EE-585

Space mission design and operations

Nicollier Claude

Cursus	Sem.	Type
Electrical and Electronical Engineering	MA2, MA4	Opt.
Microtechnics	MA2, MA4	Opt.
Space technologies minor	E	Opt.

Language of teaching	English
Credits	2
Session	Summer
Semester	Spring
Exam	Oral
Workload	60h
Weeks	14
Hours	**2 weekly**
Courses	2 weekly
Number of positions	

Summary

This course is a "concepts" course. It introduces a variety of concepts in use in the design of a space mission, manned or unmanned, and in space operations. it is at least partly based on the practical space experience of the lecturer.

Content

- Brief review of the fundamental laws of mechanics
- Types of space missions and their objectives.
- General concepts of space vehicles.
- The Space environment.
- Applied orbital mechanics, including interplanetary trajectories.
- Rendez-vous in space.
- Propulsion.
- Attitude determination and control.
- On board systems.
- Risk management.
- Examples: Space Shuttle, Space Station, Tethered Satellite, the Hubble Space Telescope.
- Extravehicular Activities.
- Future programs.

Keywords

- Space systems
- Space research
- Space exploration
- Space engineering
- Space operations

Learning Prerequisites

Required courses

- Bachelor level courses in physics, vector analysis, and calculus

Learning Outcomes

By the end of the course, the student must be able to:

- Assess / Evaluate space mission goal and objectives
- Design mission to reach goal
- Assess / Evaluate competing designs

Transversal skills

- Communicate effectively with professionals from other disciplines.
- Communicate effectively, being understood, including across different languages and cultures.

Teaching methods

28 hour course in the spring semester, out of which 12 hours are exercise hours, to reinforce the concepts explained in the course.
Dates:
February 21 (Introduction)
February 28 & March 2
March 14 & 16
March 28 & 30
April 11 & 13
April 25 & 27
May 9 & 11
May 23
May 30 (course review, optional)

Expected student activities

actively participate in the course and exercise sessions

Assessment methods

oral examination

Supervision

Office hours	Yes
Assistants	Yes
Forum	No

Resources

Bibliography

provided in the course introduction

Notes/Handbook

Course notes available before each course on Moodle

Websites

- http://www.nasa.gov
- http://www.esa.int

Moodle Link

- http://moodle.epfl.ch