



SUBJECT: THERMAL MACHINES AND POWER PLANTS		
DEGREE: MECHANICAL ENGINEERING	YEAR: 3	SEMESTER: 2 (WINTER-SPRING)

The course has 29 sessions spread over 14 weeks. Labs can be in any of them. Students will have two weekly sessions, except in a case there will be three.

WEEKLY SUBJECT SCHEDULE									
WEEK	SESSION	SESSION CONTENTS DESCRIPTION	GROUP (X)		Indicate if class is different from usual (Lab, informatic room...)	Indicar SI/NO es una sesión con 2 profesores	WEEKLY STUDENT WORK AMOUNT		
			LARGE	REDUCEDO			DESCRIPTION	HOURS	STUDYING HOURS (Max. 7h per week)
1	1	I INTRODUCTION Generalities, power plants classification and pollutants emissions		M 27 ENE			Session subject studying and notes elaboration	1,66	4
1	2	II RANKINE AND BRAYTON CYCLES BASED POWER PLANTS: Ideal Brayton cycle, inter-cooling, and reheating	J 29 ENE				Session subject studying and notes elaboration	1,66	
2	3	Regenerative Brayton cycle, complex and closed cycles -- Application exercise.		M 3 FEB			Session subject studying and notes elaboration Exercise: Brayton-based cycle	1,66	7

2	4	Simple Rankine cycle, reheating and regenerative cycle by means of open feed water heater	J 5 FEB				Session subject studying and notes elaboration Exercise: Ciclo Rankine NOTES EXCHANGE WITH OTHER GROUPS STUDENTS	1,66	
3	5	regenerative cycle by means of closed feed water heater, steam extractions and drains Complex cycles. Summary		M 10 FEB			Session subject studying and notes elaboration Exercise: cycles.	1,66	
3	6	III TURBOMACHINERY OPERATIVE FUNDAMENTALS AND ARCHITECTURE Introduction, operative fundamentals	J 12 FEB				Session subject studying and notes elaboration NOTES EXCHANGE WITH OTHER GROUPS STUDENTS	1,66	7
4	7	LAB. GROUP 11a: Práctica de montaje/desmontaje de un motor alternativo. For GROUPS 11b 12a y 12b THERE IS NO REDUCED GROUP SESSION		M 17 FEB	LAB. 1.0.D12 G11a	Sí	Preparación de la práctica	1,66	
4	8	Kinematics and pressure variation in turbomachinery	J 19 FEB				Session subject studying and notes elaboration Exercise: velocity triangle	1.66	7
5	9	LAB. GRUPO 11b: Práctica de montaje/desmontaje de un motor alternativo GROUPS 12 a y 12b: Steam Turbine and Gas Turbine architecture		M 24 FEB	LAB. 1.0.D12 G11b	Sí	Session subject studying and notes elaboration Exercise: first steam turbine stage	1,66	
5	10	Dimensional analysis and operation curves in incompressible flow	J 26 FEB				Session subject studying and notes elaboration	1,66	7
6	11	LABORATORIO GRUPO 12a: Práctica de montaje/desmontaje de un motor alternativo GROUPS 11a y 11b: Steam Turbine and Gas Turbine architecture		M 03 MAR	LAB. 1.0.D12 G12a	Sí	Session subject studying and notes elaboration Exercise: first steam turbine stage	1,66	
6	12	FIRST TEST (SUBJECTS I, II y III) (*) Test correction	J 05 MAR				Test Preparation	1,66	7
7	13	LAB. GROUP 12b: Práctica de montaje/desmontaje de un motor alternativo FOR GROUPS 11a, 11b 12a: THERE IS NO REDUCED GROUP SESSION		M 10 MAR	LAB. 1.0.D12 G12b			1,66	7

7	14	operation curves in compressible flow, variable geometry architecture. Cavitation and NPSH. Summary	J 12 MAR			Session subject studying and notes elaboration Exercise: dimensional analysis and operation curves	1,66	
8	15	IV BOILERS AND COMBUSTION CHAMBER FUNDAMENTALS Introduction. Cast iron boilers, steel boilers		M 17 MAR		Session subject studying and notes elaboration	1,66	7
8	16	Boilers (continuing), burners and combustion chambers	J 19 MAR			Session subject studying and notes elaboration	1,66	
9	17	Auxiliary elements. (Deaerator, Feed heaters, condensers and cooling towers). Accidents. Summary.		M 24 MAR		Session subject studying and notes elaboration Exercise: magnitudes in power plants	1,66	7
9	18	MID-TERM EXAM (SUBJECTS I, II, III (*))	J 26 MAR			Exam preparation	1,66	
SEMANA SANTA						HOLLY WEEK		
10	19	V COMBINED CYCLE POWER PLANTS Introduction and fundamentals		M 07 ABR		Session subject studying and notes elaboration	1,66	7
10	20	HRSg, state of the art: reheating and pressure levels. Design parameters and operation performances	J 09 ABR			Session subject studying and notes elaboration	1,66	
11	21	Integrated Gasification in Combines Cycles. CO ₂ Capture y storage. Accidents Summary		M 14 ABR		Session subject studying and notes elaboration	1,66	7
11	22	VI COMBINED HEAT AND POWER, POLYGENERATION Polygeneration, environmental considerations. Design parameters and operation performances and primary resources.	J 16 ABR			Session subject studying and notes elaboration Ejercicio: Poligeneración – Curva REE en función del tamaño de la planta	1,66	
12	23	CHP with reciprocating engines		M 21 ABR		Session subject studying and notes elaboration	1,66	7
12	24	SECOND TEST (SUBJECTS IV y V) (*)	J 23 ABR			Test Preparation	1,66	
13	25	CHP with Gas Turbines		M 28 ABR		Session subject studying and notes elaboration	1,66	7
13	26	VII NUCLEAR PLANTS Fundamentals – Elements, Type of plants	J 30 ABR			Session subject studying and notes elaboration	1,66	

14	27	Plant types, cycles		M 05 MAY			Session subject studying and notes elaboration	1,66	
14	28	Fuel cycles and nuclear accidents. Summary	J 07 MAY				Session subject studying and notes elaboration	1,66	7
	29	VIII OPERATION AND MAINTENANCE FUNDAMENTALS IN POWER PLANTS Load and speed control. Secondary control loops.		M 12 MAYO			Session subject studying and notes elaboration	1,66	
	29	CLASE DE REPASO	J 14 MAY	X			Session subject studying	1,66	3
Subtotal 1								48,33	98
Total 1 (Hours of class and student work 1-14)								146.33	
15		Recoveries, tutorials, work submissions, etc					Recoveries, tutorials, work submissions.	1.66	
16		Exams preparation and evaluation					Studying and problem solving, exercises on the subject	3	19
17									
18									
Subtotal 2								3	19
Total 2 (Hours of class and student work 15-18)								23.66	
TOTAL (Total 1 + Total 2. Maximum 180 hours)								170	