



COURSE: Chemical Basis of the Engineering

GRADE: Mechanical Engineering

YEAR: 1

TERM: 1

WEEKLY PLANNING

WEEK	SESSION	DESCRIPTION	TEACHING (mark X)		SPECIAL ROOM FOR SESSION (Computer classroom, audio-visual class room)	Indicate YES/NO if this is a sesión with two teachers	WEEKLY PROGRAMMING FOR STUDENT		
			LECTURES	SEMINARS			DESCRIPTION	CLASS HOURS (1,66=50+50 min)	HOMEWORK HOURS (Max. Estim. 6,5h)
1	1	<b>BLOCK 1: FUNDAMENTALS</b> <b>Structure of matter.</b> Atomic structure. Electronic configuration and periodic properties..	X			NO	Work on the topic taught, including recommended readings	1,66	6
1	2	Review of fundamental concepts: atom, atomic mass and isotopic distribution. Ions. Mol. Solutions. Stoichiometry.		X		NO	Work on proposed exercises	1,66	
2	3	<b>Chemical bond.</b> Link types. Interactions intermolecular. Examples of obtaining the shape and geometry of simple molecules.	X			NO	Work on the topic taught, including recommended readings	1,66	6
2	4	Solving exercises and questions related to fundamental aspects of block 1		X		NO	Work on proposed exercises	1,66	
3	5	<b>States of matter.</b> Gases, solids and liquids	X			NO	Work on the topic taught, including recommended readings	1,66	6
3	6	Solving exercises and questions related to fundamental aspects of block 1		X		NO	Work on proposed exercises	1,66	
4	7	<b>Solutions</b> and colligative properties	X			NO	Work on the topic taught, including recommended readings	1,66	6

4	8	Solving exercises and questions related to fundamental aspects of block 1		X		NO	Work on proposed exercises	1,66	
5	9	<b>BLOCK 2: THERMODYNAMICS AND CHEMICAL EQUILIBRIUM</b> <b>Thermochemistry.</b> Enthalpy and heat capacity. Hess's law. Entropy.	X			NO	Work on the topic taught, including recommended readings	1,66	6
5	10	Solving exercises and questions related to fundamental aspects of block 2		X		NO	Work on proposed exercises	1,66	
6	11	Free energy. <b>Chemical equilibrium.</b> Equilibrium constant. Factors affecting the chemical equilibrium Le Chatelier's principle.	X			NO	Work on the topic taught, including recommended readings	1,66	6
6	12	Solving exercises and questions related to fundamental aspects of block 2		X		NO	Work on proposed exercises	1,66	
7	13	<b>Acid-base and solubility.</b> Acid-base equilibrium. pH. Acid and basic ionization constant. Neutralization.	X			NO	Work on the topic taught, including recommended readings	1,66	6
7	14	<b>Laboratory session.</b> Titration of a polyprotic acid			1.0E02	YES	Lab practices in groups of 1-2 students and delivery report.	1+1 (1)	
8	15	Buffer solutions. pH Indicators. Solubility product. Factors affecting solubility.	X			NO	Work on the topic taught, including recommended readings	1,66	6
8	16	Solving exercises and questions related to fundamental aspects of block 2		X		NO	Work on proposed exercises	1,66	
9	17	<b>Electrochemistry.</b> Oxidation-reduction reactions. Standard potentials. Operation of galvanic cells.	X			NO	Work on the topic taught, including recommended readings	1,66	6
9	18	<b>Laboratory session.</b> Measuring electrochemical potentials			1.0E02	YES	Lab practices in groups of 1-2 students and delivery report.	1+1 (1)	
10	19	Electrolytic cells. Faraday's law. Applications. Nernst equation. Corrosion.	X			NO	Work on the topic taught, including recommended readings	1,66	6
10	20	Solving exercises and questions related to fundamental aspects of block 2		X		NO	Work on proposed exercises	1,66	
11	21	<b>SECTION 3: APPLIED CHEMISTRY</b> <b>Chemistry kinetics and catalysis.</b> Reaction rate. Rate law and order of reaction. Arrhenius' law. Catalysis.	X			NO	Work on the topic taught, including recommended readings	1,66	6
11	22	Solving exercises and questions related to fundamental aspects of block 3		X		NO	Work on proposed exercises	1,66	
12	23	<b>Basic operations in chemical engineering.</b> Concept of basic operation. Basic operations controlled by mass or mass/heat transport.	X			NO	Work on the topic taught, including recommended readings	1,66	6
12	24	<b>Laboratory session.</b> Separation of a mixture			1.0E02	YES	Lab practices in groups of 1-2 students and delivery report.	1+1 (1)	
13	25	<b>Organic Chemistry (I).</b> Organic compounds. Classification. Main types of organic reactions. Physical and chemical properties of paraffines and olefines. Hydrocarbons. Combustion.	X			NO	Work on the topic taught, including recommended readings	1,66	6

13	26	Study of inorganic chemistry processes.		X		NO	Work on proposed exercises. Case studies	1,66	
14	27	<b>Organic Chemistry (II).</b> Physical and chemical properties of another organic compounds. Reactivity and examples of industrial processes	X			NO	Work on the topic taught, including recommended readings	1,66	6
14	28	Fractionation and industrial use of oil, coke ... Exercises of combustion		X		NO	Work on proposed exercises. Case studies	1,66	
	29	<b>Laboratory session.</b> Reaction kinetics. Method of initial rates			1.0E02	YES	Lab practices in groups of 1-2 students and delivery report.	1+1 (1)	2,5
NOTES	(1) Dates indicated for laboratory sessions are only orientative, and may be subject of change. Consult during the course. Part of the laboratory will be carried out through a synchronous online session prior to the laboratory practice.								
<b>Subtotal 1</b>								<b>41,7 + 8 lab</b>	<b>86,5</b>
<b>Total 1 (Hours of class plus student homework)</b>								<b>137,7</b>	
15	Tutorials, handing in, etc							6	
16-18	Assessment							3	15
<b>Subtotal 2</b>								<b>9</b>	<b>15</b>
<b>Total 2 (Hours of class plus student homework)</b>								<b>24</b>	
<b>TOTAL (Total 1 + Total 2. Maximum 160 hours)</b>								<b>160,2</b>	