



A) COURSE

Course Id:	Course
0071	CHEMISTRY A

Class Hours per Week	Lab hours per week	Complementary practices	Credits	Total hour course
5	2	3	8	80

B) GENERAL COURSE INFORMATION:

	EE (IEA)	ME (IM)	MME (IMA)	EME (IME)	MTE (IMT)
Level:					
Course Type (Required/Elective)	Required	Required	Required	Required	Required
Prerequisite Course:					
CACEI Classification:					

C) COURSE OBJECTIVE

At the end of the course, the student will be capable of:

AFTER COMPLETING THE THEORETICAL AND PRACTICAL COURSE, STUDENTS WILL BE ABLE TO UNDERSTAND CONCEPTS AND LAWS, MANAGE FORMULAS, MAKING REACTIONS AND PERFORM EXPERIMENTS KNOWN PROCESSES AND BE IN A POSITION TO UNDERSTAND THE NATURAL PROCESSES (PHOTOSYNTHESIS IN PLANTS, ANIMAL LIFE, LIFE WEATHER MAN ... ETC) AND INDUSTRIAL PROCESSES SUCH AS STEEL MANUFACTURING, ACID PRODUCTION, FERTILIZERS, PLASTICS, RESINS, RUBBERS, DRUGS AND ALL KINDS OF NEW PRODUCTS THAT OFFER A BETTER STANDARD OF LIVING HUMANS.

D) TOPICS (CONTENTS AND METHODOLOGY)

1 . NATURE OF CHEMISTRY	6 Hours
Specific Objective:	



1.1 HOW IS SCIENCE (SCIENTIFIC METHOD)	
1.2 PHYSICAL PROPERTIES OF THE MATERIAL	
1.3 STATE OF THE ART AND A MODEL TO EXPLAIN	
1.4 SUSTANCIAS MIXTURES AND SEPARATIONS	
1.5 CHEMICAL ELEMENTS	
1.6 CHEMICAL COMPOUNDS	
1.7 CHANGES CHEMICALS AND CHEMICAL PROPERTIES	
1.8 CLASSIFICATION OF THE MATERIAL	
Readings and other resources	Books, Articles, Further literature, Internet Links.
Teaching Methodologies	Exhibition themes, concept analysis, problem resolution and discussion, group work and individual.
Learning Activities	

2.- ELEMENTS AND ATOMS	7 Hours
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Specific Objective:	
2.1 ORIGINS OF ATOMIC THEORY	
2.2 THE MODERN ATOMIC THEORY	
2.3 CHEMICAL ELEMENTS	
2.4 STRUCTURE ATOMIC	
5.2 SUBATOMIC PARTICLES	
2.6 THE NUCLEAR ATOM	
2.7 ISOTOPES	
2.8 ISOTOPES AND ATOMIC WEIGHT	
2.9 QUANTITIES OF SUBSTANCES THE MOL	
2.10 MOLAR MASS AND TROUBLESHOOTING	
2.11 THE PERIODIC TABLE.	
Readings and other resources	Books, Articles, Further literature, Internet Links.
Teaching Methodologies	Exhibition themes, concept analysis, problem resolution and discussion, group work and individual.
Learning Activities	

3. - CHEMICALS	6 Hours
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Specific Objective:	
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- 3.1 NAMES OF BINARY MOLECULAR COMPOUNDS
- 3.2 IONS AND IONIC COMPOUNDS
- 3.3 NAMES OF IONIC COMPOUNDS
- 3.4 PROPERTIES OF IONIC COMPOUNDS
- 3.5 IONIC COMPOUNDS IN AQUEOUS SOLUTION: ELECTROLYTES
- 3.4 PROPERTIES OF IONIC COMPOUNDS
- 3.5 IONIC COMPOUNDS IN AQUEOUS SOLUTION: ELECTROLYTES
- 3.6 SOLUBILITY OF IONIC COMPOUNDS IN AQUEOUS SOLUTION
- 3.7 THE BIOLOGICAL PERIODIC TABLE
- 3.8 MOLES OF COMPOUNDS
- 3.9 PERCENT COMPOSITION
- 3.10 DETERMINATION OF EMPIRICAL AND MOLECULAR FORMULAS

Readings and other resources	Books, Articles, Further literature, Internet Links.
Teaching Methodologies	Exhibition themes, concept analysis, problem resolution and discussion, group work and individual.
Learning Activities	

4.- CHEMICAL REACTIONS	6 Hours
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Specific Objective:	
	<ul style="list-style-type: none">4.2 BALANCING CHEMICAL EQUATIONS4.3 PATTERNS OF CHEMICAL REACTIONS4.4 EXCHANGE REACTIONS: PRECIPITATION AND NET IONIC EQUATIONS4.5 ACIDS, BASES AND EXCHANGE REACTIONS4.6 UNDESIRABLE FORMING GASES4.7 OXIDATION-REDUCTION4.8 OXIDATION NUMBERS AND REDOX REACTIONS4.9 DISPLACEMENT REACTIONS AND THE SERIES OF REDOX ACTIVITY.
Readings and other resources	Books, Articles, Further literature, Internet Links.
Teaching Methodologies	Exhibition themes, concept analysis, problem resolution and discussion, group work and individual.
Learning Activities	



5. - RELATIONS BETWEEN THE AMOUNTS OF REAGENTS AND PRODUCTS		6 Hours
Specific Objective:		
5.1 THE MOLE AND CHEMICAL REACTIONS MACRO-NANO CONNECTION		
5.2 REACTIONS IN WHICH ONE REACTANT SCARCE		
5.3 EVALUATION OF THE SUCCESS OF A SYNTHESIS: PERCENTAGE YIELD.		
5.4 A SOLUTION TO THE SOLUTIONS		
5.5 MOLARITY IN AQUEOUS SOLUTIONS AND REACTIONS		
Readings and other resources	Books, Articles, Further literature, Internet Links.	
Teaching Methodologies	Exhibition themes, concept analysis, problem resolution and discussion, group work and individual.	
Learning Activities		

6. - PRINCIPLES OF ENERGY TRANSFER AND REACTIVITY CHEMICAL REACTIONS		6 Hours
Specific Objective:		
6.1 CONSERVATION OF ENERGY		
6.2 ENERGY UNITS		
6.3 HEAT CAPACITY AND SPECIFIC HEAT CAPACITY		
6.4 TRANSFER OF ENERGY AND STATE CHANGES		
6.5 CHANGES OF ENTHALPY IN CHEMICAL REACTIONS		
6.6 USING THERMOCHEMICAL EQUATIONS FOR CHEMICAL REACTIONS		
6.7 AS MEASURED ENTHALPY CHANGES IN REACTIONS - CALORIMETRY		
6.8 THE LAW OF HESS		
6.9 STANDARD ENTHALPIES OF FORMATION MOLAR		
Readings and other resources	Books, Articles, Further literature, Internet Links.	
Teaching Methodologies	Exhibition themes, concept analysis, problem resolution and discussion, group work and individual.	
Learning Activities		

7. - ELECTRON CONFIGURATIONS, PERIODICITY AND PROPERTIES OF ELEMENTS		6 Hours
Specific Objective:		



- 7.1 ELECTROMAGNETIC RADIATION AND MATTER
- 7.2 QUANTUM THEORY OF PLANK
- 7.3 MODELS OF THE ATOM
- 7.4 PROPERTIES TYPE SPIN OF ELECTRONS FROM ATOMS.
- 7.5 CONFIGURATIONS ELECTRON ORBITALS
- 7.6 PERIODIC TRENDS ATOMIC RADIUS
- 7.7 PERIODIC TRENDS IONIC RADIUS
- 7.8 PERIODIC TRENDS IONIZATION ENERGY
- 7.9 TRENDS PERIODIC PROPERTIES OF THE ELEMENTS 1 AND 2 PERIODS

Readings and other resources	Books, Articles, Further literature, Internet Links.
Teaching Methodologies	Exhibition themes, concept analysis, problem resolution and discussion, group work and individual.
Learning Activities	

8. - COVALENT LINKS	6 Hours
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Specific Objective:	
<ul style="list-style-type: none"> 8.1 COVALENT-IONIC 8.2 COVALENT LEWIS SIMPLE-STRUCTURE 8.3 MULTIPLE COVALENT BONDS 8.4 OCTET RULE AND EXCEPTIONS 8.5 PROPERTIES OF THE LINKS 8.6 STRUCTURE OF LEWIS RESONANCE 8.7 POLARITY OF BONDS AND ELECTRONEGATIVITY 8.8 COORDINATE COVALENT BOND 	
Readings and other resources	Books, Articles, Further literature, Internet Links.
Teaching Methodologies	Exhibition themes, concept analysis, problem resolution and discussion, group work and individual.
Learning Activities	

9. - GASES AND THE ATMOSPHERE	7 Hours
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Specific Objective:	
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9.1 PROPERTIES OF GASES	
9.2 THE ATMOSPHERE	
9.3 THE KINETIC MOLECULAR THEORY	
9.4 PERFORMANCE OF GASES, GAS LAWS	
9.5 GASES IN CHEMICAL REACTIONS	
9.6 DENSITY AND MOLAR MASS OF GASES	
9.7 THE PARTIAL PRESSURES OF GASES	
9.8 BEHAVIOR OF REAL GASES	
9.9 ATMOSPHERE SUBSTANCE	
Readings and other resources	Books, Articles, Further literature, Internet Links.
Teaching Methodologies	Exhibition themes, concept analysis, problem resolution and discussion, group work and individual.
Learning Activities	

10. - LIQUID STATE, SOLID STATE, MODERN MATERIALS		6 Hours
Specific Objective:		
10.1 THE LIQUID		
10.2 VAPOR EQUILIBRIUM VAPOR PRESSURE		
10.3 CHANGE OF LIQUID AND GAS SOLID PHASE		
10.4 WATER IMPORTANT LIQUID WITH EXTRAORDINARY PROPERTIES		
10.5 TYPES SOLIDS		
10.6 CRYSTALLINE SOLIDS		
10.7 SCANNING X-RAY CRYSTALLOGRAPHY SOLID		
10.8 METALS, SEMICONDUCTORS AND INSULATORS		
Readings and other resources	Books, Articles, Further literature, Internet Links.	
Teaching Methodologies	Exhibition themes, concept analysis, problem resolution and discussion, group work and individual.	
Learning Activities		

11. - WATER AND CHEMISTRY OF SOLUTIONS		6 Hours
Specific Objective:		



11.1 THE UNIQUE PROPERTIES OF WATER AS SOLVENT	
11.2 AS SUBSTANCES DISSOLVE	
11.3 TEMPERATURE AND SOLUBILITY	
11.4 COMPOSITION OF DILUTE AQUEOUS SOLUTIONS	
11.5 CLEAN WATER AND CONTAMINATED	
11.6 VAPOR PRESSURES. P AND P BOILING SOLUTIONS FREEZING	
11.7 OSMOTIC PRESSURE OF THE SOLUTIONS	
11.8 COLLOIDS	
11.9 SURFACTANTS	
Readings and other resources	Books, Articles, Further literature, Internet Links.
Teaching Methodologies	Exhibition themes, concept analysis, problem resolution and discussion, group work and individual.
Learning Activities	

12. - PRINCIPLES OF CHEMICAL KINETICS III REACTIVITY		6 Hours
Specific Objective:		
12.1 REACTION RATE CONCETRACIÓN		
12.2 EFFECT ON THE RATE OF REACTION		
12.3 ACT ORDER REACTION RATE AND		
12.4 PERSPECTIVE NANOSCALE ELEMENTARY REACTIONS		
12.5 TEMPERATURE AND REACTION RATE		
12.6 SPEED LAWS FOR ELEMENTARY REACTIONS		
12.7 REACTION MECHANISMS		
12.8 CATALYSTS AND REACTION RATE SOLUBILITY OF GASES IN LIQUIDS.		
Readings and other resources	Books, Articles, Further literature, Internet Links.	
Teaching Methodologies	Exhibition themes, concept analysis, problem resolution and discussion, group work and individual.	
Learning Activities		

13. - PRINCIPLES OF REACTIVITY IV. CHEMICAL EQUILIBRIUM		6 Hours
Specific Objective:		



- 13.1 THE STEADY STATE
- 13.2 THE EQUILIBRIUM CONSTANT
- 13.3 DETERMINATION OF THE EQUILIBRIUM CONSTANT
- 13.4 THE MEANING OF THE EQUILIBRIUM CONSTANT
- 13.5 CALCULATION OF EQUILIBRIUM CONCENTRATIONS
- 13.6 DISPLACEMENT BALANCE PRINCIPLE "LE CHATELIER"

Readings and other resources	Books, Articles, Further literature, Internet Links.
Teaching Methodologies	Exhibition themes, concept analysis, problem resolution and discussion, group work and individual.
Learning Activities	

E) TEACHING AND LEARNING METHODOLOGIES

THE CLASS WILL BE TAUGHT BY EXPOSITORY SESSIONS BY THE TEACHER AND STUDENT PARTICIPATION WILL BE ESSENTIAL IN THE WORK AND RESEARCH IN ORDER TO COMPLETE THE COURSE THEMES AND TOPICS.

F) EVALUATION CRITERIA:

Evaluation:	Schedule	Suggested Form of Evaluation and weighing	Topics
1er. Evaluation Partial	Session 26	Exam 70% , Homework 30%,	Unity 1,2,3 y 4
2º Evaluation Partial	Session 52	Exam 70% , Homework 30%,	Unity 5,6,7 y 8
3er. Evaluation Partial	Session 80	Exam 70% , Homework 30%,	Unity 9,10,11,12 y 13
Evaluation Final Ordinary		100% Average partial evaluations	
Other Activity:			
Exam Extraordinary	Week 17 of the semester in progress	100% Exam	100% Program
Exam of title	According to schedule school secretary	100% Exam	100% Program
Exam regularization	According to schedule school secretary	100% Exam	100% Program

G) BIBLIOGRAPHY AND ELECTRONIC RESOURCES

CHEMISTRY, RAYMOND CHANG 7A EDICIÓN. MC. GRAW HILL

THE WORLD OF CHEMISTRY CONCEPTS AND APPLICATIONS, MOORE. STANITSKI, WOOD. KOTZ, PEARSON EDUCACIÓN

CHEMISTRY CENTRAL SCIENCE, BROWN LEMA Y BURSTEN PH. PRENTICE HILL



GENERAL CHEMISTRY, KENNET WHITTEN KENNET GAILEY RAIMOND DAVID, MC. GRAW HILL

SUPERIOR GENERAL CHEMISTRY. MASTERTON SLOWINSKI, STANITSKI. MC. CRAW HILL

GENERAL CHEMISTRY, MORTINER, MC. GRAW HILL

Main Books

Complementary Books