Rocket Propulsion AE441A

Sathesh Mariappan

August 2, 2021

1 Schedule

Lecture - Mookit https://hello.iitk.ac.in/, recorded videos (schedule attached at the end) are uploaded, Discussion session Thurs - 8-8.50 hrs, Mode: Zoom video conference

2 Objectives

This course is an introduction to rocket propulsion. Various types of rocket propulsive devices are discussed.

3 Prerequisites

AE311A - Compressible Aerodynamics

4 Scoring scheme

Grading will be based on assignments and online quizzes (exact breakup attached at the end).

5 Course policy

- Every student will do assignments/quizzes individually. Malpractices will be penalized as per institute norms.

6 Course contents

Principles of rocket propulsion, single and multistaging, combustion, thermochemistry, adiabatic flame temperature, thrust chambers, supersonic nozzles, non-chemical rockets, electric propulsion

7 Lecture wise breakup

Given at the end.

8 Text books

The following are the text books for this course.

1. Hill, Philip G., and Peterson, Carl R. 1992. *Mechanics and thermodynamics of propulsion*. 2 edn. Addison-Wesley.

2. Sutton, G. P., and Biblarz, O., 2001. *Rocket propulsion elements*. 7th edn. John Wiley & Sons, INC.

3. Ramamurthi, K. 2012. *Rocket propulsion*. 1st edn. Macmillan Publishers India Ltd.

9 Discussion hours

- Please come prepared for the discussion hour after watching the videos.
- We will quickly go through the contents of the current week during the discussion hour.
- Outside the discussion hours, students can contact me through email: sathesh@iitk.ac.in

10 Contact details

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11 TA details

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Schedule for AE441A- Rocket propulsion, Department of Aerospace Engineering, IIT Kanpur, Sathesh Mariappan					
Week number	**Week start**	**Lecture title**	**Chapter**	**Assignment**	**Quiz**
		Introduction to Rocket Propulsion (course)			
1	2-8-21	Performance parameters			
		Velocity increment & range			
		Multi-staging – part A			
		Multi-staging – part B			
2	9-8-21	Multi-staging – part C			
		Flight_trajectory	1	Assignment 1	
		Introduction to combustion – part A			
3	16-8-21	Introduction to combustion – part B			Quiz 1
		Thermochemistry – part A			
		Thermochemistry – part A			
4	23-8-21	Adiabatic flame temperature	2	Assignment 2	
		Rocket thrust chambers			
5	30-8-21	Rocket nozzles	3		
		Electric propulsion	4		
6	6-9-21	Closing remarks			
	13-9-21	Mid semester exam			Quiz 2
		Grading policy			
		Assignment	30	15+15	
		Quiz	70	35+35	
		Total	100		