INTRODUCTION TO ROCKET PROPULSION

PROF. D. P. MISHRA
Department of Aerospace Engineering
IIT Kanpur

TYPE OF COURSE : New | Core&Elective | UG/PG
COURSE DURATION : 12 weeks (29 Jul'19 - 18th Oct'19)
EXAM DATE : 16 Nov 2019

PRE-REQUISITES : +2 Science

COURSE OUTLINE :
This is an introductory course on rocket propulsion. The objective of this course is to impart knowledge about rocket propulsion to both UG and PG students. In this course, fundamentals aspects of rocket propulsion namely Solid, Liquid and Hydride rocket engines are to be covered extensively. Besides this, performance of rocket engine and heat transfer aspects of various components are to be covered briefly.

ABOUT INSTRUCTOR :
Prof. Debi Prasad Mishra is a Professor in the Department of Aerospace Engineering at Indian Institute of Technology (IIT) Kanpur, India. His areas of research interest include combustion, computational fluid dynamics, atomization, etc. He was conferred with the Indian Oil Golden Jubilee Professional Chair in IIT Kanpur. He has authored five textbooks and has delivered several lectures on ancient Indian Science and Technology and culture and tradition to more than 45, 000 students across India.

COURSE PLAN :

Week 1: Introduction, Types of Rocket Engines, Applications of Rocket Engines

Week 2: Aerothermodynamics of Rocket Engines, Fundamentals of Aerodynamics, Elements of thermodynamics

Week 3: Combustion, Ideal Rocket Engine

Week 4: Thrust Equation, Rocket Engine parameters, Rocket Engine Nozzles

Week 5: Space Flight Performance, Rocket Propellant

Week 6: Introduction to Solid Propellant Rocket Engine, Components of SPRE, Regression rate relation

Week 7: Liquid Propellant Rocket Engine, Injector, Feed system

Week 8: Hybrid rocket Engine, Rocket Heat transfer

Week 9: Liquid Propellant Rocket Engine, Types of liquid rocket engines, Combustion of liquid propellant

Week 10: Combustion Chamber Geometry, Types of liquid rocket engines, Injectors,Feed system

Week 11: Combustion Instability, Ignition System, Hybrid rocket Engine

Week 12: Rocket Heat transfer, Types of Cooling System