

# Multiphysic modeling



ECTS  
6 credits



Component  
INSTITUT  
NATIONAL  
DES SCIENCES  
APPLIQUEES  
TOULOUSE



Number of  
hours  
72,75h

## Presentation

### Objectives

To design and analyse high-level models of multidomain energy-transfer

systems or mechatronic systems.

Formalisation of physics concepts from previous years as lumped-parameter

modelling (0D-1D) in electrical, magnetic, hydraulic, thermal and

mechanical systems. Lectures, tutorial, lab-work with Modelica or Amesim.

Implementation and analysis of multiphysics systems with block diagrams and

state-space simulation models. Several modelling problems using lumped

parameter systems: setting to equations in various domains, simulation using

simulink, time and frequency analysis. Lectures, tutorials, lab-with Matlab /

Simulink or Amesim.

Defining and designing models using the bond-graph formalism.

Lectures and modelling project

### Pre-requisites

General physics (mechanics, electricity, fluid mechanics, thermodynamics).

## Useful info

### Place

> Toulouse