University: Cairo **Faculty:** Engineering **Department:** Aerospace Engineering

Course Specifications

Program: Aerospace Engineering
Major Field: Aircraft Propulsion
Department: Aerospace Engineering Department
Academic Year/Level: Fourth Year Undergraduate
Term: Second Term
Year of Approval: March 2015.

A- Basic Information

Title: Rocket Propulsion Systems
Code: AER405B
Credit Hours: 3
Weekly Hours: Lectures 2, Tutorials 2, Total 4

B-Professional Information

1-Overall Aims of Course

Preliminary design of solid and liquid propellant rockets.

2-Intended Learning Outcomes

A-Knowledge and Understanding

Upon completion of this course the student should be able to:

- Understand the basic skills to design rocket propulsion systems
- Understand the basic concepts involved in such designs

B-Intellectual Skills

Upon completion of this course the student should be able to:

- Analysis of different design configurations
- Creative thinking

C-Professional and Practical Skills

Upon completion of this course the student should be able to

- Implement engineering designs
- Identify any problem in the design process

D- General and Transferable Skills

Upon completion of this course the student should be able to

- Work in a group
- Have good computing skills

3-Course Contents

Topic	Number of hours	Lecture Hour	Tutorial Hour
Definition and fundamentals	4	2	2
Nozzle flow and thermodynamic relations	4	2	2
Heat transfer	8	4	4
Liquid propellant rocket fundamentals and combustion	12	6	6
Solid propellant rocket fundamentals and combustion	12	6	6
Design procedures for liquid and solid propellant rockets	20	10	10

4-Teaching and Learning Methods

- Class activities
- Lecture
- Discussions
- Research assignment

5-Student Assessment Methods

- Class test (1) to assess understanding
- Class test (2) to assess understanding and problem solving skills
- Reports to assess problem solving
- Mid-term exam to assess gains of completed topics
- Final exam to assess overall material comprehension

Assessment Schedule

Assessment 1	Week: 5
Assessment 2	Week: 11
Assessment 3	Week: 4,6,8
Assessment 4	Week 9
Assessment 5	At the end of the term

Weighting of Assessments

Mid-Term exam	20%
Semester work	5%
Practical exam	15%
Final exam	60%

6-List of References

Essential Textbooks

Rocket Propulsion Elements An Introduction to Engineering Rockets, George P. Sutton, Donald M. Ross.

Recommended Books

Rocket Propulsion, M. Barrere

7-Facilities Required for Teaching and Learning

- Small group of students
- Data show and screen
- Enhancing the ability to think for students in secondary schools

Course Coordinator: Dr. Ola M. Rashed
Head of Department: Prof. Ayman H. Kassem
Date: March, 2015.