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

1. fluid – material continuously deforms under applied shear stress
2. solid – material doesn’t continuously deform under applied shear stress
3. fluid mechanics – study of fluids at rest or in motion and the forces acting on them and on the boundary that the fluid 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 – a gas flow at M > 0.30
9. Mach number – local speed of fluid **(flow)**/local speed of sound
10. speed of sound = √(γ RT)
11. R – ideal gas constant 0.287 kJ/kg-K
12. T – absolute temperature in K or **R**
13. γ – ratio of cp/cv
14. cp – constant pressure specific heat (h = cp0(T2-T1))
15. cv – constant volume specific heat (u = cv0(T2-T1))
16. specific weight – weight of fluid per unit volume (N/m^3)
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 –
    1. dynamic viscosity (μ) (N-s/m^2) it is used for Newtonian fluids
    2. kinematic viscosity (ν) ν=μ/ρ it is used for fluids in motion
24. inviscid fluid – fluids where there viscous forces is zero
25. viscous fluid – fluids where there are **(finite)** viscous forces and FRICTION IS IMPORTANT
26. Newtonian fluid – a fluid where the shear stress is linear with the velocity gradient
27. non-Newtonian fluid – a fluid where the shear stress is non-linear with the velocity gradient
28. steady flow – a flow where the physical characteristics do not depend on time
29. unsteady flow – a flow where the physical characteristics depend on time
30. laminar flow – a flow with steady fluid **(physical)** parameters and the mass diffusion normal to the flow is negligible
31. turbulent flow – a flow with unsteady fluid **(physical)** parameters and with appreciable mass diffusion normal to the flow
32. d’Alembert’s Paradox – an experiment where it was assumed that the flow is inviscous and should not be any drag, but drag was found anyways.