

COURSE NUMBER: VC211	COURSE TITLE: Chemistry Laboratory																				
CREDIT: 1	PREREQUISITES: VC210																				
TEXTBOOKS/REQUIRED MATERIAL: Laboratory Manual (modified based on 'Hands on Chemistry Laboratory Manual, 1 st ed., Jerrey A. Paradis, Kristen Spatz, McGraw Hill Higher Education Press, 2006)	INSTRUCTOR: Ting Sun DATE OF PREPARATION: May 26, 2019 DATE OF UC APPROVAL:																				
INSTRUCTOR(S): Ting Sun	SCIENCE/DESIGN:																				
CATALOG DESCRIPTION: Chemistry Laboratory is to foster critical thinking that allows students to design, perform, and interpret experiments. In addition, the student acquires technical skills that are required for further advancement in experimental sciences. An ability to collect and analyze data is developed, so the emphasis of the course is to provide a quantitative as well as a qualitative understanding of the basic concepts of chemistry. This is accomplished by demonstrating that chemical principles are derived from experimental data. The goal is to provide students both with a more accurate picture of the scientific process and also with skills that are relevant to solving real life problems.	COURSE TOPICS: 1. Lab safety (Orientation lecture and lab tour) 2. Acids and bases. (E1) 3. Properties of buffers. (E2) 4. Spectrophotometric analysis. (E3) 5. Introduction to kinetics and determining the rate law. (E4) 6. Precipitation and water purity. (E5) 7. Determine the content of Ca in a commercial product. (Design report) 8. Present and discuss experimental work. (Final presentation)																				
COURSE STRUCTURE/SCHEDULE:																					
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COURSE OBJECTIVES [Course Outcomes in brackets]	<ol style="list-style-type: none"> 1. Provide appropriate exercises and training to develop critical thinking ability. [1, 2, 3] 2. Provide a broad view to trace the current academic research and development of chemistry and to understand the impact of chemistry in global economic, energy sources, environment, and social life. [1, 2, 3, 4, 5] 3. Provide the opportunities to cooperate with teammates, to plan, design, and research and finish experiments with a common goal in a team. [2, 3, 4, 5, 6, 7] 4. Provide the knowledge and skills to write a report in a clear, readable, informative format. [2, 3, 4, 5, 7] 5. Provide an opportunity to practice how to report what you have learnt in public, to try how to share information and communicate ideas, progress, and results in an easily-understanding and professional manner. [2, 3, 4, 5, 6, 7] 6. Recognize the need of self-learning and to develop the ability to engage in life-long learning. [1, 2, 3, 4, 5, 6, 7] 7. Prepare students for advanced course related to chemistry and for their further education. [1, 2, 3, 4, 5, 6, 7] 																				
COURSE OUTCOMES [Student Outcomes in brackets]	<p>After completing the course VC211, students should be able to:</p> <ol style="list-style-type: none"> 1. Apply critical thinking that allows to design, perform and interpret experiments. [1, 2, 4, 6, 7] 2. Apply technical skills that are required for further advancement in experimental sciences. [1, 2, 4, 6, 7] 3. Collect and analyze data developed and to provide a quantitative as well as a qualitative understanding of the basic concepts of chemistry. [1, 2, 6, 7] 4. Demonstrate that chemical principles are derived from experimental data. [1, 2, 4, 6, 7] 5. Achieve both a more accurate picture of the scientific process and also with skills that are relevant to solving real life problems. [1, 2, 4, 6, 7] 6. Demonstrate working and communications skills through teamwork and address work as a team, communicate laboratory experience, and address questions which require to organize the laboratory data and perform in-class discussions. [3, 4, 5, 6, 7] 7. Write basic technical reports and give presentations related to experiments. [3, 4, 5, 6, 7] 																				
ASSESSMENT TOOLS [Course Outcomes in brackets]	<ol style="list-style-type: none"> a. Pre-lab exercises [1, 5, 6] b. Lab reports [1, 2, 3, 4, 7] c. Final Exam [1, 2, 3] d. Design report [1, 5, 7] e. Oral presentation [4, 5, 6, 7] 																				