

IDENTIFICATION

Course code : ESI-SPI-CI-BE4-S8-UE3-EC1
ECTS : 1.5

DURATION

Lectures : 4
Tutorial classes : 8
Labs : 0
Total : 12

Project :
Personnal work :

ASSESSMENT

Group project : Conducting a "Mini-Audit" on a case study

TEACHING MATERIALS

Presentations, regulations, case studies

LANGUAGE

English

CONTACT

Modifié le : 3 août 2026

UE : UE8-EFFI

COURSE : Energy Performance Diagnosis and Improvement

SCOPE OF THE COURSE

OBJECTIVES

Master the energy audit methodology : Know how to collect data, analyze bills, and instrument a building. Perform regulatory and technical diagnostics : Understand the DPE (DOM version) and comprehensive audits. Model and simulate existing conditions : Use Dynamic Thermal Simulation (STD) to calibrate a model based on actual consumption. Recommend improvement scenarios : Propose technically coherent and economically viable work packages (ROI). Integrate tropical thermal comfort : Prioritize passive solutions (roof insulation, air circulators) before active solutions.

COMPETENCE AND SKILLS

Conduct an on-site technical survey : Use measurement tools (thermal camera, wattmeters, temperature/humidity loggers). Identify energy-saving potential : Prioritize consumption areas (Air conditioning, DHW, Lighting). Quantify and justify a renovation program : Calculate the payback period and carbon impact of proposed solutions. Advise the project owner : Simplify technical results to support decision-making (e.g., transition to solar thermal, changing air handling units).

PROGRAM

1. Regulatory Framework & Challenges : Réunion Island context, Tertiary Decree, RTAA DOM, PERENE, local energy mix decarbonization targets.
2. Audit Methodology : Site preparation, bill analysis, building typologies (residential vs. tertiary).
3. Instrumentation & Measurements : Practical use of tools : thermal camera (identifying thermal bridges), dataloggers (temperature/humidity).
4. Simulation & Calibration : Principles of STD applied to existing conditions. How to align the numerical model with reality ?
5. Improvement Scenarios : Insulation, solar protection, air conditioning optimization, LED lighting, smart control.
6. Economic Analysis & Decision Support : Total cost, financial aid (CEE, regional subsidies), drafting the summary report.

BIBLIOGRAPHY

REQUIREMENTS

Heat transfer, Thermodynamics, Energy simulation software tools 1 and 2, Thermal regulations and labels