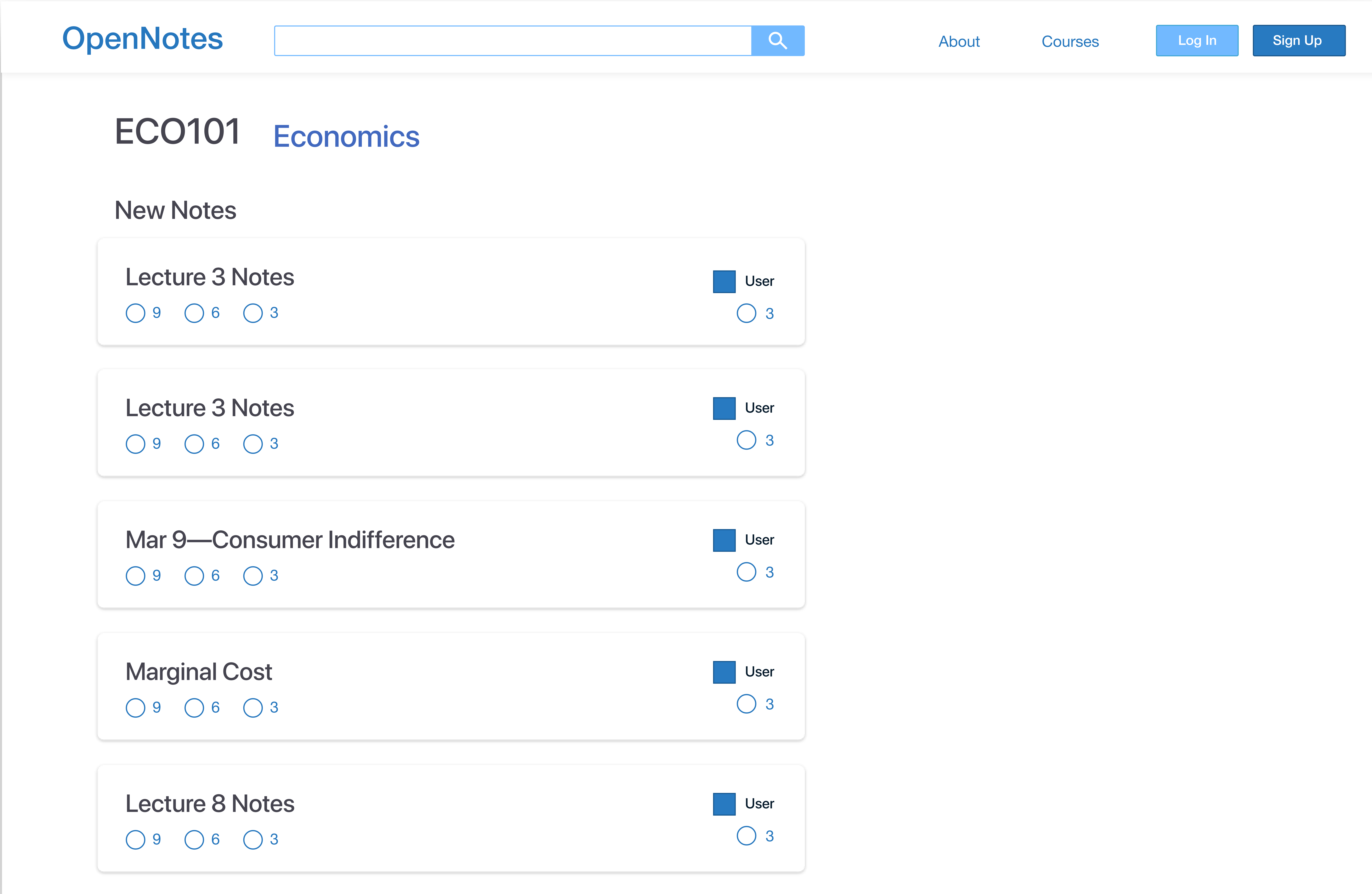
$$\int_{\vec{H}_{o1}}^{\vec{H}_{o2}} d\vec{H}_o = \int_{t_1}^{t_2} \vec{M}_o\, dt \Rightarrow \underbrace{\Delta\vec{H}_o}_{\text{change in angular momentum}} = \underbrace{\int_{t_1}^{t_2} \vec{M}_o\, dt}_{\text{angular impulse}}$$

EXAMPLE: As a planet orbits a star...



Central Force acts radially inward → no moment.

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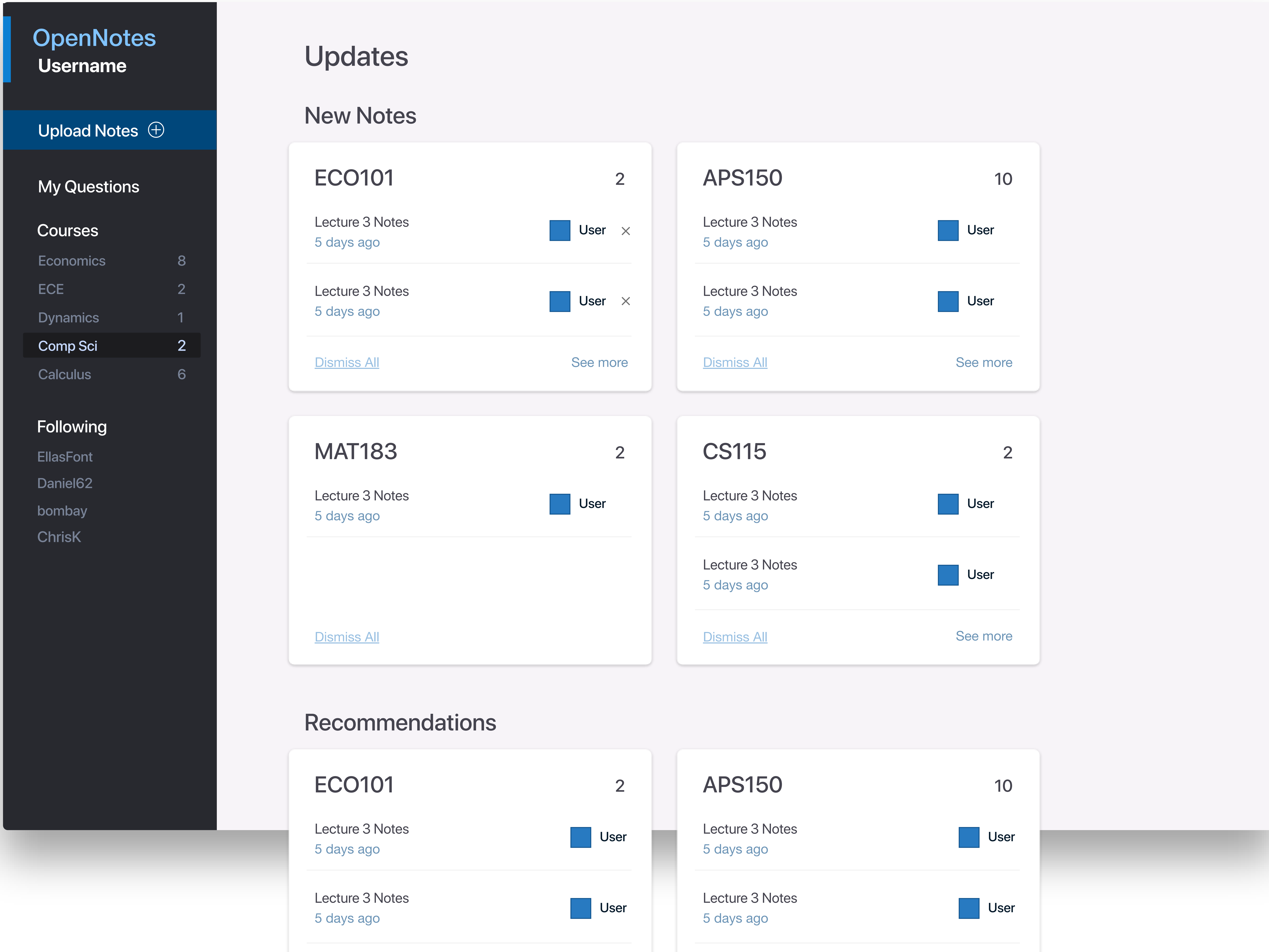

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