

<b>PROFESSOR'S NAME</b>	Prof. Amardip Ghosh
<b>DEPARTMENT</b>	Aerospace Engineering
<b>INSTITUTE</b>	IIT Kharagpur
<b>COURSE OUTLINE</b>	<p>This course is a foundation level course in Aerodynamics. Broadly the content of this course can be divided into two broad topics (1) low speed aerodynamics, (2) high speed aerodynamics. Since Aerodynamics and aerothermodynamics are based on the principles of fluid mechanics and thermodynamics, topics from those two subjects are covered wherever necessary.</p> <p><b>Learning Outcome</b></p> <p><b>Objectives:</b> At the end of the semester, students will have a broad overview of the field of aerodynamics, its theoretical foundations and its modern day applications. Students will have sufficient background for follow up courses such as (a) low speed aerodynamics (b) high speed aerodynamics and (c) hypersonic aerodynamics.</p> <ol style="list-style-type: none"> <li>1) Understand how forces, moments, heat transfer rates on objects are affected by the flow of air.</li> <li>2) Solve problems associated with air flow at various Mach numbers.</li> <li>3) Suggest improvements to commonly used aerodynamic designs</li> <li>4) Think independently to frame problems in aerodynamics</li> <li>5) Prepare for advanced level subjects in aerodynamics</li> </ol> <p><b>Lecture outlines</b></p> <p>Terminology and Scope; Lift, Drag and Moments; Aircraft components and functions; Physics of Drag, Boundary Layer Basics, Skin Friction Drag, Flow Separation Drag; Flow over 2D Wing Vs Flow over Finite Wing, Induced Drag; Compressible Vs Incompressible Flow, Wave Drag, Shock and Oblique Waves; Vorticity, Circulation, Fluid Rotation, Deformation; Conservation equations – Differential form and Integral form;</p> <p>Reynolds Transport Theorem. Lift, Drag and Thrust using Control Volumes; Streamline, Stream function, Velocity Potential; Physics of Lift, Potential Flow Theory, Zhukosky Transformation; Subsonic Compressible Flow; Supersonic Compressible Flow, Compression and rarefaction waves; Oblique and normal shocks; Rarefaction waves; Flow with area change, heat addition and friction; High temperature flows; Hypersonic Flows.</p>

<b>COURSE DETAILS</b>			
<b>S. No</b>	<b>Module ID/ Lecture ID</b>	<b>Lecture Title/Topic</b>	<b>Duration</b>
1	<b>M12-Mod1</b>	Introduction - Text Book	0:58:29
2	<b>M12-Mod2</b>	Introduction Course Content	0:57:32
3	<b>M12-Mod3</b>	Aircraft Part and Function- Part II	0:59:17
4	<b>M12-Mod4</b>	Aircraft Part and Function- Part III	0:57:46
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