

Thermics



Component

École Nationale
Supérieure
d'Électrotechnique
d'Électronique
d'Informatique
d'Hydraulique
et des
Télécommunications

In brief

- **Ametys Code:** N8AE16C
- **Open to exchange students:** No

Presentation

Objectives

- * Master the analysis of thermal phenomena in power electronics components.
- * Evaluate conduction and switching losses to establish a complete thermal balance.
- * Model thermal systems using equivalent RC networks and utilize manufacturer curves.
- * Understand the impact of temperature on the reliability, voltage withstand, and lifespan of power components.

Description

This module covers the thermal aspects essential to the design and reliability of power electronics devices used in high-power converters, inverters, and power supplies.

The course focuses on heat generation mechanisms, thermal modeling (RC networks, interface resistances), and the analysis tools offered by manufacturers.

It also addresses the selection of cooling solutions and their integration into an architecture, paying particular attention to performance, compactness, and lifespan constraints.

Pre-requisites

Power electronics: operation of power switches, converter topologies.