



OUTCOMES-BASED EDUCATION (OBE) COURSE SYLLABUS

Chem 113m General Inorganic Chemistry

I. UNIVERSITY INFORMATION

1. Vision of the University

A globally competitive university for science, technology, and environmental conservation

2. Mission of the University

Development of a highly competitive human resource, cutting-edge scientific knowledge and innovative technologies for sustainable communities and environment.

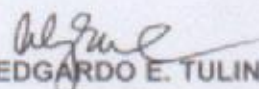
3. VSU Quality Policy Statement

The Visayas State University (VSU), a globally competitive university of science and technology and environmental conservation, is created by law to develop highly competitive human resource, cutting-edge scientific knowledge and innovative technologies for sustainable communities and environment.

Towards this end, we, at the Visayas State University, commit to:

- Produce highly competent, quality and world-class manpower in science and technology, especially for agriculture, environmental management and industry who are proficient in communication skills, critical thinking and analytical abilities;
- Generate and disseminate relevant knowledge and technologies that lead to improved productivity, profitability and sustainability in agriculture, environment and industry; and
- Satisfy the needs and applicable requirements of the industry, the community and government sectors who are in need of quality graduates and technology ready for commercialization through the establishment, operation, maintenance and continual improvement of a Quality Management System (QMS) which is aligned with the requirements of ISO 9001:2015.

It shall be the policy of the university that the quality policies and procedures are communicated to and understood by all faculty, staff, students and other stakeholders and that the system be continually improved for its relevance and effectiveness.


EDGARDO E. TULIN
President
v0 07-16-2019

4. Quality Goals of the College of Arts and Sciences

1. To produce quality manpower and graduates in biology, biotechnology, chemistry, english, liberal arts and behavioral sciences, mathematics, physics, and statistics to serve the development needs of the region.
2. To uplift the economic well-being of the region through relevant R and D and extension programs.
3. Enhance regional development of the Visayas for regional competitiveness.

5. Quality Objectives of the Department of Pure and Applied Chemistry

1. Produce highly qualified and skilled Chemists and Chemical technicians for the industry and the academia.
2. Generate relevant knowledge and technologies through basic and applied multi- and inter-disciplinary researches.
3. Achieve strong linkages and cooperation with domestic and international institutions and agencies involved in the pursuit of sustainable development.

II. PROGRAM INFORMATION

1. Name of the Program	Bachelor of Science in Applied Physics
2. CHED CMO Reference	CMO No. 20 s. 2007
3. BOR Approval	BOR Resolution No. 450 s. 2019

4. Program Educational Objectives and Relationship to Institution Mission

Program Educational Objectives	Mission*		
	a	b	c
1. Provide the students with a comprehensive and rigorous training in physics as a foundation for careers in pure and applied physics or interdisciplinary sciences.	√	√	√
2. Impart the students with sufficient knowledge to enable them to pursue areas such as (i) advanced physics research, (ii) physics teaching, (iii) graduate studies, (iv) employment in physics-related jobs in business, industry, government and other fields.	√	√	√
3. Produce students that apply the principles and methods of physics to find solutions of practical problems of society such as those arising in the industries, health or public service.	√	√	√

**a - development of a highly competitive human resource, b - cutting-edge scientific knowledge, c - innovative technologies for sustainable communities and environment*

III. COURSE INFORMATION

1. Course Code	Chem 113m
2. Course Title	General Inorganic Chemistry
3. Pre-requisite	High School Chemistry
4. Co-requisite	Chem 113.1 – General Inorganic Chemistry Laboratory
5. Credit	3 units
6. Semester Offered	2 nd Semester
7. Number of hours	3 hours per week
8. Course Description	Basic chemistry principles: Atomic theories, periodic table and properties of elements, chemical equations and stoichiometry,

	chemical bonding and molecular structures, states of matters, properties and reactions of solutions.
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9. Program Outcomes (POs) in relation to the Program Educational Objectives (POEs)				
Program Outcomes (POs)		Program Educational Objectives		
		1	2	3
a	Grasp basic knowledge of mathematics, classical mechanics, electrodynamics, quantum mechanics and statistical mechanics (physics related cognitive abilities and competencies).	√	√	√
b	Apply scientific reasoning, mathematical computational and experimental methods in solving physics problems (practical skills).	√	√	√
c	Design solutions responsive to community needs.	√	√	√
d	Recognize recent developments in Physics.	√	√	√
e	Act as effective transmitters of Physics.	√	√	√

10. Course Outcomes (COs) and Relationship to Program Outcomes (POs)					
After completing this course, the student must be able to perform the following COs:	Program Outcomes Code				
	a	b	c	d	e
CO1 Understand the nature, importance, and scope Chemistry as a central science.	I	I			
CO2 Describe matter in terms of atoms, ions, and molecules and explain and predict their behavior in terms of their electronic structure and interactions.	I	I			
CO3 Understand the concepts of chemical bonding and molecular structure.	I	I			
CO4 Describe chemical reactions quantitatively and perform calculations involving the application of chemical principles.	I	I			
CO5 Apply chemical principles to explain various chemical phenomena.	I	I			
CO6 Discuss the principle involved in the formation of solutions and describe their properties.	I	I			

Legend: I – Introductory, E – Enabling, D – Demonstrative

Each letter indicates the expected level of competency that each CO should provide for each PO.

11. Course Content and Plan					
Week	Topics	Learning Outcomes	Teaching and Learning Activities		Assessment Tasks
			Teaching Activities	Learning Activities	
Class Orientation					
1	OBE Course Syllabus (including VSU Vision Mission, and Quality Policy Statement) Class Policies	At the end of this meeting, the student must be able to:	Face-to-Face Meeting Class Orientation	Participate in the discussion Class interaction	Oral Recitation

	<p>Requirements</p> <p>Grading System</p> <p>Learning Guide/Moodle Classroom</p> <p>Submission of requirements</p>	<p>State the basic information regarding the course</p> <p>Recognize the VSU VMGO, Quality Policy Statement</p> <p>Discuss the course policies</p> <p>Identify the class requirements</p> <p>Communicate his/her internet connection capabilities.</p> <p>Convey his/her expectations of the course.</p>	<p>Q & A for clarification, setting of expectations, and getting-to-know-each other</p> <p>Introduction and navigation of the Virtual Classroom:</p> <p>Conduct online class orientation</p> <p>VSUEE/VC: Chem 113m General Inorganic Chemistry</p>	<p>Sharing of Ideas</p> <p>Feedbacks</p> <p>Familiarization with the virtual classroom</p>	
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CO1: Understand the nature, importance, and scope of Chemistry as a central science.

2 – 3	<p>Module No. 1 Introduction to Chemistry</p> <p>Lesson No. 1.1 Chemistry: Definition and Scope</p> <p>Lesson No. 1.2 Scientific Method</p> <p>Lesson No. 1.3 Matter: Classification, Physical States, and Properties</p> <p>Lesson No. 1.4 Measurements</p> <p>Lesson No. 1.5 Chemical Formula Writing</p>	<p>1. Give the importance of Chemistry and identify its different branches.</p> <p>2. Apply the steps of Scientific method.</p> <p>3. Classify matter and identify its physical and chemical properties.</p> <p>4. Convert units of measurement using dimensional analysis.</p> <p>5. Define</p>	<p><i>Face-to-Face Meeting</i></p> <p>Discussion through PowerPoint presentation</p> <p>Giving of assignments/ problem sets/ worksheets</p> <p>Readings from journal/ reference books</p>	<p>Class interaction</p> <p>Note-taking</p> <p>Sharing of Ideas</p> <p>Peer discussion</p> <p>VSUEE/VC:</p> <p>Downloading resource materials</p>	<p>Quiz # 1 – 3</p> <p>Learning Task # 1 – 3</p>
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	Lesson No. 1.6 Naming of Compounds	molecules and compounds and write their chemical formulas 6. Give correct names for chemical compounds			
4					1 st Examination (Module 1)
CO2: Describe matter in terms of atoms, ions, and molecules and explain and predict their behavior in terms of their electronic structure and interactions.					
4 – 5	Module No. 2 The Components of Matter Lesson No. 2.1 The Atomic Theory and Structure of the Atom Lesson No. 2.2 Molecules, Ions, Atomic Number, Mass Number, and Isotopes Lesson No. 2.3 Quantum Number and Atomic Orbitals Lesson No. 2.4 Electronic Configuration	1. Explain the basic laws of matter and relate it to Dalton's atomic theory 2. Differentiate atoms, ions and sub-atomic particles and describe the atomic structures. 3. Describe the quantum mechanical model of the atom. 4. Identify an atom by its set of quantum numbers and vice versa. 5. Write the electron configuration of atoms	Face-to-Face Meeting Discussion through PowerPoint presentation Giving of assignments/ problem sets/ worksheets Readings from journal/ reference books	Class interaction Note-taking Sharing of Ideas Peer discussion VSUEE/ C: Downloading resource materials	Quiz # 4 – 5 Learning Task # 4 – 5
6	Module No. 3 Periodic Relationships among Elements Lesson No. 3.1 Development of the Periodic Table	1. Write the timeline in the development of periodic table. 2. Classify the elements in	Face-to-Face Meeting Discussion through PowerPoint presentation	Class interaction Note-taking Sharing of	Quiz # 6 – 7 Learning Task # 6 – 7

	<p>Lesson No. 3.2 Periodic Classification of Elements</p> <p>Lesson No. 3.3 Periodic Trends</p>	<p>the periodic table.</p> <p>3. Arrange elements according to the different variations of properties such as the nuclear charge, atomic size, ionization energy, electron affinity and metallic character.</p>	<p>Giving of assignments/ problem sets/ worksheets</p> <p>Readings from journal/ reference books</p>	<p>Ideas</p> <p>Peer discussion</p> <p>VSUEE/V C:</p> <p>Downloading resource materials</p>	
7					2 nd Examination (Module 2 and 3)
CO3: Understand the concepts of chemical bonding and molecular structure.					
7 – 8	<p>Module No. 4 Chemical Bonding</p> <p>Lesson No. 4.1 Ionic bonds versus Covalent bonds</p> <p>Lesson No. 4.2 Molecular Geometry – VSEPR model</p> <p>Lesson No. 4.3 Valence Bond Theory and Hybridization</p>	<p>1. Differentiate ionic bonds from covalent bonds.</p> <p>2. Write Lewis structures of ionic and covalent compounds</p> <p>3. Draw the resonance structures of some compounds.</p> <p>4. Draw the structure of covalent compounds using VSEPR theory.</p> <p>5. Explain the valence bond theory and how it contributes to the stability of the molecule.</p>	<p><i>Face-to-Face Meeting</i></p> <p>Discussion through PowerPoint presentation</p> <p>Giving of assignments/ problem sets/ worksheets</p> <p>Readings from journal/ reference books</p>	<p>Class interaction</p> <p>Note-taking</p> <p>Sharing of Ideas</p> <p>Peer discussion</p> <p>VSUEE/V C:</p> <p>Downloading resource materials</p>	<p>Quiz # 8 – 9</p> <p>Learning Task # 8 – 9</p>

		6. Determine the hybridization of atomic orbitals			
9					3 rd Examination (Module 4)
CO4: Describe chemical reactions quantitatively and perform calculations involving the application of chemical principles.					
10 – 11	<p>Module No. 5 Mass Relationship in Chemical Reactions</p> <p>Lesson No. 5.1 The mole concept and Avogadro's Number</p> <p>Lesson No. 5.2 Percent composition of compounds: Empirical and Molecular formulas</p> <p>Lesson No. 5.3 Chemical reactions and Chemical equations</p> <p>Lesson No. 5.4 Stoichiometry</p>	<ol style="list-style-type: none"> 1. Convert moles to number of particles and vise-versa. 2. Determine the molecular formula of a compound using percent composition. 3. Identify the types of chemical reactions. 4. Interpret and balance a chemical equation. 5. Determine the amounts of products or reactants from a stoichiometric problem. 7. Identify a limiting reagent and compute for the percent yield. 	<p><i>Face-to-Face Meeting</i></p> <p>Discussion through PowerPoint presentation</p> <p>Giving of assignments/ problem sets/ worksheets</p> <p>Readings from journal/ reference books</p>	<p>Class interaction</p> <p>Note-taking</p> <p>Sharing of Ideas</p> <p>Peer discussion</p> <p>VSUEE/ C:</p> <p>Downloading resource materials</p>	<p>Quiz # 10 – 11</p> <p>Learning Task # 10 – 11</p>
12					4 th Examination (Module 5)
12 – 13	<p>Module No. 6 Gases</p> <p>Lesson No. 6.1 Kinetic Molecular Theory of Gases and the Gas Laws</p> <p>Lesson No. 6.2 Stoichiometry involving</p>	<ol style="list-style-type: none"> 1. Identify the properties of gases (volume, pressure, temperature) 2. Explain the kinetic molecular 	<p><i>Face-to-Face Meeting</i></p> <p>Discussion through PowerPoint presentation</p> <p>Giving of assignments/</p>	<p>Class interaction</p> <p>Note-taking</p> <p>Sharing of Ideas</p>	<p>Quiz # 12</p> <p>Learning Task # 12</p>

	gases Lesson No. 6.3 Deviation from Ideal Behavior: Real Gases	theory of gases. 3. Discuss the common gas laws and express in equation form. 4. Determine the pressure, volume, or temperature of a gas under certain conditions of change using gas laws and ideal gas / real gas equations. 5. Compare ideal gas from a real gas and discuss how real gases deviate from the ideal gas law. 6. Solve gas law problems integrating stoichiometry.	problem sets/ worksheets Readings from journal/ reference books	Peer discussion VSUEE/V C: Downloading resource materials	
14					5 th Examination (Module 6)
CO5: Apply chemical principles to explain various chemical phenomena.					
14 – 15	Module No. 7 Liquids and Solids Lesson No. 7.1 Intermolecular Forces of Attraction Lesson No. 7.2 Properties of Liquids and Solids Lesson No. 7.3 Phase Changes and Phase Diagrams	1. Describe and differentiate the types of intermolecular forces of attraction (IMFA) 2. Describe the properties of liquids and solids and discuss the effect of IMFA on these properties	<i>Face-to-Face Meeting</i> Discussion through PowerPoint presentation Giving of assignments/ problem sets/ worksheets Readings from journal/	Class interaction Note-taking Sharing of Ideas Peer discussion VSUEE/V C:	Quiz # 13 Learning Task # 13

		3. Describe the nature of the different phase changes of matter and interpret the parts of phase diagrams	reference books	Downloadi ng resource materials	
CO6: Discuss the principle involved in the formation of solutions and describe their properties.					
16-17	Module No. 8 Solutions Lesson No. 8.1 Types of Solutions Lesson No. 8.2 Concentration Units of Solutions Lesson No. 8.3 Colligative Properties	1. Describe the types of solutions based in conductivity, amount of solute, pH, and state. 2. Calculate concentrations of solutions using different units and convert one unit to the other. 3. Understand the various colligative properties and solve problems involving colligative properties of electrolyte and non-electrolyte solution.	<i>Face-to-Face Meeting</i> Discussion through PowerPoint presentation Giving of assignments/ problem sets/ worksheets Readings from journal/ reference books	Class interaction Note-taking Sharing of Ideas Peer discussion VSUEE/ C: Downloadi ng resource materials	Quiz # 14 – 15 Learning Task # 14 – 15
18					6 th Examination (Module 7 – 8)
* VSUEE – VSU E-Learning Environment/ Virtual Classroom					
12. Life-long Learning Opportunities					
<ul style="list-style-type: none"> The students will learn and gain a deeper understanding on the concepts of Chemistry which they can apply in their chosen field of profession. In addition, this course could instill in them an appreciation on how Chemistry plays a vital role in our daily life. 					
13. Contribution of Course to Meeting the Professional Component (%)					
General Education: 100% Basic Education (<i>Foundation</i>): 50% Professional Education (<i>Major Field</i>): 0%					
14. References and Other Learning Resources					
A. Textbook(s)/ E-Books CHANG R. and GOLDSBY K. 2016. Chemistry. 12 th Edition, McGraw – Hill Companies Inc.					

BROWN, T.L., LEMAY, H. Jr. BURSTEN, B.E., MURPHY, C.J. and WOODWARD, P.M.2012. Chemistry: The Central Science, 12 Edition. Prentice Hall International, Inc.

ATKINS, P. and JONES, L. 2008. Chemical Principles: The Quest for Insights 4th Edition. W.H. Freeman and Co.

EBBING, D.D. and GAMMON, S.D. 2009. General Chemistry, 9th Edition Houghton Mifflin Company

SILBERBERG, M.S. 2007. Principles of General Chemistry, McGraw – Hill Companies Inc.

B. Other Learning Resources

Video Clips from Youtube.com

15. Course Assessment and Evaluation

The performance of students will be assessed and evaluated based on the following:

$$50\% \text{ Midterm} + 50\% \text{ Final Term} = 100\% \text{ (Overall Final)}$$

Item No,	Assessment Tasks	Percentage Contribution (1)	No. of Times in the Semester (2)	Individual Task % Contribution (1/2)
1	Examination (E)	50	6	8.33%/E
2	Quiz (Q)	40	15	2.67%/Q
3	Learning Task (LT)	10	15	0.67/LT
		100%		

Cos	Assessment Tasks	Weight in Percent	Minimum Average for Satisfactory Rating	Target and Standards
CO 1	Quiz (1–3)	7.99%	60%	At least 60% of the students have at least 60% score
	Learning Task (1–3)	2.01		
	Exam 1	8.33%		
CO 2	Quiz (4–7)	10.66%	60%	At least 60% of the students have at least 60% score
	Learning Task (4–7)	2.68%		
	Exam 2	8.33%		
CO 3	Quiz (8–9)	5.33%	60%	At least 60% of the students have at least 60% score
	Learning Task (8–9)	1.34%		
	Exam 3	8.33%		
CO 4	Quiz (10–12)	7.99%	60%	At least 60% of the students have at least 60% score
	Learning Task (10–12)	2.01%		
	Exam (4–5)	16.67%		
CO 5 – CO 6	Quiz (13–15)	7.99%	60%	At least 60% of the students have at least 60% score
	Learning Task (13–15)	2.01%		
	Exam 6	8.33%		
TOTAL		100%		

Grading System (% Passing: 60%)

Range	Grade	Range	Grade
97 – 100	1.00	65 – 69	2.75
93 – 96	1.25	60 – 64	3.00
89 – 92	1.50	Below 60	5.00
85 – 88	1.75		
80 – 84	2.00		
75 – 79	2.25		
70 – 74	2.50		

16. Course Policies**A. Classroom Rules****a. Face-to-face (offline) Mode:**

1. All students are required to maintain the cleanliness of the classroom at all times. Thus, all chairs, tables, and other items present in the classrooms must be returned to their proper places after every class.
2. Trashes are to be thrown in garbage bins near the classroom.
3. Students are to turn their cellular phones off or in silent mode for the class duration and are not allowed to use their cellular phones except for emergency purposes.
4. Students are encouraged to take down notes using pen and paper. Upon the approval of the instructor, notes written on the board or presented may be photographed.
5. Working/reading/studying on subject matters not related to the subject matter of the class or course is not allowed.

b. Online Mode:

1. In blended learning, the official virtual classroom is VSU E-Learning Environment (VSUEE) (<https://elearning.vsu.edu.ph>). Therefore, a class orientation concerning the use and navigation of the platform will be done.
2. In case when face-to-face meeting is not possible due to certain circumstances, Google Meet will be used for web-conferencing and real-time class meetings. The username and password link will be posted in VSUEE/VC.
3. Class interaction and participation are encouraged during meetings. Students will be sharing ideas, feedback on outputs, and other related concerns in the subject during this time.

B. Attendance and Absences

1. Students who commit six (6) consecutive absences without prior notice to the faculty are considered dropped.
2. Suppose a student is absent and wishes to be excused for the said absence, he/she must write an excuse letter or present a medical certificate from the university health services to the faculty. (Section 298 and 299, ViSCA Code)
3. For online classes, attending virtual meetings is highly encouraged. However, if you cannot attend due to internet connection limitations, keep up with the lessons and do all the necessary exercises.

C. Quizzes, Problem Sets, and Examinations

1. Quizzes should be done and completed within the allotted time. These are either announced or unannounced. Meanwhile, online quizzes must be submitted and completed through the VSUEE portal within the allotted time.

2. All examinations will be done on-site based on the schedule agreed upon by the class or the registrar for term examinations. Special/make-up exams will not be given without a valid excuse. A reasonable proof to justify your absence must be presented if an exam is missed without advance notice due to illness or emergency. The validity of the reason will be up to the discretion of the instructor/professor.
3. Make sure your answers are original. Once caught cheating with your classmates or retrieving answers from any solving site on the internet, your answers will be considered wrong. Consequently, a failing grade of 5.00/DR will be given. Furthermore, University rules on cheating will be strictly implemented.

D. Reference/Instructional Materials

This Chem 113m General Inorganic Chemistry OBE Syllabus and the pdf files of lecture PowerPoint presentations posted in VSUEE are the official instructional materials in this subject. They will serve as your guide in learning for the whole semester.

E. Consultation/Clarifications

For any inquiries/clarifications, you may contact the course instructor/professor through email or in person during the official class schedule.

F. Other Important Rules

1. All students must adhere to the VSU Health and Safety Protocol while attending on-site meetings.
2. All students are reminded to observe all university policies, regulations, and rules. In addition, everyone is advised to read, understand, and practice the provisions of the VSU Student Manual. Non-compliance to the said policies shall have their respective consequences set by the instructor.
3. By the end of the first half of the semester, students who have not complied with any course requirements (less than 50% compliance) and have been absent without official leave (AWOL) are considered unqualified. Hence, a final remark of dropped will be given at the end of the semester.

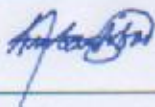
These class policies shall serve as our written agreement for the whole semester and are solely applicable to this subject. If there are any changes to enhance the class learning opportunity within the semester, the instructor/professor will communicate with you accordingly.

17. Course Materials and Facilities Available

1. Lecture Notes and PowerPoint Presentations
2. VSU E-Learning Environment
3. Learning Modules / Guide
4. Video Lectures

18. Revision History

Revision number	Date of Revision	Date of implementation	Highlights of Revision	Revised by
00	February 2023	2 nd Semester 2022-2023	OBE compliant CHED CMO no. 20 s. 2007; ISO format compliant V02 11-14-2022	KEVIN NICK S. BANDIBAS

19. Preparation			
	Name	Signature	Date Signed
Prepared by	KEVIN NICK S. BANDIBAS		02/23/2023

III. INSTRUCTOR/PROFESSOR INFORMATION

1. Name of Instructor/Professor	KEVIN NICK S. BANDIBAS
2. Office and Department	Department of Pure and Applied Chemistry
3. Telephone/Mobile Numbers	09280591100
4. Email Address	kevin.bandibas@vsu.edu.ph
5. Consultation Time	1:00 – 4:00 W

20. Department Instructional Materials Review Committee:

Committee	Name	Signature	Date Signed
Member:	VIVIAN P. LINA		
Member:	MARIA ROBELYN A. INSIK		
Chairperson:	ELIZABETH S. QUEVEDO		

	Name	Signature	Date Signed
Verified by:	MA. THERESA P. LORETO CAS Dean		
Validated by:	NANCY D. ABUNDA Head, OIMD		

Note:

- 1) The number of POs will depend on each degree program offered
- 2) COs and Relationship to POs
 - a. (I) - **Introductory** – an Introductory Course to an outcome
 - b. (E) - **Enabling** – an Enabling Course or a course that strengthens the outcome
 - c. (D) - **Demonstrated** – a Demonstrative Course or a course demonstrating an outcome.

REMINDER:

1. The author should not be part of the DIMRC.
2. *If the author is the Department Head, he/she will be replaced by another chairperson from among the senior faculty members.
3. **If the author is the College Dean, the Head of Instructional Materials Development will approve.
4. Follow the next higher supervisor, no same person
5. For the component campuses, if the author is the College Dean, the Director for Academic Affairs will approve.
6. If the author is the Department Head and at the same time the College Dean, the Director for Academic Affairs will be the Chairperson of the DIMRC, and the Chancellor will approve it.

(3) Distribution of copies: OHIMD, Department, Faculty