MA 559- Aerodynamics of compressible and viscous flows

Course Code:	MA-559
UTAA Credit (Theoretical-Laboratory hours/week):	3(3-0)
ECTS Credit:	6.0
Department:	Mechanical and Aeronautical Engineering
Language of Instruction:	English
Level of Study:	Graduate
Offered Semester:	Fall and Spring Semesters.

Course Objectives

Review of basic thermodynamics, conservation equations, constitutive relations, steady isentropic flow, shock waves, expansion waves, applications of isentropic flow/shocks/expansions. Real gas effects, flow with heat addition or removal, unsteady wave motion, physics of shock waves, methods of characteristics, conical flow, the time-marching technique and its application to blunt body flows, high Mach number flows.

C**ourse Content**

To give the fundamentals of compressible flow

To investigate the variations of fluid properties in high speed flow

To investigate the basic aerodynamic propertios of the bodies in compressible flow

Course Learning Outcomes

1-Can model, simplify, and apply the fundamental equations for compressible flow to find the basic properties of compressible flow

2-Can find the basic aerodynamic properties of the bodies by calculating the subsonic and supersonic flow properties

3-Can make fundamental calculations for supersonic wind tunnels, nozzles and diffusers

4-Can calculate the properties of transonic and hypersonic flow for basic geometries