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

1. fluid – material initially deforms under an applied shear stress and continuously deforms (liquid or gaseous state)
2. solid – material initially deforms under an applied shear stress but does not continuously deform it eventually fails
3. fluid mechanics – the study of fluids and the forces exerted on them and on the boundary layer it contacts
4. fluid statics – the study of fluids at rest
5. fluid dynamics – the study of fluids in motion
6. incompressible fluid – constant density fluids
7. compressible fluid – variable density fluids
8. compressible flow – flow of a gas with M > 0.3
9. Mach number – local speed of fluid/local speed of sound
10. speed of sound = √(γ RT)
11. R – ideal gas constant
12. T – absolute temperature (K or R)
13. γ – ratio of specific heats
14. cp – constant pressure specific heat (h = cp0 T)
15. cv – constant volume specific heat (u = cv0 T)
16. specific weight – weight per unit volume (γ=ρ g)
17. specific gravity – ratio of fluid 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 – fluid characteristics that gives it its ability to flow
    1. dynamic viscosity – (N-s/m^2) used in Newtonian fluids
    2. kinematic viscosity - ν=μ/ρ (m^2/s) used for fluids in motion
24. inviscid fluid – a fluid where there are no viscous forces
25. viscous fluid – fluids where there is a finite value of viscous forces and FRICTION IS IMPORTANT
26. Newtonian fluid – a fluid where the shear stress ∝ velocity gradient
27. non-Newtonian fluid – a fluid where the shear stress is nonlinear with velocity gradient
28. steady flow – flow where the physical characteristics DO NOT depend on time
29. unsteady flow – flow where the physical characteristics DO depend on time
30. laminar flow – flow that shows steady physical parameters and negligible mass diffusion normal to the flow
31. turbulent flow – flow that shows unsteady physical parameters and appreciable mass diffusion normal to the flow
32. d’Alembert’s Paradox – an experiment where there was an inviscous assumption with no drag but there was drag anyways