

Heat Transfer

Heat Conduction

IDENTIFICATION

CODE : GME-3-COND-S2
ECTS : 2.0

HOURS

Lectures : 6.0 h
Seminars : 8.0 h
Laboratory : 8.0 h
Project : 0.0 h
Teacher-student
contact : 22.0 h
Personal work : 20.0 h
Total : 42.0 h

ASSESSMENT METHOD

Exam [lesson documents
authorized]: 2 h

TEACHING AIDS

Student textbook
Course summary
Mind map
Slides
Formative tests
Annals

TEACHING LANGUAGE

French

CONTACT

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AIMS

Skills:

- select the existing solution of the 1D heat equation in a solid or in a fin as a function of the real problem
- integrate the 1D steady-state heat equation in a solid, with or without sources, in a simple geometry
- identify the boundary conditions of a real heat conduction problem and apply them to the solution, to determine the temperature field
- perform a heat balance on a infinitely small element of a fin
- determine the heat flux or heat flux density from the space-time temperature equation
- calculate the efficiency of a fin or a finned surface

Objectives:

Basic knowledge on Heat transfer
Equations of heat conduction problems in solid media
Resolution of basic heat conduction problems by analytical methods

CONTENT

Basic physical phenomena ; one dimensional, steady-state heat conduction with or without heat sources ; one dimensional,transient conduction ; theory of fins.

BIBLIOGRAPHY

Incropera, F.P, De Witt, D.P., Fundamentals of Heat and Mass transfer, J. Wiley, N.Y., 2002.
Sacadura, J.F., Transferts thermiques, initiation et approfondissements, Lavoisier, 2015.

PRE-REQUISITE

Mathematics: Integral and derivative, differential equation resolution, Bessel function, Error function, Laplace and Fourier transform