

COURSE: MATERIALS SCIENCE AND ENGINEERING		
DEGREE:	YEAR: 2nd	TERM: 1st

WEEKLY PROGRAMMING

WEEK	SESSION	DESCRIPTION	GROUPS		Special room for session (computer classroom, audio-visual classroom...)	WEEKLY PROGRAMMING FOR STUDENT		
			LECTURES	SEMINAR		DESCRIPTION	CLASS HOURS	HOMEWORK HOURS Maximum 7 H
1	1	MATERIALS FAMILIES, APPLICATIONS AND SELECTING CRITERIA - Concept of Materials Science and Engineering. - Classification of materials. Properties. - Application and selection of materials	X			Previous reading of proposed themes Personal work about lesson	1,5	2
1	2	MATERIALS FAMILIES, APPLICATIONS AND SELECTING CRITERIA - Bond in solids. - Relationship between bond, structure and properties in materials		X		Personal work about lesson. Proposed exercises. Discussion	1,5	
2	3	STRUCTURE OF MATERIALS - Crystalline structures (metallic and ceramics). - Structure of polymers - Amorphous materials. Concept of glass transition	X			Previous reading of proposed themes Personal work about lesson	1,5	6
2	4	STRUCTURE OF MATERIALS - Atomic positions, directions and crystallographic planes. - Lineal, planar and volumetric densities in crystals.		X		Personal work about lesson. Proposed exercises. Discussion	1,5	
3	5	STRUCTURE OF MATERIALS - Defects in crystalline solids. - Concept of solid solution	X			Previous reading of proposed themes Personal work about lesson	1,5	4
3	6	STRUCTURE OF MATERIALS - Diffusion In solids.		X		Personal work about lesson. Proposed exercises. Discussion	1,5	
4	7	PHASE DIAGRAMS - Basic concepts. One-component diagrams. - Two-component systems with total and partial solubility. - Solid state precipitation. - Invariant reactions. - Intermetallics.	X			Previous reading of proposed themes Personal work about lesson	1,5	6

4	8	PHASE DIAGRAMS - Application of lever rule. - Calculus in phase diagrams. - Formation of microstructure.		X		Personal work about lesson. Proposed exercises. Discussion	1,5	
5	9	PHASE DIAGRAMS - Fe-C system. - Ceramics' phase diagrams. - Ternary phase diagrams.	X			Previous reading of proposed themes Personal work about lesson	1,5	5
5	10	PHASE DIAGRAMS - Calculus in phase diagrams with invariant reactions in solid state. - Microstructures in eutectoid reactions.		X		Personal work about lesson. Proposed exercises. Discussion	1,5	
6	11	MECHANICAL PROPERTIES - Definition of mechanical properties. - Stress-deformation concepts - Elastic and plastic deformations. - Slipping systems. - Hardening.				Previous reading of proposed themes Personal work about lesson	1,5	6
6	12	MECHANICAL PROPERTIES - Calculus in tensile tests.				Personal work about lesson. Proposed exercises. Discussion	1,5	
7	13	MECHANICAL PROPERTIES - Application to ceramics: modulus of rupture. - Application to polymers. - Hardness.				Previous reading of proposed themes Personal work about lesson	1,5	5
7	14	MECHANICAL PROPERTIES - Practical cases related to hardness measurement and deformation of materials.				Personal work about lesson. Proposed exercises. Discussion	1,5	
8	15	METALLIC MATERIALS - Solidification. - Classification of metallic alloys. - Steels. Transformations under equilibrium conditions.				Previous reading of proposed themes Personal work about lesson	1,5	6
8	16	METALLIC MATERIALS - Steels. Non-equilibrium transformations. - TTT Diagrams and thermal treatments. - Exercises				Personal work about lesson. Proposed exercises. Discussion	1,5	
9	17	METALLIC MATERIALS - Types of steels: construction steels, stainless steels, tool steels.				Previous reading of proposed themes Personal work about lesson	1,5	6
9	18	METALLIC MATERIALS - Light alloys. - Copper-base alloys.				Personal work about lesson. Proposed exercises. Discussion	1,5	

10	19	CERAMIC MATERIALS - Structure and bond in ceramics. Structure of silicates. - Glasses. - Properties of ceramics. - Processing of ceramics.				Previous reading of proposed themes Personal work about lesson	1,5	4
10	20	CERAMIC MATERIALS - Applications of ceramics.				Personal work about lesson. Proposed exercises. Discussion	1,5	
11	21	POLYMERIC MATERIALS - General concepts. - Classification. - Properties.				Previous reading of proposed themes Personal work about lesson	1,5	4
11	22	POLYMERIC MATERIALS - Types of polymers. - Processing. - Problems of polymers.				Personal work about lesson. Proposed exercises. Discussion	1,5	
12	23	COMPOSITE MATERIALS - Classification of composite materials. - Polymer matrix composite materials. - Processing.				Previous reading of proposed themes Personal work about lesson	1,5	5
12	24	COMPOSITE MATERIALS - Exercises related to polymers and composites.				Personal work about lesson. Proposed exercises. Discussion	1,5	
13	25	FUNCTIONAL PROPERTIES - Metallic conductors - Non-metallic conductors				Previous reading of proposed themes Personal work about lesson	1,5	5
13	26	FUNCTIONAL PROPERTIES - Semiconductors.				Personal work about lesson. Proposed exercises. Discussion	1,5	
14	27	FUNCTIONAL PROPERTIES - Isolating and dielectric materials.				Previous reading of proposed themes Personal work about lesson	1,5	4
14	28	FUNCTIONAL PROPERTIES - Magnetic materials.				Personal work about lesson. Proposed exercises. Discussion	1,5	
SUBTOTAL							42	+ 68 = 110
15		Tutorials, handing in, etc						
16-18		Assessment					3	
TOTAL							150	

LABORATORIES CLASSES PROGRAMMING

SESSION	WEEK	DESCRIPTION	LABORATORY	WEEKLY PROGRAMMING FOR STUDENT		
				DESCRIPTION	CLASS HOURS	HOMEWORK HOURS Maximum 7 H
1		Microscopic properties	Avda Mediterráneo	Previous reading of practice and associated theory. Answering the questionnaire.	1,5	1
2		Macroscopic properties I	Avda Mediterráneo	Previous reading of practice and associated theory. Answering the questionnaire.	1,5	1
3		Macroscopic properties II	Avda Mediterráneo	Previous reading of practice and associated theory. Answering the questionnaire.	1,5	1
4		Functional properties	Avda Mediterráneo	Previous reading of practice and associated theory. Answering the questionnaire.	1,5	1
TOTAL						