Universidad Carlos III de Madrid

SUBJECT NAME: MATERIALS PERFORMANCE IN EXTREME CONDITIONS		
POSTGRADE: UNIVERSITY MASTER IN MATERIALS SCIENCE AND ENGINEERING **Professors: María Asunción Bautista, Sophia Tsipas y Juan Cornide**	**ECTS: 3**	**FOUR -MONTH PERIOD: 2**

TIMETABLE OF THE COURSE (detailed version)

WEEK	SESION	DESCRIPTION OF THE CONTENT OF THE SESSION	GRUOP (tick X)		Indicate different classroom space required (computer classroom, audiovisual, etc...)	TRABAJO DEL ALUMNO DURANTE LA SEMANA		
			1	2		DESCRIPCION	ATTENDANCE HOURS	HOURS OF INDIVIDUAL WORK (maximum 7 h)
1	1	Presentation of the subject. 1. Challenges of material in the industry. 2. Aqueous corrosion and the factors that determine the anode location. Corrosion under thermal isolation.	X			Study of the contents taught during the lesson.	1.5	2
1	2	3. High temperature oxidation of materials.	X			Study of the contents taught during the lesson.	1.5	2
2	3	4. Stress corrosion cracking 5. Deterioration of the mechanical properties in extreme conditions.	X			Study of the contents taught during the lesson. Doing the first individual exercise of the continuous assessment	1.5	2.5
2	4	6.Extreme wear conditions 7. Tribocorrosion.	X			Study of the contents taught during the lesson. Doing the second individual exercise of the continuous assessment	1.5	2.5
3	5	8. H embrittlement. 9. Challenges of joining of components in the industry. 10. Corrosion inhibitors.	X			Study of the contents taught during the lesson.	1.5	2
3	6	10. Cathodic protection. Anodic protection. 11 Materials performance in the chemical industry.	X			Study of the contents taught during the lesson. Doing the third individual exercise of the continuous assessment questions in	1.5	2.5

						small groups		
4	7	12. Materials performance in the petrol industry.	X			Study of the contents taught during the lesson. Doing the fourth individual exercise of the continuous assessment.	1.5	2.5
4	8	12. Materials performance in the petrochemical industry. 13. Materials performance in thermal fuel plants.	X			Study of the contents taught during the lesson.	1.5	2
5	9	**Group A: Laboratory 1:** Manufacturing of different corrosion cells. Preferential location of anodes and cathodes **Group B: Laboratory 3:** Hot corrosion. Wear Test	X		GA: 1.0A04 GB: 1.0A03	Reading the guide notes for the experimental work and solving the raised questions in small groups	1.5	2.5
5	10	**Group B: Laboratory 1:** Manufacturing of different corrosion cells. Preferential location of anodes and cathodes **Group A: Laboratory 3:** Hot corrosion. Wear Test	X		GB: 1.0A04 GA: 1.0A03	Reading the guide notes for the experimental work and solving the raised questions in small groups	1.5	2.5
6	11	**Group A: Laboratory 2:** Analysis of the results of the former laboratory session. Influence of acid concentration in passivable systems. Measurement of the intensity of galvanic couples **Group B: Laboratory 4:** Analysis of the results of the former laboratory session	X		GA: 1.0A04 GB: 1.0A03	Reading the guide notes for the experimental work and solving the raised questions in small groups	1.5	3
6	12	**Group B: Laboratory 2:** Analysis of the results of the former laboratory session. Influence of acid concentration in passivable systems. Measurement of the intensity of galvanic couples **Group A: Laboratory 4:** Analysis of the results of the former laboratory session	X		GA: 1.0A04 GB: 1.0A03	Reading the guide notes for the experimental work and solving the raised questions in small groups	1.5	3
7	13	14. Materials performance in the paper industry. 15. Materials performance in nuclear power generation plants. Effect of irradiation on materials	X			Study of the contents taught during the lesson.	1.5	2

7	14	16. Materials performance in solar power stations Materials performance in aerospace and aeronautical industries.	X			Study of the contents taught during the lesson.	1.5	2.5
TOTAL HOURS							21	33.5