



OUTCOMES-BASED EDUCATION (OBE) SYLLABUS

CHEM 141 Qualitative 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.

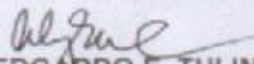
3. VSU Quality Policy Statement

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 Agriculture and Food Science

World class education in agriculture and allied fields that builds empowered and resilient communities.

5. Quality Objectives of the Department of Food Science and Technology

- To generate knowledge and technologies in food processing and utilization that are appropriate, acceptable, profitable, safe and ecologically sound;
- To enhance transfer of food processing technologies and sustain development of integrated processing systems that generates employment and income especially in rural areas communication systems management;
- To promote public awareness and advocacy on relevant issues affecting food quality and safety;
- To establish linkages and cooperation with local, national and international private and government institutions and organizations involved in the pursuit of development in food science and technology; and
- To establish and maintain development-oriented and income-generating projects as models in instruction and income generation

II. PROGRAM INFORMATION

1. Name of the Program	Bachelor of Science in Food Technology
2. CHED CMO Reference	CMO No. 7, series 2019
3. BOR Approval	BOR Resolution No. 84, series 2018

4. Program Educational Objectives and Relationship to Institution Mission

Program Educational Objectives	Mission*		
	a	b	c
1. To produce professionals who have the capacity to apply the science and technology and related fields of study in post-harvest handling, preparation, processing, packaging, storage and distribution of food to ensure food security and the well-being of individuals, families and communities. It also includes the social, cultural, economic, managerial and entrepreneurial and environmental aspects of food systems as well as the art of food preparation.	√	√	√
2. To promote continued excellence in food science education.	√	√	√

**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 141
2. Course Title	Qualitative Chemistry
3. Pre-requisite	Chem 140 – Quantitative Inorganic Analysis
4. Co-requisite	Chem 141.1
5. Credit	2 units
6. Semester Offered	Second Semester
7. Number of hours	2 hours lecture
8. Course Description	Theoretical principles and techniques in qualitative chemical analysis

9. Program Outcomes (POs) in relation to the Program Educational Objectives (PEOs)			
Program Outcomes (POs)		Educational Program Objectives	
		1	2
a	Demonstrate communication skills (i.e. oral and written) that led to success in a food technology career including preparation of proposals, position papers, technical reports, communicating technical information to a nontechnical audience, making formal and informal presentations;	√	√
b	Explain the functionality of different food ingredients and chemical changes occurring during post-harvest handling, preparation, processing, packaging and storage, including reactions involving carbohydrates, protein, and fats;		√
c	Apply the international and local regulations required for the manufacture, distribution and sale of food products, either fresh or processed;	√	√
d	Apply the role of microorganisms in postharvest handling, preparation, processing and preservation, packaging and storage with respect to pathogenic, spoilage, and fermentative microorganisms;	√	√
e	Apply the principles of engineering as they relate to converting agricultural commodities to the finished products;	√	
f	Apply the principles and various facets of food technology, including sensory evaluation, in practical situations, problem solving and environmental sustainability;	√	√
g	Apply the basic elements of sanitation and quality assurance programs to assure food safety;	√	√
h	Analyse and evaluate the microbiological, physical, chemical, sensory and functional properties of food;	√	√
i	Plan and conceptualize new product ideas and procedures leading to innovative food technologies;	√	√
j	Generate and share knowledge relevant to agriculture; and	√	√
k	Formulate and implement plans and programs in food technology in support of agriculture.	√	√
10. Course Outcomes (COs) and Relationship to Program Outcomes (POs)			

After completing this course, the student must be able to perform the following COs:	<i>Program Outcomes Code</i>							
	a	b	c	d	e	f	g	h
CO 1. Familiarize the different methods of qualitative chemical analyses;	I	I	I	I	I			E
CO 2. Explain the theoretical principles in qualitative chemistry;		I	I	I	I	I		E
CO 3. Relate chemistry with local, national and international concerns on food safety and environmental conservation.	D	E	D	E	D	E	I	I
CO 4. Appreciate the advancement of instruments for qualitative chemical analysis; Relate chemistry with local, national and	I	I	I	E	E	E	I	D

international concerns on food safety and environmental conservation.								
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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 Requirements Grading System and Activities Learning Guide / Instructional Workbook / Laboratory Manual Submission of requirements Values Integration: Relevance Integrity Truth Excellence Satisfaction	o Promote the Vision, Mission, Goals, Objectives and Core Values of the University	F2F Meeting #1: Q & A for clarification, setting of expectations, and getting-to-know-each other; Class interaction; Sharing of Ideas; Feedbacks VSUEE/VC*: Familiarization of the virtual classroom; Printed Learning Guide (independent study);	Role play through a video	Oral recitation
CO 1: Familiarize the different methods of qualitative chemical analyses;;					
2	Module No. 1 (Introduction to Qualitative Chemistry) Lesson No. 1.1 (Functions of qualitative analysis)	o Familiarize the functions of qualitative analyses.	F2F Meeting #2:	VSUEE/VC: Note-taking; Downloading resource materials;	Learning Task: Assignment 1 Due Date: Week 2

			Printed Learning Guide; Independent study	Solving assigned tasks	
3	Module No. 1 (Introduction to Qualitative Chemistry) Lesson No. 1.2 (Fundamental Concepts of Qualitative Analysis)	<ul style="list-style-type: none"> Understand the fundamental concepts of qualitative analyses. 	F2F Meeting #3: Power point presentation; Class recitation; Printed Learning Guide (independent study)	VSUEE/V C: Note-taking; Downloading resource materials; Answering lesson exercises	Quiz 1: Due Date: Week 3
4	Module No. 2 (Common Analytical Processes for Qualitative Chemistry) Lesson No. 2.1 (Operations for Qualitative Analysis)	<ul style="list-style-type: none"> Describe the various operations for qualitative 	F2F Meeting #4: Printed Learning Guide; Independent study	VSUEE/V C: Note-taking; Downloading resource materials; Solving assigned tasks	Learning Task: Homework 1 Due Date: Week 4
5	Module No. 2 (Common Analytical Processes for Qualitative Chemistry) Lesson No. 2.2 (Solubility Rules for Inorganic Substances)	<ul style="list-style-type: none"> Familiarize the solubility inorganic substances in water; 	F2F Meeting #5: Power point presentation; Class discussion; Printed Learning Guide (independent study)	VSUEE/V C: Note-taking; Downloading resource materials; Answering lesson exercises	Quiz 2: Due Date: Week 5
CO 2. Explain the theoretical principles in qualitative chemistry;					
6	Module No. 3 (Solubility Equilibria and Hydrolysis Reactions) Lesson No. 3.1 (Solubility Equilibria)	<ul style="list-style-type: none"> Illustrate how solubility 	F2F Meeting #6:	VSUEE/V C: Note-taking; Downloading	Learning Task: Problem Set 1 Due Date: Week 6

		equilibria can be used in solving problems on qualitative analyses;	Printed Learning Guide; Independent study	resource materials; Solving assigned tasks	
7	Module No. 3 (Solubility Equilibria and Hydrolysis Reactions) Lesson No. 3.2 (Hydrolysis of Ions)	<ul style="list-style-type: none"> Figure-out how hydrolytic reactions can be used in solving problems on qualitative analyses; 	F2F Meeting #7: Power point presentation; Group activity Printed Learning Guide (independent study)	VSUEE/V C: Note-taking; Downloading resource materials; Answering lesson exercises	Quiz 3: Due Date: Week 7
8	Module No. 4 (Precipitation and Complexation for Qualitative Analyses) Lesson No. 4.1 (Precipitation of Ions)	<ul style="list-style-type: none"> Explain the theoretical principle behind precipitation for qualitative analyses; 	F2F Meeting #8: Printed Learning Guide; Independent study	VSUEE/V C: Note-taking; Downloading resource materials; Solving assigned tasks	Learning Task: Assignment 2 Due Date: Week 8
9	Module No. 4 (Precipitation and Complexation for Qualitative Analyses) Lesson No. 4.2 (Complexation of Ions)	<ul style="list-style-type: none"> Demonstrate the theoretical principle behind complexation reaction for qualitative analyses; 	F2F Meeting #9: Power point presentation; Individual activity Printed Learning Guide (independent study)	VSUEE/V C: Note-taking; Downloading resource materials; Answering lesson exercises	Midterm Exam on Modules 1-4: Due Date: Week 9
CO 3: Relate chemistry with local, national and international concerns on food safety and environmental conservation.					
10	Module No. 5 (Redox Reaction and Non-aqueous Ionization for Qualitative Analyses)		F2F Meeting #10:	VSUEE/V C: Note-taking;	Learning Task: Homework 2

	Lesson No. 5.1 (Redox Reaction of Ions)	<ul style="list-style-type: none"> Describe the importance of redox reaction for qualitative analyses; 	Printed Learning Guide; Independent study	Downloading resource materials; Solving assigned tasks	Due Date: Week 10
11	Module No. 5 (Redox Reaction and Non-aqueous Ionization for Qualitative Analyses) Lesson No. 5.2 (Non-aqueous ionization)	<ul style="list-style-type: none"> Illustrate the importance of non-aqueous ionization for qualitative analyses; 	F2F Meeting #11: Power point presentation; Class recitation; Printed Learning Guide (independent study)	VSUEE/VC: Note-taking; Downloading resource materials; Answering lesson exercises	Quiz 4: Due Date: Week 11
12	Module No. 6 (Stages and Types of Qualitative Analyses) Lesson No. 6.1 (Stages of Qualitative Analyses)	<ul style="list-style-type: none"> Understand the stages of qualitative analyses; 	F2F Meeting #12: Printed Learning Guide; Independent study	VSUEE/VC: Note-taking; Downloading resource materials; Solving assigned tasks	Learning Task: Problem Set 2 Due Date: Week 12
13	Module No. 6 (Stages and Types of Qualitative Analyses) Lesson No. 6.2 (Types of Qualitative Analyses)	<ul style="list-style-type: none"> Describe the different types of qualitative analyses; 	F2F Meeting #13: Power point presentation; Group discussion; Printed Learning Guide (independent study)	VSUEE/VC: Note-taking; Downloading resource materials; Answering lesson exercises	Quiz 5: Due Date: Week 13
CO 4. Appreciate the advancement of instruments for qualitative chemical analysis.					
14	Module No. 7 (Qualitative Analysis of		F2F Meeting	VSUEE/VC:	Learning Task:

	Anions) Lesson No. 7.1 (Class/Group Detection of Anions)	<ul style="list-style-type: none"> ○ Explain the class and group detection of anions; 	#14: Printed Learning Guide; Independent study	Note-taking; Downloading resource materials; Solving assigned tasks	Assignment 3 Due Date: Week 14
15	Module No. 7 (Qualitative Analysis of Anions) Lesson No. 7.2 (Identification of Anions)	<ul style="list-style-type: none"> ○ Illustrate a schematic diagram for the identity of anions thru qualitative analyses; 	F2F Meeting #15: Power point presentation; Class activity Printed Learning Guide (independent study)	VSUEE/VC: Note-taking; Downloading resource materials; Answering lesson exercises	Quiz 6: Due Date: Week 15
16	Module No. 8 (Qualitative Analysis of Cations) Lesson No. 8.1 (Class/Group Detection of Cations)	<ul style="list-style-type: none"> ○ Familiarize the class and group detection of cations; and 	F2F Meeting #16: Printed Learning Guide; Independent study	VSUEE/VC: Note-taking; Downloading resource materials; Solving assigned tasks	Learning Task: Homework 3 Due Date: Week 16
17	Module No. 8 (Qualitative Analysis of Cations) Lesson No. 8.2 (Identification of Cations)	<ul style="list-style-type: none"> ○ Appreciate the schematic diagram for the identity of cations thru qualitative analyses. 	F2F Meeting #17: Power point presentation; Individual task Printed Learning Guide (independent study)	VSUEE/VC: Note-taking; Downloading resource materials; Answering lesson exercises	

18					Final Examination Due Date: Week 18
* VSUEENC – VSU E-Learning Environment/ Virtual Classroom					
12. Life-long Learning Opportunities This course is designed to enable students acquire knowledge, skills, and develop appropriate techniques in qualitative chemistry. It is envisioned for the students to appreciate the advancement of instrumentation as a rapid tool for qualitative chemical analyses. These experiences will help and better equip them in their future career.					
13. Contribution of Course to Meeting the Professional Component (%) General Education: 0 % Basic Education (Foundation): 0 % Professional Education (Major Field): 100 %					
14. References and Other Learning Resources A. Textbook(s)/ E-Books Christian, G.D., P.K. Dasgupta and K.A Schug. 2013. Analytical Chemistry. Seventh Edition. John Wiley & Sons Inc., Oregon, USA. 837p. Ebbing, D.D., S.D. Gammon and R.O. Ragsdale. 2003. Essentials of General Chemistry. Houghton Mifflin Company, New York, USA Harris, D.C. 2007. Quantitative Chemical Analysis. Eighth Edition. W.H. Freeman and Company, New York, USA. 878p. Laitinen, H.A. and W.E. Harris. 2009. Chemical analysis: an advanced text and reference. Second edition. University of Florida Press, USA. Mendenhall, W.M. and T.L. Sincich. 2015. Statistics for Engineering and the Sciences. Sixth Edition. Chapman and Hall/CRC Press, Florida, USA. 1182p. Salas, F.M. and Y.A. Salas. 2022. Learning Guide in Chem 141 – Qualitative Chemistry. Department of Pure and Applied Chemistry, College of Arts & Sciences, Visayas State University, Visca, Baybay City, Leyte, Philippines. Sattasangi, P.D. 2014. Microscale Procedure for Inorganic Qualitative Analysis with Emphasis on Writing Equations: Chemical Fingerprinting Applied to the n-Bottle Problem of Matching Samples with their Formulas. Pennsylvania, USA. Skoog, D.A., D.M. West and F.J. Holler. 2002. Fundamentals of analytical chemistry. 7 th edition. Svehla, G. 2008. Vogel's Qualitative Chemical Analysis. Seventh Edition. Pearson Education, New York, USA.					
B. Other Learning Resources Journals Cheng, S.C., V.E. Ziffle and R.C. King. 2020. Innovative Food Laboratory for a Chemistry of Food and Cooking Course. <i>Journal of Chemical Education</i> , 97(3):659-667. Ebbing, D.D., S.D. Gammon and R.O. Ragsdale. 2003. Essentials of General Chemistry Houghton Mifflin Company, New York, USA					

Felmy, A.R. and D. Rai. 1999. Application of Pitzer's Equations for Modeling the Aqueous Thermodynamics of Actinide Species in Natural Waters: A Review. *Journal of Solution Chemistry*, 28(5):533-553

Grabowski, L.E. and S.R. Goode. 2017. Determining a Solubility Product Constant by Potentiometric Titration to Increase Students' Conceptual Understanding of Potentiometry and Titrations. *Journal of Chemical Education*, 94(5):636-639

Greaves, R., B. Kelestyn, R.A.R. Blackburn and R.R.A. Kitson. 2021. The Black Student Experience: Comparing STEM Undergraduate Student Experiences at Higher Education Institutions of Varying Student Demographic. *Journal of Chemical Education*, 99(1):56-70.

Passos, M.L.C., M. Lucia and M.F.S. Saraiva. 2019. Detection in UV-visible spectrophotometry: Detectors, detection systems, and detection strategies. *Measurement*, 135:896-904

Rocha, F., A. Alves and V. Homem. 2022. Exploring the Potential of Sewage Sludge as Agricultural Fertilizer: Determination of Heavy Metals and Nutrients by Microwave-Assisted Digestion Followed by ICP-OES Analysis. *Journal of Chemical Education*, 99(8):3088-3093.

Zhao, R., Q. Chu and D. Chen 2022. Exploring Chemical Reactions in Virtual Reality. *Journal of Chemical Education*, 99(4):1635-1641.

Videos

<https://www.youtube.com/watch?v=atN5fqNGTfA>

Websites

<https://www.better-digital-photo-tips.com/neutral-density-filter.html>/Accessed:27 January 2022

<https://www.britannica.com/science/gravimetric-analysis>

<https://www.britannica.com/science/turbidimetry>

<https://www.rotovap.cn/rotary-evaporator/1249.html>/Accessed:27 January 2022

<https://www.sciencedirect.com/topics/chemistry/filtration>/ACCESSED:27 January 2022

<https://www.studyread.com/atomic-absorption-spectroscopy/>

<http://www.titrations.info/complexometric-titration-end-point-detection>

<https://www.vedantu.com/chemistry/distillation>/27 January 2022

<https://www2.chemistry.msu.edu/VirtTxtJml/Spectrpy/UV-Vis/uvspec.htm>

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	Quizzes	20	6	3.33%/Q
2	Learning Tasks	40	7	5.71%/LT
3	Term Exam	40	2	20.00%/TE

COs	Assessment Tasks	Weight in Percent	Minimum Average for Satisfactory Rating	Target and Standards
CO 1	Assignment 1 Homework 1 Quiz 1-2	18.0	60 %	At least 60 % of the students have at least 60 % score
CO 2	Assignment 2, Problem Set 1	35.0	60 %	At least 60 % of the students have at

	Quizzes 3 Midterm Exam			least <u>60</u> % score
CO 3	Homework 2 Problem Set 2 Quiz 4-5	18.0	<u>60</u> %	At least <u>60</u> % of the students have at least <u>60</u> % score
CO 4	Assignment 3 Quiz 6 Final Exam	29.0	<u>60</u> %	At least <u>60</u> % of the students have at least <u>60</u> % score
TOTAL		100%		

Grading System (% Passing: 60 %)

Range	Grade	Range	Grade
96-100	1.00	72 - 75	2.25
91- 95	1.25	68 - 71	2.50
86- 90	1.50	64 - 67	2.75
81- 85	1.75	60 - 63	3.00
76- 80	2.00	1 - 59	5.00

16. Course Policies

- 1) The official virtual classroom is VSU E-Learning Environment (VSUEE) (<https://elearning.vsu.edu.ph>). A class orientation will be done in relation to the use and navigation of the platform.
- 2) ZOOM or Google Meet will be used for web-conferencing and virtual class meetings. Username and password link will be posted in VSUEE/VC.
- 3) Attending the virtual meeting is highly - encouraged but not compulsory for offline students. If you cannot attend due to internet connection limitation, there is no problem. Just keep up with the lessons and do all the necessary exercises that is required of you.
- 4) The F2F meeting is our avenue for synchronous learning. Class interaction and participation is encouraged, sharing of ideas, feedbacking of your outputs and other related concerns in the subject will be done during this time.
- 5) All requirements will be submitted preferably through the VSUEE or email but if internet connection is not stable or you do not have an internet connection. You may send your activities to the office through a courier or during F2F classes.



ONLINE Submission:

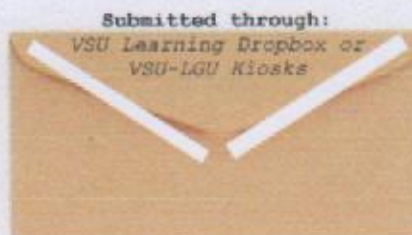
Scan (.pdf) / take a picture (.jpg) / MS Word file (.docx) of the Learning task/activity then send through the VSUEE/VC or email.



OFFLINE Submission:

Place your answers in a SEALED BROWN ENVELOPE. On the envelope, write your FULLNAME, YEAR LEVEL, COURSE, CONTACT NUMBER, EMAIL ADDRESS, COURSE NUMBER, COURSE TITLE, and DATE OF SUBMISSION, COURSE PROFESSOR.

JUAN DELA CRUZ
 3rd year BSED - Math
 0920 - 1234567
juandelacruz@gmail.com
 Course Title: _____
 Date submitted: _____
 Course Professor: _____
 Department _____, College _____



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Submit through a courier: The office address is DEPARTMENT OF CHEMISTRY, COLLEGE OF ARTS AND SCIENCES, Visayas State University, Baybay City, Leyte, Philippines.

VSU Learning Dropbox: Drop your outputs and look for the VSU Learning Dropbox (College of Arts and Sciences), located at the parking space near ATM Machine, Lower Guard Post 2.

VSU - Academic/LGU Kiosks: Drop your outputs in the designated VSU - Academic/LGU Kiosks of your respective LGU.

- 6) Original copies of all answers, solutions, and laboratory reports should be kept by the student, put in a folder/envelope one after the other, and should be bound together to form a "portfolio" as part of the final requirements of the course.
- 7) In answering the Learning Task/Activities, it can be done in any of the following:
 - a. Use the Learning Guide in Chemistry 141 (type of IM), in answering the given activities/tasks. Additional sheet of paper may be used as necessary.
 - b. Handwritten or encoded in MS Word file format
 - c. General format for additional sheet either handwritten/Word file:
 - i. A4 size bond paper
 - ii. 1" margin all sides
 - iii. Arial, 12 font size, double space (for encoded outputs)
- 8) Quizzes is set on VSUEE - VC. All quizzes are announced and will open every after a topic has been discussed. You have one week to comply with the quiz and answer it anytime you think that you are ready.
- 9) This Learning Guide in Chem 141 (type of IM) is our official instructional material in this subject. It will serve as your guide for the whole semester. Whether you have internet connection or not, use it.
- 10) In the submission of activities, there are deduction for late submissions but ON-TIME submission is much appreciated.
- 11) If you have any inquiries/clarifications, you may contact the course instructor/professor during official class schedule; Monday to Friday only.
- 12) All students are reminded to observe all policies, regulations, and rules of the university and other related laws of the land and are advised to read, understand, and practice the provisions of the VSU Student Manual.
- 13) Lastly, as we embark in this "new normal". Let us have an open mind and heart as we adjust in this new way of delivering the teaching-learning process and still continue to aim for quality in education.

This class policy serves as our written agreement for the whole semester. If there are any changes to enhance the class learning opportunity within the semester, it will be communicated accordingly.

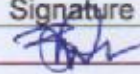
17. Course Materials and Facilities Available

- Lecture notes and videos
- LCD/LED Projector and Projector Screen
- Classroom filled with armchairs
- Electric fans and fluorescent light
- Computer table, whiteboard, and markers
- Updated periodic table

18. Revision History

Revision number	Date of Revision	Date of implementation	Highlights of Revision	Revised by
0	Jan 2, 2020	August 1, 2020	New Format (ISO)	Felix M. Salas
1	Jan 24, 2021	March 1, 2021	New Normal Format (ISO)	Felix M. Salas
2	Feb 10, 2022	February 15, 2022	Updated references & other resources	Felix M. Salas

19. Preparation

Prepared by	Name	Signature	Date Signed
	FELIX M. SALAS		Feb 10, 2023

III. INSTRUCTOR/PROFESSOR INFORMATION

1. Name of Instructor/Professor	Felix M. Salas
2. Office and Department	Department of Pure and Applied Chemistry
3. Telephone/Mobile Numbers	Office: 053-565-0600 (loc 1032); Mobile: 09088103742; Residence: 053-563-0271
4. Email Address	felix.salas@vsu.edu.ph
5. Consultation Time	7:00 am – 8:30 am MWF

20. Department Instructional Materials Review Committee:

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

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

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.

Distribution of copies: OIMD, College, Department, Faculty and ODQA