ENGR335

KEY WORDS AND STUDY QUESTIONS FOR CH 4

velocity field	Pitot tube	ideal fluid flow
local acceleration	stagnation point	real fluid flow
convective acceleration	stagnation pressure	separation
	static pressure	separation point
steady flow	Pitot-static tube	boundary layer
uniform flow		wake
constant density flow	Bernoulli equation	bluff body
laminar flow	stream tube	slender body
turbulent flow	contraction	pressure coefficient
	diverging passage	polar plot
flow visualization	venturi	
streaklines	Torricelli's theorem	Euler equation
particle pathlines		negligible friction
streamlines		Solid-body rotation

1. What are the three causes of pressure variation in a flowing fluid? Which one of these is neglected in the Euler equation?

2. The velocity along a straight, horizontal streamline is decreasing. How does pressure vary along the streamline? Assume that friction can be neglected.

3. Give all the assumptions behind the form of Bernoulli's equation as written in equation 4.24 of the text.

4. Make a sketch of the overall features of flow over an airplane wing. Label the stagnation point, the separation points, and the wake. In what regions of the flow can friction be neglected?

5. A steady flow has negative convective acceleration in the x-direction. A line of fluid aligned in the x-direction and of length L is marked with dye. What happens to the length of this fluid as it moves with the flow?

6. Write the partial derivative that represents local acceleration. Describe a flow where there is a non-zero local acceleration.

Exam 1 will be held as scheduled on Friday, September 15. This exam will be an open book, open notes exam. Bring calculator. The exam will cover selected material from class 1 up to and including class 9.