

IDENTIFICATION

Course code : E5BE9CB2
ECTS : 2

DURATION

Lectures : 4
Tutorial classes : 12
Labs : 8
Total : 24

Project :
Personnal work :

ASSESSMENT

Lab report grade

TEACHING MATERIALS

Handout

LANGUAGE

English

CONTACT

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UE : Conception

COURSE : Aerodynamics

SCOPE OF THE COURSE

OBJECTIVES

The goal is to study the aerodynamics of buildings to optimize architectural designs in climate-responsive urban planning.

COMPETENCE AND SKILLS

- Mastery of concepts in urban planning and aero-climatic architecture applied to thermal comfort in humid tropical environments,
- Understanding the mechanisms behind the development of natural ventilation in buildings, as well as physical simulation methods using turbulent wind tunnels for these phenomena.

PROGRAM

Pragmatic approach (linked to the course “Sustainable development in tropical environments”) • Review of fluid mechanics applied to wind and its effects • Methods for assessing natural ventilation • Physical simulation on scale models in a turbulent wind tunnel of wind effects on and around buildings • Architectural design for natural ventilation (individual and collective housing) • Case studies
Tutorials : Bioclimatic design of a construction project in a realistic situation (geographical site on a real location – climate adjustment – existing environment) Lab work : Study on scale models in a wind tunnel • Characteristics of the turbulent boundary layer • Study on scale models of aerodynamic parameters for natural ventilation : assessment of internal velocity fields and flow rates based on parameters such as “nearby environment” / “façade porosity” / “internal partitioning” / “orientation” / “roof architecture” / “special cases of depressurization shafts and scoops”

BIBLIOGRAPHY

REQUIREMENTS

Fluid mechanics course, thermal comfort in tropical environments course, numerical simulation methods