## Introduction



ASEN 3728 Aircraft Dynamics
UNIVERSITY OF COLORADO BOULDER



# Outline

What is A/C Dynamics About?
Course Logistics
Nomenclature

\* All lecture topic recordings will begin with an outline slide to aid in searching for material



### Aircraft Dynamics

Newton's Laws

(ASEN 2703)

Inertial Reference Frame

+ Aerodynamics

(ASEN 2702, ASEN 3711)

Body Reference Frame

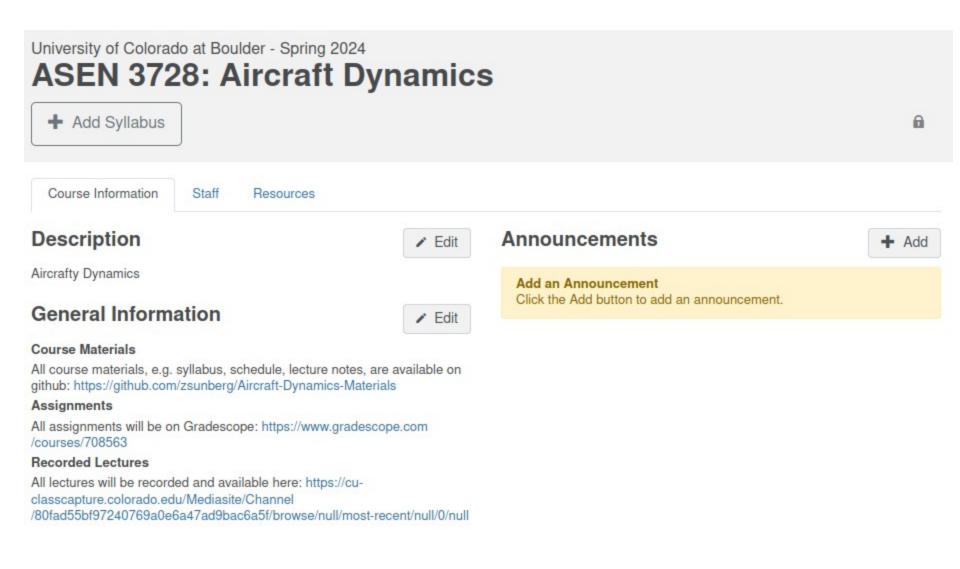
Aircraft Dynamics (ASEN 3728)



Nonlinear Equations of Motion



#### Course Hub: Piazza





## My Assumptions

The material is challenging, and can take multiple engagements to understand fully A student who comes to my office or asks a question wants to learn

It may take multiple ways of explaining a concept before a student understands

We must work together to belo you find the

We must work together to help you find the way to understand

Taking notes in class and doing the homework yourselves are critical steps to understanding

I am trying to bring you to the point of understanding, not just give you the answer We will have fun this semester





#### **Action Items**

- Today: Make sure you can log in to Gradescope – we will use it in class on Tues
- Every Week (including Next Week)
  - <sup>3</sup> Tuesday: Reading Quiz due Midnight (Released Monday)
  - Thursday: Homework due Midnight



#### 3728.O



Once a week I will feature course-related memes and videos from the Internet.

Students should submit links to memes and videos on **topics related to the course** (not about the course).



#### 3728.0



#### 3728.O



# Break



### True or False Question

Expect TRUE/FALSE questions as part of the Homework and Exams. In all cases students are expected to provide a concise, correct, logically sound justification for full credit.

### True or False Question

$$\mathbf{v}_B^E = \left(\begin{array}{c} u^E \\ v^E \\ w^E \end{array}\right) = \left(\begin{array}{c} 25 \\ 0 \\ -4 \end{array}\right)$$

True or False: Given this velocity  $\mathbf{v}_B^E = \left(\begin{array}{c} u^E \\ v^E \\ w^E \end{array}\right) = \left(\begin{array}{c} 20 \\ 0 \\ -4 \end{array}\right) \quad \begin{array}{c} \text{vector } \mathbf{v}_B^E \text{ one can conclude that the aircraft is ascending? Justify your} \\ \text{answer} \end{array}$ answer.

### True or False Question

$$\mathbf{v}_B^E = \left(\begin{array}{c} u^E \\ v^E \\ w^E \end{array}\right) = \left(\begin{array}{c} 25 \\ 0 \\ -4 \end{array}\right)$$

 $\mathbf{v}_B^E = \left( \begin{array}{c} u^E \\ v^E \\ w^E \end{array} \right) = \left( \begin{array}{c} 25 \\ 0 \\ -4 \end{array} \right) \quad \begin{array}{c} \text{True or False: Given this velocity} \\ \text{vector } \mathbf{v}_B^E \text{ one can conclude that the} \\ \text{aircraft is ascending? Justify your} \end{array}$ answer.

The vector  $\mathbf{v}_B^E$  is the inertial velocity expressed in body coordinates. In order to know if the aircraft is ascending you need to know the vector in inertial coordinates. In order to calculate this vector, we need to know the orientation of the aircraft.

