

Applicability and limitations of one-dimensional models, shock-reflection and shock polars, Analysis of detached shocks and their impact on the flow field, applications of detached shock analysis; Shock-shock interaction and shock-boundary layer interaction, shock-induced separation

Shock-expansion methods for airfoils; design and functioning of supersonic wind tunnel; Incomplete expansion, shock structures in under-expanded and over-expanded jets; Axisymmetric nozzle design using method of characteristics; Heat transfer in high speed flows, Introduction to methods of analysis in conduction, convection and radiation applied to high speed flows

Shock-induced heating, thermal shielding; Introduction to hypersonic aerodynamics, equilibrium and non-equilibrium flows, Variation of transport properties of gases, Viscous interactions, aerothermodynamics of hypersonic re-entry vehicles

**TEXT BOOKS/ REFERENCES:**

1. JD Anderson, "Modern Compressible Flow with Historical Perspective", McGraw Hill, 2012.
2. John J Bertin "Hypersonic Aerothermodynamics", AIAA Education Series, 1994.
3. John David Anderson, "Hypersonic and High Temperature Gas Dynamics", AIAA Education Series, AIAA 2006