Semester	Period	Bloc	Duration (h)	Coef
S7	**2 (6 weeks)**	**MECHANICS & ENERGETICS**	**18**	**2**

Module	Contact Person
Thermal Science	**N. RANC**

General Learning Outcome
Analyze and model heat transfer systems (conduction, convection and radiation). Applied appropriate equation for conduction, convection and radiation problems.

Detailed Learning Outcomes						
N°	Description On successful completion of the module, students will be able to:	Eval.	Activities (hours)			
			Lct.	Ex.	S.L.	HW /Pr.
1.	**Identify the main heat transfer mode in a physical system (conduction, convection and radiation)**	**HW**	**0.5**	**0.5**		**0.5**
2.	**Write a heat conduction equation and the boundary conditions in the case of steady state and transient regimes and be able to solve it in some particular cases.**	**HW, Exam**	**3**	**3**	**4**	**2**
3.	**Calculate a heat transfer coefficient h from an empirical correlation and use it to determine a heat transfer for a variety of fluid flow regime (forced and free convection).**	**HW, Exam**	**3**	**3**	**4**	**2**
4.	**Calculated radiated heat from a real surface. Determine view factors between surfaces and use it to calculate heat transfer and equilibrium temperature of the surface.**	**HW, Exam**	**2.5**	**2.5**	**4**	**2**

Comments

Required prior knowledge: Nothing
 	
Content:
Introduction to heat transfer and the application in engineering systems
Heat transfer by conduction
    Fourier's law and heat equation
    Steady state heat conduction
    Transient heat conduction
Heat transfer by convection
    Principle of the convection : governing equation
    Correlation method : application to forced and free convection

Heat transfer by radiation
    Physical description of radiation
    Characterization of radiative intensity
    Radiation characteristic of real surface
    Basic laws of thermal radiation : Planck's law, Stefan's law
    Introduction to view factors
    Radiative exchange between grey surfaces

Type of teaching: courses and exercises in the classroom, homework

Form of examination: written exam (50%) and homework (50%).

Legend			
Eval.	Evaluation system	S.L.	Self learning
Lct.	Lectures	Pr.	Project
Ex.	Exercises	HW	Homework