

VISION

To become the Centre of Excellence in aviation education

MISSION

- a. To provide quality aviation education and
- b. To assist our graduates in the labor market

BASIC STUDIES EDUCATIONAL OBJECTIVES	Mission	
	a	b
1. . To provide students with a good and solid foundation in mathematics, basic engineering sciences, engineering drawing, physics, general chemistry and other branches of natural sciences and to apply knowledge to aviation and other related discipline.	√	√
2 To develop communicative skills in listening, speaking, reading, writing and graphics communication pertaining to technical drawing interpretation.	√	√
3. To teach and train students the importance of humanistic values and respect of cultural differences through humanities and social sciences.	√	√
4. To impart high ethical standards to the students through assimilation and incorporation in the learning activities.	√	√
5. To infuse students with enhanced computer concepts and expertise through incorporating competent applications and disciplines.	√	√
6. . To acquire the total human development according to its physical, mental, emotional, social aspects in promoting a healthy lifestyle.	√	√

COURSE SYLLABUS

1. **Course Code:**NSCI121
2. **Course Title:**General Chemistry 2
3. **Pre-requisite/s:** General Chemistry 1, General Chemistry 1 Lab, College Algebra, Trigonometry
4. **Co-requisites:** NSCI 121L
5. **Credit:** 3 units lecture

Course Title: General Chemistry 2	Date Effective: A.Y.2012-2013	Prepared by: Editha E. Domingo Albert Soriano Heide Sanchez Fernando Paguirigan Amelia Santos	Reviewed by: Engr.Editha E. Domingo	Approved by: Engr. Lorenzo L. naval, Jr. VP for Academic Affairs	Page 1 of 9
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6. **Course Description:** Gases, atmospheric pressure, absolute temperature, gas laws, application of gaslaws, kinetic molecular theory, ideal gas laws, real gas, Intermolecular forces, Liquids and Solids; Solutions, Saturated solution and Solubility, Ways of expressing concentration, Colligative properties; Colloids; Chemical Kinetics, Chemical Equilibrium; Acid-BaseEquilibria; Electrochemistry; Chemistry of the Environment; Chemistry of Life, Organic and Biological

PROGRAM OUTCOMES	Basic Studies Educational Objectives					
	1	2	3	4	5	6
a. An ability to apply knowledge of mathematics, physical sciences, engineering sciences to the practice of aviation and aviation related program.	√	√		√	√	
b. An ability to design and conduct experiments to test hypotheses and verify assumptions, as well as to analyse and interpret data and to simulate processes.	√	√		√	√	√
c. An ability to design, improve, innovate, and to supervise systems or processes to meet desired needs within realistic constraints.	√	√		√		√
d. An ability to work effectively in multi-disciplinary and multi-cultural teams in diverse fields of practice.	√	√	√	√	√	√
e. An ability to identify,formulates, and solves aviation and aviation related program problems.	√	√		√	√	√
f. An understanding of the effects and impact of the aviation and aviation related program profession on the environment and the society, as well as the social and ethical responsibilities of the profession.		√	√	√		√
g. Specialized knowledge in at least one field of aviation and aviation related program practice, and the ability to apply such knowledge to provide solutions to actual problems.	√	√		√	√	
h. An ability for effective oral and written communications particularly in the English language.	√	√	√	√		√
i. An ability to engage in life-long learning and to keep current of the development in a specific field of specialization.	√	√		√	√	√
j. An ability to use the appropriate techniques, skills and tools necessary for the practice of aviation and aviation related program.	√	√	√	√	√	
k. A knowledge of contemporary issues.	√	√	√	√		√
l. An ability to apply acquired aviation and aviation related program knowledge and skills for national development.	√	√	√	√	√	√

8. **Course Objectives and Relationship to Program Outcomes:**

Course Objectives The students should be able:	PROGRAM OUTCOMES											
	a	b	c	d	e	f	g	h	i	j	k	l
1. To recognize and distinguish the different gas laws and relate them to the field of aviation science.	√	√			√			√	√	√		
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2. To summarize and design activities that relates gas principles, chemical equilibrium and condition to mathematical expression from simple to complicated problem.	√	√	√		√	√		√	√	√	√	
3. To apply the different calculation techniques in solving problems in concentration of solutions and chemical laws and use this in relation to aircraft industry.	√	√		√	√	√		√	√	√		

9. Course Coverage

WEEK	TOPIC/ACTIVITY	METHODOLOGY & STRATEGY	ASSESSMENT & EVALUATION TOOLS
1	Orientation and Introduction to the course <i>Course Policies and Guidelines, Nature and Scope of the course, PATTS Mission and Vision</i>	Discussion of course policies and guidelines	
	Gases Properties and Behaviors of gases Volume, Pressure and Temperature	Lecture and Discussion	Seatwork Recitation
	Kinetic Molecular Theory	Lecture and Discussion Class interaction	Recitation
2	The Gas Laws Boyle's Law Charles' Law	Lecture and Discussion Sample Problems	Seatwork Homework
	Gay-Lussac's Law Combined Gas Law	Lecture and Discussion Sample Problems	Seat work Board work
	Quiz No. 1		Quiz Discussion
3	Dalton's Law of Partial Pressure	Lecture and Discussion Sample Problems Pair work	Seatwork Home work
	Ideal Gas Law Comparison of Real and Ideal Gas	Lecture and Discussion Sample Problems Class Interaction	Homework
	Quiz No. 2		Quiz Discussion

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4	Further Applications of Gas Laws Calculation of Molecular weight a. Avogadro's Law b. Graham's Law of Diffusion c. Ideal Gas Law	Lecture and Discussion Pair work	Seatwork Homework
	Calculation of Gas Density a. Avogadro's Law b. Ideal Gas Law	Lecture and Discussion Sample Problems	Seatwork Homework Board work
	Quiz No. 3		Quiz Discussion
5	Reactions Involving Gases a. Volume-Volume Gay Lussac's Law of Combining Volumes	Lecture and Discussion Sample Problems	Seatwork Homework Recitation
	b. Mass- Volume Relationship c. Volume – Mass Relationship	Lecture and Discussion Sample Problems	Seatwork
	Liquefaction of Gases a. Critical Temperature b. Critical Pressure	Discussion Class Interaction	Assignment
PRELIMINARY EXAMINATION			
6	Liquid Behavior of Liquids Properties of Liquids a. Viscosity b. Surface Tension c. Capillary Action	Lecture, Discussion and Class Interaction	Research
	d. Evaporation e. Vapor Pressure f. Boiling Point g. Heat of Vaporization	Lecture, Discussion and Class Interaction	Seat work Home work
7	Solids Behavior of Solids Types of Solids Structure of Solids Bonding in Solids Heat Fusion	Lecture and Discussion Reporting	Seatwork Homework
	Quiz 1		Quiz 1 Discussion
	Solutions Types of Solutions Factors Affecting Solubility	Lecture, Discussion Class Interaction	Seatwork Homework

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8	Concentration of Solutions Percent by Mass Percent by Volume Mass per Volume	Lecture Discussion Sample problems	Seat work Home work
	Molarity Molality	Lecture Discussion Sample Problems	Seat work Home work
	Quiz 2		Quiz Discussion
9	Mole Fraction Normality	Lecture, Discussion Group work	Seatwork Homework
	Dilution and Mixing problems Titration Reactions Involving Gases	Lecture, Discussion Pair work	Seat work Home work
	Quiz No. 3		Quiz Discussion
10	Colligative Properties Raoult's Law Freezing Point Depression Boiling Point Elevation	Lecture Discussion Cooperative Learning	Seat work Home work
	Vapor Pressure Depression Osmotic Pressure	Lecture Discussion Cooperative Learning	Seat work Home work Recitation
	Quiz No. 4		Quiz Discussion
11	The Colloidal System Parts of Colloids Types of Colloids Formation of Colloids	Discussion Cooperative Learning Reporting	Research Homework
	Properties of Colloids Uses of Colloids Importance of Colloid Chemistry	Reporting Discussion Cooperative Learning	Seatwork Homework
	MIDTERM EXAMINATION		

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12	Chemical Kinetics Rate of Chemical reaction Factors Affecting the Rate of Chemical Reaction Nature Of Reactants Activation Energy Catalyst	Lecture and Discussion Cooperative Learning	Seatwork Homework
	Effect of Concentration on the Rate of Chemical reaction Reversible Reactions Chemical Equilibrium Chemical Equilibrium Constant Problems Involving K_{eq} Le Chatelier's Principle	Lecture and Discussion Cooperative Learning	Seatwork Homework Research
	Quiz No. 1		Quiz Discussion
13	Acids, Bases and Salts Arrhenius Concept Bronsted-Lowry Concept Conjugate Acids and Bases Strength of Acids and Bases	Lecture and Discussion	Seatwork Homework
	Buffer System Ionic Equilibria Ionization of Water K_a and K_b Common Ion Effect Solubility Equilibria	Lecture and Discussion Cooperative Learning	Seatwork Homework
	Quiz No. 2		Quiz Discussion
14	Chemical Thermodynamics First Law of thermodynamics Thermodynamic Terms Enthalpy Changes	Lecture, Discussion and Class Interaction	Seatwork Homework
	Calorimetry Thermochemical Equations Molar Enthalpies Hess's Law	Lecture, Discussion and Class Interaction	Seatwork Homework
	Bond Energies Changes in Internal Energies Relationship of ΔH and ΔE	Lecture, Discussion and Class Interaction	Seatwork Homework
15	Quiz No. 3		Quiz Discussion
	Electrochemistry Electrical Conduction Electrodes Electrolysis of molten salts Electrolysis of aqueous salt	Lecture, Discussion and Cooperative Learning	Seatwork Homework
	Faraday's Law of Electrolysis Commercial Applications of Electrolytic cells	Lecture, Discussion and Cooperative Learning	Seatwork Homework Research

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16	Environmental Chemistry Atmosphere Ozone Layer Hydrologic Cycle Carbon Cycle	Lecture and Discussion Reporting	Seatwork Homework
	Nitrogen Cycle Sulfur Cycle Phosphorous Cycle Earth's water	Group Discussion Class Interaction	Seatwork Homework Research
	Environmental Pollution Related to Aircraft Industry: Air, Water, Solid Waste, Hazardous Materials	Group Discussion Class Interaction	Seatwork Homework Research
17	Organic Chemistry Saturated Hydrocarbons Naming of Saturated Hydrocarbons	Group Discussion Reporting Class Interaction	Seatwork Homework Research
	Unsaturated Hydrocarbons Aromatic Hydrocarbons	Group Discussion Reporting Class Interaction	Seatwork Homework Research
	Functional Groups Fundamental Classes of Organic Reactions	Group Discussion Reporting Class Interaction	Seatwork Homework Research
18	Final Examination		

10. Course Outcomes and Relationship to Course Objectives / Program Outcomes

Course Outcomes	Course objectives			Program Outcomes											
	1	2	3	a	b	c	d	e	f	g	h	i	j	k	l
A Student completing this course should be at the minimum be able to:															
1. apply appropriate units to describe accuracy and precision in measurement	√	√	√	√	√	√		√		√		√			
2. perform conversion of units	√	√	√	√	√	√		√		√		√			
3. determine the effects of pressure, temperature and volume to different gases in ideal and non-ideal condition	√	√	√	√	√	√		√		√		√			
4. state the effect of intermolecular forces to solution formation and identify the factors that affects solubility	√	√		√	√	√						√			

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5. solve problems involving concentration of solution; specifically in acid and base reaction using titration process	√	√		√	√	√						√			
6. identify the different colligative properties and recognize the importance of these properties to daily life	√	√		√	√	√						√			
7. distinguish the different types of colloids and relate some of its useful properties which is important to industry	√	√		√	√	√						√			
8. appreciate some useful ways of expressing concentration	√	√		√	√	√						√			
9. discuss the factor that affects the rate of a chemical reaction; solve problem; involving reaction rate	√	√		√	√	√						√			
10. write equilibrium constant expression for reversible reactions	√	√		√	√	√						√			
11. interpret the magnitude of an equilibrium constant	√	√		√	√	√						√			
12. calculate the value of an equilibrium constant using equilibrium concentrations of reactants and products	√	√	√	√	√	√						√			
13. predict the equilibrium concentration of reactants and products	√	√	√	√	√	√						√			
14. distinguish the direction in which a reaction must proceed in order to achieve equilibrium	√	√	√	√	√	√						√			
15. distinguish acids, bases and salts	√	√	√	√	√	√						√			
16. state the law of thermodynamics and relate the energy changes in a chemical reaction.	√	√	√	√		√	√				√	√			
17. solve problems using Faraday's law of Electrolysis.															
18. relate environmental pollution to aircraft industry.	√	√	√	√	√	√						√			
19. learn the basics of Organic Chemistry	√	√	√	√	√	√						√			

11. Contribution to Course to Meeting the Professional Component:

General Education: 5%
 Basic Sciences and Mathematics: 95% 100%

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12. Textbook: Chemistry (Revised Edition) by Rebecca S. De Borja, Books Atbp, 2011

13. References:

- a. General Chemistry-One Semester 6th ed. by Chang, McGraw Hill, 2011
- b. Principles of General Chemistry 2thed. by Silberberg, C&E Pub. Inc; 2011
- c.a. Brown, LeMay, Bursten, Chemistry, The Central Science, 10thed, Prentice Hall, 2002
- d. Whiten, Davis, Peck, Stanley, General Chemistry, 7thed, Brooks/Cole Div Thomas Learning, 2005
- e. Ebbing & Gammon, General Chemistry, 9thed, 2009
- f. Chang, Raymond, General Chemistry, 5thed, 2008

14. Course Evaluation

$$\text{The Final Course Grade} = \frac{\text{Prelim Grade} + \text{Midterm Grade} + \text{Final Grade}}{3}$$

The Periodical Grade is computed as follows:

Classwork	60%
Periodical Exam	40%
Total	100%

The Classwork is computed as follows:

Homeworks, Seatworks, Recitations, Problem Set	40%
Quizzes	60%
Total	100%

Grading Scale:

Final Average	Grade	Final Average	Grade
Below 70	5.0	84-86	2.0
70-73	3.0	87-90	1.75
74-76	2.75	91-93	1.5
77-80	2.5	94-97	1.25
81-83	2.25	98-100	1.0

15. Committee Members:

Engr. Editha Domingo-Head
Engr. Amelia C. Santos
Mr. Albert V. Soriano
Date: March 14, 2012

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