Universidad Carlos III de Madrid
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COURSE: Aerospace Propulsion II		
DEGREE: Aerospace Engineering	**YEAR: 4th**	**TERM: 2nd**

WEEKLY PLANNING

WEEK	SESSION	DESCRIPTION	GROUPS (mark X)		SPECIAL ROOM FOR SESSION (Computer class room, audio-visual class room)	Indicate YES/NO If the session needs 2 teachers	WEEKLY PROGRAMMING FOR STUDENT		
			LECTURES	SEMINARS			DESCRIPTION	CLASS HOURS	HOMEWORK HOURS (Max. 7h week)
1	1	**Introduction to reciprocating engines** Basics. Pros and cons. Classification. Geometric parameters. Indicated parameters.	X	X			Reading corresponding notes chapters; Personal work about the lecture	1,6	3
2	2	**Thermodynamic cycles** Ideal Otto and Diesel cycle. Efficiencies. Actual cycles.		X	X		Analyze thermodynamic cycle performance with a Matlab code	1,6	3
3	3	**Breathing exercises I** The flow through a valve. Mach index and volumetric efficiency. Partial throttle	X	X			Reading corresponding notes chapters; Personal work about the lecture	1,6	3

4	4	**Breathing exercises II** Combustion chamber, valve, manifolds	X	X			Reading corresponding notes chapters; Personal work about the lecture	1,6	3
5	5	**Turbochargers and intercoolers** Supercharging. Intercoolers. Classification. Physical modeling of turbochargers.	X	X			Reading corresponding notes chapters; Personal work about the lecture	1,6	3
6	6	**Engine cooling** Types of cooling systems (air cooling vs. water cooling). Types of heat transfer. Heat transfer in an engine: correlations. Heat transfer in the coolant.	X	X			Reading corresponding notes chapters; Personal work about the lecture	1,6	3
7	7	**Engine friction and lubrication** Engine friction, lubrication, efficiency and losses	X	X			Reading corresponding notes chapters; Personal work about the lecture	1,6	3
8	8	**Visit to the air force museum**		X		X	Prepare a report about an aero engine in the museum	1,6	3
9	9	**Quiz**		X			Reading corresponding notes chapters; Personal work about the lecture	1,6	3
10	10	**Flow in the cylinder** Phases of flow, turbulence, swirl and tumble, compression	X	X			Reading corresponding notes chapters; Personal work about the lecture	1,6	3
11	11	**Combustion and fuels** Spark ignition engines. Normal combustion in spark ignition engines. Parameter influence in normal combustion. Model of normal combustion. Abnormal combustion.	X	X			Reading corresponding notes chapters; Personal work about the lecture	1,6	3
12	12	**Combustion and fuels II** Compression ignition engines. Analysis of the combustion process. Delay time reduction. Fuel quality. Combustion process model. Types of compression ignition engines.	X	X			Reading corresponding notes chapters; Personal work about the lecture	1,6	3
13	13	**Overall engine performanc**e Carburation and injection. Transient response.	X	X			Reading corresponding notes chapters; Personal work about the lecture	1,6	3

14	14	**Design considerations** Introduction to Kinematics in reciprocating engines. Crank handle connecting rod system kinematics. Introduction to dynamics in reciprocating engines. Torque calculation. Mechanical loads in the engine.	X	X			Reading corresponding notes chapters; Personal work about the lecture	1,6	3
							Subtotal 1	**23,33**	**42**
							Total 1 *(Hours of class plus student homework hours between weeks 1-7)*	65,33	

15		Tutorials, handing in, etc						5	
16		Assessment						3	
17									
18									
							Subtotal 2	**3**	**6**
							Total 2 *(Hours of class plus student homework hours between weeks 15-18)*	17	

TOTAL *(Total 1 + Total 2. Maximum 90 horas)*	82,33