

EE-585

**Space mission design and operations**

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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
<b>Hours</b>	<b>2 weekly</b>
Courses	2 weekly
<b>Number of positions</b>	

**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

## 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>