

# Systems Design Laboratory

Welcome

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Systems Design Laboratory is  
not another theory course!



## Systems Design Laboratory:



- is a “**hands-on**” modeling course
- provides you with **concrete skills**
- involves the use of several **software libraries**
- is about **solving concrete problems**



**Last but not least:** plenty of room for **theses**, research, and more (e.g., the ICE lab context)

<https://www.icelab.di.univr.it/?lang=en>

## Objectives

- From theory (i.e., *Discrete Event and Hybrid Systems*) to practice
- Design, analysis, and synthesis of systems starting from models
- Focus on cyber-physical systems, Industry 4.0, and robotic systems

## Skills acquired by students

- Autonomous evaluation of advantages and disadvantages of design choices of specification formalisms, and of algorithms for the analysis and synthesis of discrete-event and hybrid systems
- Ability to work together with application-domain specialists to choose the formal models suitable for the specification, analysis and control of a given system
- Ability to carry on independent study of recent literature.

# Essential Information - Homepage and Academic Staff



## Studying at the University of Verona

Here you can find information on the organisational aspects of the Programme, lecture timetables, learning activities and useful contact details for your time at the University, from enrolment to graduation.

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 [AY of matriculation](#)  
2022/2023

Academic calendar

Teaching staff

**Modules**

Additional learning activities

Career prospects

News

[← Back to the study plan](#)

[Back to the modules per semester →](#)

### Laboratorio per la progettazione dei sistemi (2022/2023)

Teaching code  
4S009016

Coordinator  
[Tiziano Villa](#)

Language  
English 

Period  
Semester 2 dal Mar 6, 2023 al Jun 16, 2023.

Academic staff  
[Tiziano Villa](#), [Matteo Zavatteri](#)

Credits  
6

Scientific Disciplinary Sector (SSD)  
INF/01 - INFORMATICS

[Lessons timetable](#)

 Moodle

[Seminars](#)

<https://www.corsi.univr.it/?ent=cs&id=954&menu=studiare&tab=insegnamenti&codiceCs=S81&codins=4S009016&crediti=6.0&aa=2022/2023&lang=en>

Tiziano Villa  
(coordinator)



## *Unit: Formal models for systems*

- **Formal models for discrete-event systems**
- **Boolean functions and networks**
- **Decision diagrams**
- **Multiple-valued and temporal logics**
- **Finite and  $\omega$ -automata**

<https://www.di.univr.it/?ent=persona&id=3849&lang=en>

Matteo Zavatteri



## *Unit: Discrete Event Systems*

- Modeling of plants and control requirements with finite state automata
- Supervisory control
- Eclipse Supervisory Control Engineering Toolkit (ESCET)
- Compositional Interchange Format (CIF specification language)
- Simulation
- Automated synthesis of supervisory controllers
- Design of graphical user interfaces in SVG

<https://www.di.univr.it/?ent=persona&id=20745&lang=en>



- Specific book chapters (often already studied from previous courses)
- Slides
- Short lecture notes
- Specific case studies analysis
- Online documentation and tutorials
- Example code

## Essential Information - Setup



**Fully Controllable Setting:** You will use your own computer.  
(Fewer problems, no UniVR/IT dependencies).

# Essential Information - Examination Methods



*SDL includes 2 subject areas:*

- *Formal models for systems (Villa)*
- *Discrete event systems (Zavatteri)*

The grade is split as follows

Part	Task description	Max
P	A project chosen in one of the 2 areas	20/30
E1	1 exercise for formal models for systems	5/30
E2	1 exercise for discrete event systems	5/30
Final grade P + E1 + E2		30/30