**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 without failure
2. solid – a material that is initially acted upon by a shear stress, but deforms up to failure, not continuously
3. fluid mechanics – the study of fluids and the forces acting on them while in motion or at rest **(and the forces acting on the contacted body)**.
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** – gas flow with **~~(M < 0.8)~~ M > 0.3**
9. Mach number – ratio of local speed of fluid to local speed of sound
10. speed of sound = √(γ RT)
11. R – ideal gas constant
12. T – absolute temperature
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 density of fluid 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 – certain physical characteristics of the fluid that gives it its ability to flow (resistance to flowing)
    1. dynamic viscosity (μ)- used in Newton Fluids (N-s/m^2) (lbf-s/ft^2)
    2. kinematic viscosity (ν)- ν=μ/ρ used in dynamic fluids (m^2/s) (ft^2/s)
24. inviscid fluid – fluids where the viscous forces are zero
25. viscous fluid – fluids where there are viscous forces **(AND FRICTION IS IMPORTANT)**
26. Newtonian fluid – fluids where the shear stress is linear with velocity gradient
27. non-Newtonian fluid – fluids where the shear stress is non-linear with velocity gradient
28. steady flow – flow where the physical parameters don’t depend on time
29. unsteady flow – flow where the physical parameters depend on time
30. laminar flow – flow that has **~~characteristics of steady flow~~** **steady parameter characteristics** and negligible mass diffusion
31. turbulent flow – flow that has **~~unsteady characteristics~~** **unsteady parameter characteristics, NORMAL TO FLOW OF DIRECTION** and appreciable mass diffusion
32. d’Alembert’s Paradox – an experiment where drag was found after assuming there was no drag.