



International Summer Program 2020

Course Title	Introduction to Aerospace Engineering
Your Instructor	Name: Prof. Dipak Kumar Maiti Home Institution: Indian Institute of Technology Kharagpur, India Email: dkmaiti@aero.iitkgp.ac.in , dkmaiti@gmail.com
Course Meetings	June 29 – July 17, 2020 Monday to Thursday: 14:30~18:00 / Friday: 14:30~15:30
Classroom	TBA

Course Overview	<p>The aim of this course is to provide a general overview of the field of Aerospace Engineering. The course will consist of Several Topics, each consisting of two-four Lectures. Aerospace Engineering consists of four major disciplines, e.g., Aerodynamics, Aerospace Structures, Flight Mechanics and control and Propulsion. The course will give information about standard atmospheric conditions and assumptions. An important field in aerospace engineering is aerodynamics. The course will cover basic aspect of fluid mechanics and aerodynamics. The core issue of lift generation on the wing of aircraft structure will be addressed which will be understandable by students with the knowledge of 12th standard physics, chemistry and mathematics. The aerospace structure is an important field of mechanics. This will give understanding of various types of load acting on aerospace structures and its requirement to withstand by aerospace structures. Aerospace vehicles are statically unstable. The flight mechanics deal with rigid body dynamics and its control to make the system dynamically stable. Propulsion is an important area which will discuss about thrust generation by various types of aviation fuels. An attempt will be made to cover the contents in an interesting manner, by a judicious use of a mix of power point presentations, in-class activities, quizzes, innovative and hands on assignments that will not only increase the awareness of the students, but also satiate their curiosity and desire to know more about the various concepts related to the subject.</p>
Course Materials	PDF or PowerPoint versions of the lecture slides will be made available via an online source (to be determined) before class whenever possible.

<p>Evaluation</p>	<p>(e.g.) Final 50%, Participation 20%, Attendance 20%, Assignment 10%</p>																																									
<p>Grading Scale <i>(Do not change)</i></p>	<p>Grading Scale</p> <table border="1" data-bbox="483 415 1464 646"> <thead> <tr> <th>Points</th> <th>Grade</th> <th>GPA</th> <th>Points</th> <th>Grade</th> <th>GPA</th> </tr> </thead> <tbody> <tr> <td>95 or Above</td> <td>A+</td> <td>4.5</td> <td>75 or Above</td> <td>C+</td> <td>2.5</td> </tr> <tr> <td>90 or Above</td> <td>A0</td> <td>4.0</td> <td>70 or Above</td> <td>C0</td> <td>2.0</td> </tr> <tr> <td>85 or Above</td> <td>B+</td> <td>3.5</td> <td>65 or Above</td> <td>D+</td> <td>1.5</td> </tr> <tr> <td>80 or Above</td> <td>B0</td> <td>3.0</td> <td>60 or Above</td> <td>D0</td> <td>1.0</td> </tr> <tr> <td></td> <td></td> <td></td> <td>59 or Below</td> <td>Fail</td> <td>0</td> </tr> </tbody> </table> <p>★ <i>Students will get a F if they miss more than 1/4 course loads.</i></p>						Points	Grade	GPA	Points	Grade	GPA	95 or Above	A+	4.5	75 or Above	C+	2.5	90 or Above	A0	4.0	70 or Above	C0	2.0	85 or Above	B+	3.5	65 or Above	D+	1.5	80 or Above	B0	3.0	60 or Above	D0	1.0				59 or Below	Fail	0
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Please continue to the next page for the course calendar.

Course Calendar

	Dates	Class Hours	Subject
Lecture 1	June 29 (Monday)	14:30~18:00	Atmosphere and its properties, Nomenclature of aircraft, missile and launch vehicle structural components.
Lecture 2	June 30 (Tuesday)	14:30~18:00	Fluid Mechanics – I : Incompressible flow, Bernoulli's Equation, Coanda Effect, and Mach Number, etc., Fluid Mechanics –II : Viscous Flow, Boundary Layer, Pressure Measurement
Lecture 3	July 1 (Wednesday)	14:30~18:00	Aerodynamics – I: Airfoils, and Lift Generation Theories
Lecture 4	July 2 (Thursday)	14:30~18:00	Aerodynamics – II: Critical Mach no., Types of Drag, summarization and topics covered and quiz on aerodynamics and atmospheric conditions, etc.
Lecture 5	July 3 (Friday)	14:30~15:30	Engineering Mechanics – I, Solid Mechanics – I
Lecture 6	July 6 (Monday)	14:30~18:00	Solid Mechanics – II, Introduction to analysis of aerospace structures.
Lecture 7	July 7 (Tuesday)	14:30~18:00	Aerospace Structural analysis, summarization and quiz on mechanics and structural analysis
Lecture 8	July 8 (Wednesday)	14:30~18:00	Introduction to Thermodynamics and Aircraft Propulsion
Lecture 9	July 9 (Thursday)	14:30~18:00	Various types of power plants, their uses and concept of various types of propellants. A short quiz.
Lecture 10	July 10 (Friday)	14:30~15:30	Aircraft Performance - I : Steady Level Flight and Altitude effects, (13) Aircraft Performance- II : Glide, Climb, Ceilings, Turn, and Pull up
Lecture 11	July 13 (Monday)		Field Trip
Lecture 12	July 14 (Tuesday)	14:30~18:00	Aircraft Performance- III : Takeoff and Landing, Range and Endurance, Range-Payload Diagram, (15) Aircraft Longitudinal Stability, and V-n Diagram, Aircraft Design, etc., Quiz
Lecture 13	July 15 (Wednesday)	14:30~18:00	Summarization of topics covered related to aerospace engineering and conducting quiz on whole topics
Lecture 14	July 16 (Thursday)	14:30~18:00	Final Test

Lecture 15	July 17 (Friday)		Graduation
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