WEEK	SESSION	DESCRIPTION OF THE SESSION CONTENT	GROUP		Indicate if different to classroom	Indicate if session with 2 professors	STUDENT'S WEEKLY WORK		
			LARGE	SMALL			DESCRIPTION	FACE-TO-FACE HOURS	HOURS OF WORK (Max. 7h per week)
1	1	Introduction. Contents and methodology. Review of previous concepts. Properties and Ts diagram of water. Substance models. Examples.	x			NO	Introduction. Contents and previous concepts. Theoretical study on properties and T-s diagram of water. Recall on incompressible liquid and ideal gas models. Examples.	1.67	3
2	2	Problems: properties.		x		NO	Resolution of exercises to determine thermodynamic properties for a state or its variation in thermodynamic processes.	1.67	5
2	3	Balances in thermodynamic systems. Energy and entropy balance in closed systems. Balance of mass, energy and entropy in open systems or control volumes. Examples.	x			NO	Theoretical study about mass, energy and entropy balances in closed systems. Work of examples.	1.67	
3	4	Problems of closed systems.		x		NO	Resolution of exercises on closed systems.	1.67	6
3	5	Devices under steady-state - I. Nozzles, Diffusers, Compressors, Pumps and Turbines. Hydraulic turbine.	x			NO	Theoretical study of balances in steady-state devices. Application to nozzles, compressors, pumps and turbines.	1.67	
4	6	Problems: nozzles, compressors, pumps and turbines.		x		NO	Resolution of exercises.	1.67	6
4	7	Devices under steady-state - II. Heat exchangers, boilers, combustion chambers, condensers. Valves and mixers.	x			NO	Theoretical study about heat exchangers and valves.	1.67	
5	8	Problems: heat exchangers and valves.		x		NO	Resolution of exercises.	1.67	7
5	9	Thermal engines. Basic concepts. Carnot power cycle.	x			NO	Theoretical study about thermal engines and Carnot power cycle.	1.67	
6	10	Problems: thermal engines and Carnot cycle.		x		NO	Resolution of exercises.	1.67	7
6	11	Rankine cycle. Brayton cycle.	x			NO	Theoretical study about Rankine and Brayton cycles.	1.67	
7	12	Problems: Rankine and Brayton cycles.		x		NO	Resolution of exercises.	1.67	6
7	13	Cycles in internal combustion engines.	x			NO	Theoretical study on internal combustion engine cycles.	1.67	
7-8	L1	Lab 1: Performance of a power cycle.	External		Computer room	YES	Study of the lab guide. Development of the lab. Processing of data obtained and delivery of datasheet.	1.67	6
8	14	Problems: internal combustion engines.		x		NO	Resolution of exercises.	1.67	
8	15	Refrigeration cycles. Reversed Carnot cycle.	x			NO	Theoretical study on refrigeration cycles.	1.67	
9	16	Problems: refrigeration cycles and reversed Carnot cycle.		x			Resolution of exercises.	1.67	7
9	17	Heat transfer modes, properties. Problems. Heat diffusion equation. Boundary conditions.	x			NO	Theoretical study about heat transfer modes, and associated properties. Resolution of exercises. Heat diffusion equation. Temporal and spatial boundary conditions. Resolution procedures.	1.67	
9-10	L2	Lab 2: Performance on internal combustion engine and refrigeration cycle.	External		Computer room	YES	Study of the lab guide. Development of the lab. Processing of data obtained and delivery of datasheet.	1.67	7
10	18	One-dimensional steady-state conduction in plane wall. Thermal resistances, series/parallel and contact. Problems.		x		NO	Theoretical study about one-dimensional steady-state conduction. Resolution for conduction in plane wall without heat generation.	1.67	
10	19	One-dimensional steady-state conduction in cylindrical and spherical geometries. Concept of critical radius. Problems.	x			NO	Theoretical study about one-dimensional steady-state conduction in cylindrical and spherical geometries. Thermal resistances. Critical radius of insulation. Resolution of exercises.	1.67	
11	20	One-dimensional steady-state conduction with heat generation in plane, cylindrical and spherical coordinates. Examples and problems.		x		NO	Theoretical study and resolution of exercises about conduction with heat generation.	1.67	6
11	P	Partial exam: Thermodynamics and cycles.	x			YES	Mid-term exam	1.67	
12	21	Problems of heat transfer by conduction: with and without generation.		x		NO	Resolution of exercises.	1.67	6
12	22	Transient conduction: theory and problems.	x			NO	Theoretical study and resolution of exercises about transient conduction.	1.67	
13	L3	Lab 3: Heat dissipation in electronic devices.		x	Lab.	YES	Study of the lab guide. Development of the lab. Processing of data obtained and delivery of datasheet.	1.67	6
14	23	Fins.		x		NO	Theoretical study on heat conduction in fins	1.67	6
14	24	Problems: fins.	x			NO	Resolutions of exercises.	1.67	
15	25	Problems: fins and general about heat transfer.	External			NO	Resolution of exercises on the second part: heat transfer by conduction.	1.67	3

							Subtotal 1	**48.3**	**87**
								135.3	
15		Lab exam. Recovery and tutorials.					Lab exam in AG. Attendance to tutorials.		5
16									
17		Preparing final exam and assessment					Theoretical study and resolution of problems about the course contents.		35
18									
							Subtotal 2	**0.0**	**40**
								40.0	
TOTAL *(Total 1 + Total 2. Max. 180 hours)*								**175.3**	