University of the Philippines Diliman
College of Science, Institute of Chemistry

CHEMISTRY 1 Syllabus
CHEMISTRY: SCIENCE THAT MATTERS

1. **Course Number:** **Chemistry 1**
2. **Course Title:** **Chemistry: Science that Matters**
3. **Course Description:** **Basic chemistry concepts relevant to everyday life**
4. **Prerequisite:** **None**
5. **Semester Offered:** **1st and 2nd Semester; Midyear**
6. **Course Credit:** **3.0 units**
7. **Number of Hours:** **3.0 hrs/wk**
8. **Course Goals:** **To provide the basic principles in chemistry that relate to everyday experiences and important local, national and international issues**

9. **Course Outcomes:** **Upon completion of the course, students must be able to:**

CO 1. Relate basic chemistry concepts with their experiences
CO 2. Describe the impact of chemistry in areas of human activity
CO 3. Explain the rapidly changing chemistry-related issues confronting society
CO 4. Communicate chemistry concepts to others.

10. **Course Outline:**

Hours	Course Topics	References
1.5	**I. What's the matter with matter** A. Introduction to Chemistry B. Classification of matter C. Properties of Matter D. Changes of matter E. States of matter F. Energy of matter: energy change with phase change	Chap. 1 Brown et al. (2017). Chemistry: The Central Science, 14th ed. Chap 1 Denniston et al. (2017) General, Organic and Biochemistry, 9th ed. Chap. 1 Hill and McCreary (2016). Chemistry of the Changing Times, 14th ed.
6	**II. Misplacing Matter: Spreading Pollution Around** A. Air Pollution 1. The Atmosphere 2. Pollutants 3. Problems a. Ozone Depletion b. Ozone formation in the troposphere c. Acid Rain d. Greenhouse gases B. Water Pollution	1995 Nobel Prize lecture of F.S. Rowland https://www.nobelprize.org/nobel_prizes/chemistry/laureates/1995/rowland-lecture.pdf My Life with O_3, NOx and Other YZOxs: A Nobel Lecture by P.J. Crutzen https://www.nobelprize.org/nobel_prizes/chemistry/laureates/1995/crutzen-lecture.pdf Molina & Rowland (1974) Crutzen (1970) Video: An Inconvenient Truth Video: Science and Policy

		a. Water pollutants b. Water Quality standards C. Land Pollution a. Biodegradable and Non-biodegradable material b. Solid waste management D. Policies and Solutions Key Concepts: Stability of Atoms and Molecules Bonding Concentration of Solutions	https://www.youtube.com/watch?v=gOf5FFqe0Y4 Chap. 2, 3. 4 & 8 American Chemical Society. (2018) Chemistry in Context, 9th ed. Chap. 18 Brown et al. (2017). Chemistry: The Central Science, 14th ed. Chap. 12, 14 &15 Hill and McCreary (2016). Chemistry of the Changing Times, 14th ed. Austria, Fuentes, Nuesca & Lamorena (2017) Carlos et al. (2016) Delfino et al. (2016) Gibe & Cayetano (2017) Lagmay et al. (2015) Licuanan, W. Y. et al. (2015) Minimo & Lagmay (2016)
6	III.	**Energy Harnessed, Energy Unbound** A. Introduction to Combustion B. Fossil Fuel C. Renewable and Non-renewable sources D. The Philippine Energy Situation E. Alternative Sources of Energy Key Concepts: Chemical Reactions Stoichiometry Energy in Reactions Thermodynamics of Reaction	Chap. 5, 6 & 7 American Chemical Society. (2018) Chemistry in Context, 9th ed. Chap. 21 Brown et al. (2017). Chemistry: The Central Science, 14th ed. Chap 9 Denniston et al. (2017) General, Organic and Biochemistry, 9th ed. Chap. 11 & 15 Hill and McCreary(2016). Chemistry of the Changing Times, 14th ed.
6	IV.	**Cure Alls and Lethal Potions** A. Poisons 1. Toxicity 2. Chemical structure and property 3. Mechanism of action B. Drugs C. Pesticides and Fertilizers D. Chemical Warfare Key Concepts: Shapes of Molecules Intermolecular forces Introduction to Organic Chemistry Kinetics and Enzymes	Chap. 17 American Chemical Society. (2018) Chemistry in Context, 9th ed. Loiseleur, O. (2017). OPCW Fact Sheet Nos. 2, 4 and 6, Nov. 2017 Chap. 18, 20, 21 & 22 Hill and McCreary, (2016). Chemistry of the Changing Times, 14th ed. Chap 10 Denniston et al. (2017) General, Organic and Biochemistry, 9th ed. Bartolome, Villaseñor & Angeles-boza (2017)
3	V.	**Fatal Attraction: Looking good and Smelling Nice** A. Cosmetics	Romanowski and Schueller (2009). Beginning Cosmetic Chemistry, 3rd ed. PCHRD. Killer Chemicals in Cosmetics from

		1. Components 2. Safety B. Perfumes and pheromones 1. Chemical Nature of components 2. Properties C. Cleaning Agents 1. Soaps 2. Detergents Key Concept Organic Chemistry Gases	http://www.pchrd.dost.gov.ph/index.php/news/library-health-news/1756-killer-chemicals-in-your-cosmetics Alani, J.I., Davis, M.D., Yiannias J.A. (2013). Fatima et al. (2013) Juliano & Magrini (2018) Lionetti & Rigano (2018) McFadden et al. (2013) Qu et al. (2018)
1.5		**Exam 1**	
6	**VI.**	**Giant Molecules** A. Polymers B. Biopolymers C. New Materials Key Concepts: Organic Chemistry Structure-Activity Relationships Biomolecules	Chap 16, 17, 18 Denniston et al. (2017) General, Organic and Biochemistry, 9th ed. Chap. 10 Hill and McCreary, (2016). Chemistry of the Changing Times, 14th ed. Chap. 9 American Chemical Society. (2018) Chemistry in Context, 9th ed. Usman et al. (2017)
6	**VII.**	**Bon Apetit with Chemistry** A. Food and Nutrition 1. Food Pyramid 2. Macronutrient in food 3. Energy from Food 4. Food and lifestyle 5. Health problems associated with diet B. Beverage 1. Water 2. Electrolytes C. Food additives 1. Vitamins 2. Preservatives 3. Adulterants Key Concepts Biomolecules: Carbohydrates, Fats and Proteins Energy Solutions	Pogozelski, W., Arpaiaa, N., Priore S. (2005). Chap. 10 &11 American Chemical Society. (2018) Chemistry in Context, 9th ed. Gottardi et al. (2016) Iammarino et al (2017) Harvard Health Pblications (2015) Slavin & Carlson (2014) Lamothe et al. (2017) Lui et al. (2017) Chap. 16, 17 & 19 Hill and McCreary, (2016). Chemistry of the Changing Times, 14th ed.
6	**VIII.**	**Biotechnology** A. Forensic chemistry	Watson, J.D., Crick, F.H. (1953) Chap. 16

	B. Human genome project C. Genetically-modified organisms (GMOs) D. Bioremediation E. Gene therapy Key Concepts DNA Structure	Hill and McCreary, (2016). Chemistry of the Changing Times, 14th ed. Chap. 13 & 14 American Chemical Society. (2018) Chemistry in Context, 9th ed.
6	**Group Presentations**	
1.5	**EXAM 2**	

11. Course Requirements:

	Points
First Exam	**200**
Problem Sets/Recitation	**100**
Projects	**100**
Second Exam	**200**
TOTAL	**600**

Passing: 50%

Grade Equivalent (%)	
90 – 100	1.00
85 – 89	1.25
80 - 84	1.5
76 – 79	1.75
72 – 75	2.00
68 – 71	2.25
64 – 67	2.50
60 – 63	2.75
55 – 59	3.00
49 – 54	4.00
≤ 48	5.00

12. Course Policy:

a. There are no make-up exams for missed examinations. If the student misses an examination, then his grade is INC provided his class standing is passing.

b. The problem sets will be collected or graded. A quiz is scheduled on the date the problem set is due. There will be no make-up for missed quizzes.

c. For projects:

At the start of the semester, you will be allowed to group yourselves in 4's. Each group will draw out their presentation dates. Your group will pick a topic and have an outline checked at least 3

weeks before your presentation date. Evaluation will be done by your groupmates, your classmates (40%) and the instructor (60%).

d. A grade of 5.0 may be given in the following cases:
No final exam and class standing is failing.
- Unofficial dropping.
- 6 absences without valid excuse

e. Intellectual dishonesty

Any student found to violate University rules on **intellectual dishonesty** shall be subject to the investigation process as prescribed by existing University guidelines.

Student Handbook 2012
Article III Definitions
15. Intellectual dishonesty – any fraudulent act performed by a student to achieve academic advantage or gain for oneself or others, including but not limited to:
a. Plagiarism, defined as "the appropriation of another person's ideas, processes, results or words without giving appropriate credit" ;
b. Fabrication, defined as "making up data or results" ; falsification, or "manipulating research materials, equipment, or processes or changing or omitting data or results such that the research is not accurately represented in the research record" ; distortion and/or destruction of data;
c. Copying or providing the means or accessing means to copy exam answers, homework, projects, laboratory experiments, term papers, etc.; possession and/or use of cheat devices during an examination; allowing another person to take an examination in one's name, and/or impersonating another student or allowing someone to impersonate oneself in an academic activity; and manipulating a corrected exam paper;
d. Submission of the same work in two or more courses without the instructors' consent; and
e. Other acts analogous to a, b, c, and/or d.

13. References:

Books

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Brown, T.E., LeMay, H. E., Bursten, B.E., Murphy, C., Woodward, P., Stolzfus, M.E. (2017) Chemistry: The Central Science (14th ed.). Pearson Education, Inc.

Denniston, K., Topping, J., Dorr, D.Q. (2017) General, Organic and Biochemistry (9th ed.). McGraw Hill Education.

Hill, J. W. and McCreary, Terry W. (2016). Chemistry for Changing Times (14th ed.). Pearson Education, Inc.

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Websites

Organization for the Prohibition of Chemical Warfare (OPCWW) Fact Sheets, OPCW, The Netherlands, 2017.https://www.opcw.org/documents-reports/fact-sheets/

Journal Articles

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Harvard Health Publications (2015). Demystifying nutrition: the value of food, vitamins and supplements Longwood Seminars, March 5, 2013. https://hms.harvard.edu/sites/default/files/assets/Sites/Longwood_Seminars/Nutrition_3_5_13.pdf

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