

AA 462 COURSE DETAILS

TITLE:	Rocket Propulsion
CREDITS:	3
FORMAT & SCHEDULE:	Lecture, 3 hours / week
FACULTY CONTACT:	James Hermanson

COURSE DESCRIPTION (Catalog Short Form, 50 words Max):

Covers the physical and performance characteristics of chemical rocket propulsion systems. Includes rocket equations, mass ratios, staging, flight performance, nozzle theory and design, combustion thermochemistry, propellant categories, fuels, oxidizers, monopropellants, rocket system components and materials and rocket design principles.

COURSE OVERVIEW & LEARNING OBJECTIVES:

Course Objectives:

1. Students will understand the fundamentals of rocket propulsion.
2. Students will become proficient at carrying out performance calculations for typical chemical rocket systems.
3. Students will understand the reasons behind rocket component selection and design based on mission requirements and physical properties of propellants.
4. Students will be able to design an entire rocket system to meet specified mission requirements.

COURSE REQUIREMENTS

PREREQUISITES: A A 260

REQUIRED TEXTBOOK: *Rocket Propulsion Elements*, 9th ed., G.P. Sutton and O. Biblarz, John Wiley & Sons, Inc., 2017.

COURSE SCHEDULE

Topics

Fundamentals of rocket propulsion, rocket equation, staging, flight performance, propellant categories.

Thrust, efficiency, nozzle flow, types of nozzles, two-phase flow, flow separation.

Combustion thermochemistry, thermochemical codes.

Liquid rocket engines and propellants (fuels, oxidizers, monopropellants).

Solid propellant rockets, hybrid rockets, propellants, design issues.

Thrusters and systems, materials and process engineering, component selection, design approaches.