**MAE 303 – Mechanics of Fluids – Chapter 1-Definitions of Some Important Terms**

1. fluid – a material that is initially acted upon by a shear stress and continuously deforms. (must be liquids or gases)
2. solid – a material that is initially acted upon by a shear stress but does NOT continuously deform
3. fluid mechanics – the study of fluids at the forces acting on them and over the contact body region
4. fluid statics – study of fluids at rest
5. fluid dynamics – study of fluids in motion
6. incompressible fluid – constant density fluids
7. compressible fluid – variable density fluids
8. compressible flow – flow where there is a gas at M > 0.3
9. Mach number – ratio of local speed of fluid to local speed of sound
10. speed of sound = √(γ RT) = 343 m/s at standard atmospheric elevation
11. R – ideal gas constant (kJ/kg-K)
12. T – absolute temperature (K)
13. γ – ratio of cp to cv
14. cp – constant pressure specific heat
15. cv – constant volume specific heat
16. specific weight – weight of fluid per unit volume
17. specific gravity – ratio of fluid’s density to density of water
18. subsonic flow – M < 1
19. sonic flow – M = 1
20. transonic flow – 0.8 ≤ M ≤ 1.2
21. supersonic flow – M > 1
22. hypersonic flow – M ≥ 6
23. viscosity – these parameters give a fluid and ability to flow. It also resists its flow
    1. dynamic viscosity – used in Newtonian fluids (N-s/m^2)
    2. kinematic viscosity – used in moving fluids (m^2/s)
24. inviscid fluid – fluids where there are no viscous forces
25. viscous fluid – fluids where there are viscous forces (FRICTION IS IMPORTANT)
26. Newtonian fluid – fluids where the shear stress is linear with velocity gradient
27. non-Newtonian fluid – fluids where shear stress and velocity gradient do not vary linearly
28. steady flow – flow where the fluid **~~parameters~~** **characteristics** do not depend on time
29. unsteady flow – flow where the fluid **~~parameters~~** **characteristics** do depend on time
30. laminar flow – flow where the fluid parameters are steady and the mass diffusion is negligible
31. turbulent flow – flow where the fluid parameters aren’t steady and the mass diffusion is NOT negligible
32. d’Alembert’s Paradox – an experiment where a drag force was found after assuming the no drag inviscous assumption