







Funded by the European Union

INTERNATIONAL Summer School



Axiomatic Design and Systems Engineering for Sustainable System Design

14th -18th July 2025

The summer school aims at teaching both scientific foundations, practical methods and helps to develop specific professional skills.









UNIVERSITY of INFORMATION TECHNOLOGY and MANAGEMENT in Rzeszow, POLAND







Contact for registration of external applicants: Dr. Ali Asghar Bataleblu | Free University of Bolzano, Italy | aliasghar.bataleblu@unibz.it Participants from the SUSEE project partners can contact their project coordinators.

Summer SCHOOL

Fundamental principles of **Axiomatic Design (AD)** are reviewed, with insights and perspectives of over 30 years of teaching and practice. This should be of interest to beginners and to all levels of users.

The latest methods for using AD, qualitatively and quantitatively, for selecting the best design solutions and for fostering innovations are presented. AD, originating with Nam Suh at MIT in the late 1970s, contends that all good designs comply with two axioms: maintaining independence of the functional elements and minimizing information content. AD can add value and reduce costs in designs and in the design process. Participants learn also to use **Mirò software** for the design of complex systems and products.

This tutorial is intended students, PhD students, researchers and design practitioners, who might have never used Axiomatic Design as design theory, or who would like a fresh perspective.

LECTURE:

- 1. Introduction in Axiomatic Design (AD)
- 2. Domains in AD
- 3. Customer Needs, Functional Requirements, Design Parameters, Process Variables and Constraints
- 4. Independence Axiom and Information Axiom
- 5. Design Matrix
- 6. Decomposition and Mapping process
- 7. Design of Complex Systems and practical examples

EXERCISE

CONTENT

OUTLINE

- Case study elaboration in groups during the exercise hours.
 - Introduction in Mirò software for engineering design and application in the group work.
 - The lectures of the summer school will be offered in hybrid by international experts in Axiomatic Design via live streaming.

MONDAY 14 JULY 2025 ARRIVAL OF PARTICIPANTS

15:00 – 17:00	Registration. Opening Reception and Teams' Introduction	
17:00 - 17:30	Break	
17:30 – 19:00	Presentation of main steps for the Summer School and Q&A (Prof. Erwin Rauch)	

TUESDAY 15 JULY 2025 AXIOMATIC DESIGN AND DESIGN OF COMPLEX SYSTEMS		
8:15 – 9:00	Arrival at companies	
9:00 - 11:15	Company visits	
11:15 – 11:45	Arrival to the Faculty of Engineering	
11:45 – 12:30	Lab visit Faculty of Engineering B5	
12:30 - 14:00	Lunch	
14:00 - 14:45	Introduction to Axiomatic Design (Prof. Chris Brown - President IAAD)	
14:45 - 15:30	Systems Engineering Lifecycle Design Process (Prof. David Cochran)	
15:30 - 15:45	Break	

15:45 -16:00	Challenges main steps and Q&A (Prof. Erwin Rauch)
16:00 - 16:45	Introduction to Challenges (company representatives)
16:45 - 18:00	Groupwork Part 1 (Problem Statement, CN to use cases, Top level FR-PS, Q&A)

WEDNESDAY 16 JULY 2025

ADVANCED CONCEPTS, APPLICATIONS OF AD AND SE

8:30 - 10:30	Groupwork Part 2 (Decomposition, Q&A)
10:30 - 10:45	Break
10:45 - 11:45	Groupwork Part 2 (Decomposition, Q&A)
11:45 – 12:45	Lab visit Faculty of Engineering B1
12:45 - 14:00	Lunch
14:00 - 14:30	Model-Based Systems Engineering (Dr. Ali Bataleblu)
14:30 - 15:00	Independence Metrics (Prof. João Fradinho)
15:00 - 16:00	Check-up of decompositions with tutors
16:00 - 16.30	Bus Transfer to Lake Caldaro
16:30 - 17:30	Lake of Caldaro
17:30 - 18:00	Bus Transfer
18:00 - 21:00	Social Dinner in Schlosskellerei Turmhof Tiefenbrunner
21:00 - 22:00	Bus Transfer to city center

THURSDAY 17 JULY 2025 GRUPWORKS AND PRESENTATIONS

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8:30 - 10:30	Groupwork Part 3 (Decomposition, FR-PS tree, Critical Thinking, Q&A)
10:30 - 10:45	Break
10:45 - 12:45	Groupwork Part 4 (Preparation of presentations)
12:45 - 14:00	Lunch
14:00 - 14:45	AD in Everyday Items (Prof. Joe Foley)
14:45 - 16:00	Teamwork Presentation, part 1
16:00 - 16:15	Break
16:15 – 18:15	Teamwork Presentation, part 2
18:15 – 18:45	Evaluation and Award Winners

FRIDAY 18 JULY 2025

SUMMER SCHOOL WRAP-UP 8:00 - 10:00 **Reflection on Summer School**



CASE STUDY IN THE EXERCISE HOURS: Decomposition of a given or own case study

TUTORING: One of the IAAD members takes over the local tutoring for group works.