

EE-522

**How to design for value for space applications**

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| Cursus                   | Sem. | Type |
|--------------------------|------|------|
| Space technologies minor | E    | Opt. |

|                            |                     |
|----------------------------|---------------------|
| Language of teaching       | English             |
| Credits                    | 2                   |
| Session                    | Summer              |
| Semester                   | Spring              |
| Exam                       | During the semester |
| Workload                   | 60h                 |
| Weeks                      | 14                  |
| <b>Hours</b>               | <b>3 weekly</b>     |
| Courses                    | 1.5 weekly          |
| TP                         | .5 weekly           |
| <b>Number of positions</b> |                     |

**Summary**

The objective of this course is to introduce a three-step methodology to support the iterative and incremental definition, exploration, and evaluation of alternative Business Models and System Architectures. The methodology will be applied to a space project.

**Content**

Decisions made in early design stages condition detailed design phases and considerably affect the cost and the success of the system or service under development. This success relies on the ability to satisfy customers' needs and expectations while ensuring profitability for the company. But customers may face difficulty to express their needs, and they are not ready to pay for everything.

Therefore, it is critical to elicit and assess the values not only for the customers, but also for the other stakeholders and the company itself. Decisions impacting value creation still need to be better understood and articulated by considering the unarticulated and latent stakeholder values, the complexity in system design and the economic benefit in developing the system or service.

This course introduces a three-step methodology to support the iterative and incremental definition, exploration and evaluation of BM alternatives and system architectures. The proposed methodology is composed of three steps:

1. ValSearch: How to do market research for Business Model design
  1. Understand markets
  2. Understand customers
  3. Understand and develop an offer
  4. Capture competitors' business model
2. ValUse: How to elicit values and design value propositions
  1. Elicit value-in-exchange
  2. Elicit value-in-use
3. ValXplore: How to explore desirability, feasibility and viability of value propositions under uncertainty
  1. Explore business scenarios alternatives
  2. Design the business problem
  3. Explore the solution space

4 hours of classes take place every two weeks. 3 hours are dedicated to lectures. The 4th hour is devoted to practical work on projects.

**Keywords**

market research, business model design, system design, tradespace exploration

**Learning Outcomes**

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

- Structure market research.
- Design value propositions.
- Explore the desirability, feasibility and viability of value propositions.

### Transversal skills

- Access and evaluate appropriate sources of information.
- Collect data.
- Make an oral presentation.
- Summarize an article or a technical report.
- Demonstrate a capacity for creativity.
- Communicate effectively with professionals from other disciplines.
- Use a work methodology appropriate to the task.

### Teaching methods

lectures, exercises, projects

### Expected student activities

- Attend lectures.
- Complete exercises.
- Work on a space project.

### Assessment methods

- Project report
- Project presentation
- Participation in class

### Supervision

|              |     |
|--------------|-----|
| Office hours | No  |
| Assistants   | Yes |
| Forum        | Yes |

### Resources

#### Virtual desktop infrastructure (VDI)

No

### Bibliography

- Sonia Ben Hamida. ***Innovate by Designing for Value – Towards a Design-to-Value Methodology in Early Design Stages***. CentraleSupélec, Université Paris-Saclay, 2017. <https://hal.archives-ouvertes.fr/tel-01811739v1>
- Parnell, Gregory S. ***Trade-off Analytics: Creating and Exploring the System Tradespace***. John Wiley & Sons, 2016.
- Osterwalder, Alexander, Yves Pigneur, Gregory Bernarda, and Alan Smith. ***Value Proposition Design: How to Create Products and Services Customers Want***. John Wiley & Sons, 2015.

- Osterwalder, Alexander, and Yves Pigneur. ***Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers***. John Wiley & Sons, 2010.

### Ressources en bibliothèque

- [Value Proposition Design / Osterwalder](#)
- [Business Model Generation / Osterwalder](#)
- [Trade-off Analytics / Parnell \(order placed by the Library\)](#)

### Moodle Link

- <https://moodle.epfl.ch/course/view.php?id=16146>

### Videos

- <https://www.youtube.com/watch?v=ReM1uqmVfP0>
- <https://www.youtube.com/watch?v=QoAOzMTLP5s&t=55s>
- <https://www.youtube.com/watch?v=iFqCBI4T8ks>