

Basics of thermal sciences

Course code: ABT1

ECTS Credits: 4.5

Department	: ET	Lectures	: 20h00
Lecturers	: D. Saury	Tutorials	: 10h00
Year of study	: 1 st year	Laboratory sessions.	:
Semester	: 1 st semester	Project	:
Assessment method(s)	: 1 written test	Home works	:
Language of instruction	: English	Total hours	: 30h00
Type of courses	: Compulsory		

Objective: To introduce the main concepts of heat transfer and to understand different transfer methods (physical aspects, energetic balances, calculation principle of temperature fields)

Prerequisites: none

Content:

1. Overview : the main heat transfer modes (conduction, convection & radiation)
2. Fundamental of heat
 - Phenomenology of conduction
 - General equations of conduction
 - Steady state problems
 - Transient and periodic regimes
3. Fundamental of Convection
 - Phenomenology of convection
 - General equations of convection
 - Similarity and dimensional analysis
 - Forced convection in external flow, internal flow
 - Natural convection
 - Mixed Convection
4. Fundamental of Radiation
 - Basic laws and quantities
 - Black body radiation
 - Actual surfaces and emission factors
 - View Factors
 - Radiative transfer between surfaces
5. Introduction to mass transfer

Recommended reading : none

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