

**STA. TERESA COLLEGE**Bauan, Batangas
College Department

Course Code	<i>NaSci 1</i>
Course Name	<i>Inorganic Chemistry lecture and laboratory</i>
Course Credits	5 units
Course Description	Inorganic Chemistry (lecture) is a course covering the basic principles that include atomic structure, chemical equations and stoichiometry, periodic table, chemical bonding and molecular structure, gases, liquids, solids and solutions. Inorganic chemistry (laboratory) a course developing basic laboratory skills. It includes experiments and exercises illustrating the concepts covered in Inorganic Chemistry. A more detailed discussion of topics not extensively covered in the lecture is provided through additional activities, exercises and video presentations.
Contact Hours/Week	5 hours
Prerequisite	<i>None</i>
Course Outcomes	<ol style="list-style-type: none">1. Develop expertise relevant to the professional practice in Chemistry2. Develop the ability to apply critical reasoning and the ability to apply the concepts of Chemistry to practical problems3. Develop an understanding of the range and chemistry of elements in the periodic table and their compounds4. Establish an appreciation of the role of inorganic chemistry in the chemical sciences5. Develop an understanding of the role of the chemist in measurement and problem solving in inorganic chemistry6. Provide experience in some scientific methods employed in inorganic chemistry through video presentation7. Develop skills in the scientific method of planning, developing, conducting, reviewing and reporting experiments8. Develop understanding of the professional and safety responsibilities residing in working with inorganic systems9. Cooperate with your groupmates in doing activities using available gadgets, online resources, applications and other video clips10. Make a video presentation on the application of Chemistry in daily life



STA. TERESA COLLEGE

Bauan, Batangas
College Department

COURSE OUTLINE AND TIME FRAME

Timeframe	Course Contents / Subject Matter
Week 1	A. CHEMISTRY: The Study of Change
Week 2	B. Matter
Week 3	C. Atomic Structure and Quantum Theory
Week 4	D. Electronic Structure of an Atom / Periodic Relationships Among Elements
	PRELIMINARY EXAMINATION
Week 5	E. Periodicity
Week 6	F. Chemical Bonding
Week 7 -8	G. Chemical Formula and Molecular Geometry
Week 9	H. Chemical Reactions/ Balancing Chemical Reactions
	MIDTERM EXAMINATION
Week 10-11	I. Stoichiometry and Mathematics of Reactions and Chemical Equilibrium
Week 12-13	J. Solution and Their Properties
	SEMI FINAL EXAMINATION
Week 14-15	K. Gases
Week 16	L. Liquids and Solids
Week 17 -18	M. Acids and Bases
	FINAL EXAMINATION



ALIGNMENT OF COURSE OUTCOMES WITH SUMMATIVE ASSESSMENT TASKS

Course Objectives	Project – Based Assessment Task	Details
<ol style="list-style-type: none">1. Develop critical thinking skills to be able to interpret and analyze data, models, law and theories in order to explain, evaluate and predict various chemical scenarios2. Enhance communication skills to be able to communicate the knowledge and understanding to peers and instructors to effectively evaluate chemical information from various sources including scientific literature and media3. Improve empirical and quantitative skills, to effectively engage in using formulas, equations, and procedures to carry out the various calculations and similar types of operations involved in quantitative aspects of chemistry.4. Evaluate the concepts and skills learned in chemistry	<p data-bbox="1041 467 1221 503">Lab Stations</p> <p data-bbox="949 690 1310 725">Multi Media Presentation</p> <p data-bbox="969 946 1290 982">Quizzes/ Problem Set</p>	<p data-bbox="1378 472 2252 651">The students need to complete the number of experiments performed. Likewise the students will also be asked analyze a scenario about the application of chemistry in actual scenario. They need to discuss the situation based on the concepts learned in Inorganic Chemistry.</p> <p data-bbox="1378 691 2282 833">The students will be asked to make a multi media presentation (like TEDx) to impart to the community the significance of Chemistry and how it affects positively and negatively the daily life practices.</p> <p data-bbox="1378 948 2282 1089">Through major examinations, Prelim, Midterm, Semi Final and Final Examination the knowledge and comprehension in the subject can be determined through the students' performance in the major examinations.</p>



STA. TERESA COLLEGE

Bauan, Batangas
College Department

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<ol style="list-style-type: none"> 1. Define Chemistry 2. Determine the steps to follow in scientific method 3. List the common metric units in Chemistry 4. Express numbers in scientific notation 5. Perform simple operation on numbers expressed in scientific notation 6. Define the terms volume and density as they apply to chemistry 7. Describe how measurement readings are taken and estimated 8. Define and apply the terms accuracy, precision and significant digits 9. Define the term percent error and calculate the percent error of a measurement 10. Understand the factor label method and use it to solve problems 	<p>I. CHEMISTRY: The Study of Change</p> <ol style="list-style-type: none"> A. The Scientific Method B. Measurement C. Handling Numbers D. Dimensional Analysis 	<p>Chang, R. & Overby J. (2011). General Chemistry. Singapore: Mc Graw Hill</p> <p>Guidelines for Chemical Laboratory Safety in Secondary Schools. (2016). Washington D.C.: American Chemical Society</p>	<p>Research</p> <p>Lecture</p> <p>Socratic Paideia</p> <p>Group Activity</p>	<p>Rubric for grading the report sheet of experiment</p> <p>Individual Insights</p> <p>Group Output</p> <p>Quiz</p> <p>Home Based Activity</p>	<p>Laptop</p> <p>Power Point Presentation through Google Meet</p> <p>Laboratory Tools</p>	<p>1 week</p>



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Bauan, Batangas
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11. Define matter 12. Identify the classification of matter 13. Determine the laws that govern matter 14. Differentiate physical from chemical properties of matter	II. Matter	Chang, R. & Overby J. (2011). General Chemistry. Singapore: Mc Graw Hill The Properties and Structure of Matter. https://www.nust.na/sites/default/files/documents/Chapter%205_Properties%20and%20Structure%20of%20Matter.pdf retrieved Sept.18, 2019	Socratic Methods Research Discussion	Rubric for grading the report sheet Quizzes (LMS) Individual Insights Group Output	Laptop Power Point Presentation Google Meet Video Clips from You Tube	1 week



STA. TERESA COLLEGE

Bauan, Batangas
College Department

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15. Define atom 16. Compare the Dalton, Thomson and Rutherford models of the atom 17. Define and apply the terms atomic number, mass number, isotope and atomic mass 18. Calculate the atomic mass of an element, given the mass and abundance of its naturally occurring isotopes 19. Describe the Bohr model and its relationship to atomic spectra 20. Describe the modern quantum mechanical model and relationship to electron configuration 21. Use the diagonal rule to predict the filling patterns of atoms 22. Define and apply the terms: principal energy level, quantum number, sublevel, orbital, electron configuration, ground state, excited state, valence electron and Lewis structure (electron dot diagram)	III. Atomic Structure, Quantum Theory and Electronic Structure of an Atom	Chang,R. & Overby J. (2011). General Chemistry. Singapore: Mc Graw Hill Burnh Chang,R. & Overby J. (2011). General Chemistry. Singapore: Mc Graw Hill am, J.	Socratic Method Problem Set on the % Abundance of Isotopes	Rubric Quizzes (LMS) PRELIM EXAMINATION (LMS)	Laptop Power Point Presentation Video Clip You Tube Google Meet	1 week



STA. TERESA COLLEGE

Bauan, Batangas
College Department

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<p>23. Trace the history of modern Periodic Table</p> <p>24. Describe the general arrangement of the elements in the Modern Periodic Table with regard to electron configuration</p> <p>25. Describe how properties of metallic elements differ from those of non metallic elements</p> <p>26. Define the term metalloid and use the Periodic Table to indicate which elements are metalloids</p> <p>27. Indicate how the general properties of elements vary within the Periodic Table: metallic character, atomic radius, ionization energies, electron affinity, ionic radius and electronegativity</p> <p>28. Compare and contrast the properties of the elements in the various representative groups of the Periodic Table</p> <p>29. Compare some of the properties of the transition elements with those of the representative elements</p> <p>30. Describe how the properties of the elements vary across the period</p>	<p>IV. Periodic Relationship Among Elements</p> <p>V. Periodicity</p>	<p>Chang, R. & Overby J. (2011). General Chemistry. Singapore: Mc Graw Hill https://www.sciencealert.com/this-awesome-printable-periodic-table-tells-you-how-to-use-all-those-elements-chemistry</p> <p>Periodic Relationship Among Elements http://www.wou.edu/~postonp/ch222/pdf/Ch222-Ch08-Chang-s08.pdf retrieved Sept. 18, 2019</p>	<p>Socratic Paideia</p> <p>Lecture Recitation (google meet)</p> <p>Writing stories on the application of elements in our daily life. (Messenger and LMS)</p> <p>Graphic Organizer. The students will indicate the similarities of the properties of elements with regard to group and period</p>	<p>Quizzes (LMS)</p> <p>Problem set</p>	<p>Laptop (Google Meet)</p> <p>Writing Tablet</p> <p>Power Point Presentation</p> <p>Periodic Table (pdf)</p>	<p>2 weeks</p>



STA. TERESA COLLEGE

Bauan, Batangas
College Department

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31. Predict the type of bond existing in a compound 32. Distinguish between ionic and covalent bonds 33. Distinguish between polar and nonpolar bonds 34. Describe coordinate covalent bonds 35. Draw Lewis structure for covalently bonded atoms	VI. Chemical Bonding A. Ionic Bond B. Covalent Bonding	Chang,R. & Overby J. (2011). General Chemistry. Singapore: Mc Graw Hill Chemical Bonding I. Mc Graw Hills http://www1.udel.edu/chem/sametz/101Fall09/Ch8temp.pdf	Worksheets. A worksheet will be given to each student to accomplish the activity on chemical bonding, formula writing and molecular geometry (Messenger)	Quizzes (LMS) Problem Set (Messenger)	Laptop (Google meet) Power point Presentation Writing Tablet	1 week
36. Use the VSEPR to predict the shape of a covalently bonded molecule or ion 37. Define oxidation number 38. Determine the chemical formula and chemical name of a compound 39. Distinguish between molecular compounds and ionic compounds 40. Define the term binary compound Write the formulas for binary compound and for compounds containing polyatomic ions using the Stock System	VII. Chemical Formula and Molecular Geometry	Chang,R. & Overby J. (2011). General Chemistry. Singapore: Mc Graw Hill	Each student is assigned to identify chemical compounds being used at home. They are required to determine the chemical formula (Messenger) Each student will make a representation of molecular geometry with the use of recycled materials (Video clip , google drive)	Problem Set (Messenger) Quizzes (LMS) Presentation of self made molecular geometry (google meet)	Rubric for grading aPeriodic Table (pdf) pdf online learning materials Writing tablet	2 weeks



STA. TERESA COLLEGE

Bauan, Batangas
College Department

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41. Write word and formula equation for chemical reactions 42. Balance a chemical equation 43. Classify the types of chemical reactions 44. Define a redox reaction 45. Determine oxidizing and reducing agents 46. Balance a redox reaction 47. Calculate the formula mass of a substance 48. Define the term mole in relation to number of particles, mass of a substance and volume of an ideal gas at STP 49. Calculate the molar mass of a substance 50. Solve mole problems using the factor label method 51. Calculate the empirical formula of a substance from its percent composition by mass 52. Solve mole, mass and volume problems involving chemical equations 53. Solve problems involving numbers of particles, limiting reactants and percent yields	VIII. Chemical Reactions/ Balancing Chemical Reactions IX. Stoichiometry and Mathematics of Reactions and Chemical Equilibrium	Chang, R. & Overby J. (2011). General Chemistry. Singapore: Mc Graw Hill An Introduction to Chemical Reactions. https://preparatorychemistry.com/Bishop_Book_4_eBook.pdf Chapter 3 Stoichiometry: Calculations with Chemical Formulas and Equations. https://www2.chemistry.msu.edu/courses/chem151/chap3lect_2009.pdf	Experiment 4 Types of Chemical Reactions (Messenger) Computation (Messenger) Socratic Method Problem Solving Problem Set (Messenger)	MIDTERM EXAMINATION (LMS) Problem Set (Messenger) Recitation Quizzes (LMS)	Laptop (Google Meet) Power point Presentation Writing Tablet	2 weeks



STA. TERESA COLLEGE

Bauan, Batangas
College Department

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54. Define the terms solution, solute and solvent 55. Define the terms miscible, saturated, unsaturated, solubility and supersaturation 56. Determine the factors that affect solubility 57. Describe how the concentration of a solution can be expressed with respect to the following terms: percent parts per million, mole fraction, molarity and molality and solve problems involving these measurements of concentration	X. Solution and Their Properties	Chang,R. & Overby J. (2011). General Chemistry. Singapore: Mc Graw Hill Solution and their Properties https://personal.utdallas.edu/~son051000/chem1312/Chapter13a.pdf	Experiment 5 Solutions Demonstration through video presentation Tyndall Effect in some samples of solution, colloids and suspension found at home. (Problem Based)	Accomplished Report Sheets (Messenger) Quiz (LMS) Recitation (Google meet) SEMI FINAL EXAMINATION (LMS)	Flashlight Sample of Solutions, Colloids and suspension s	1 week
58. Define colligative properties 59. Distinguish among solutions, suspensions and colloidal dispersions 60. Define the Kinetic Molecular Theory 61. Describe and apply various gas laws to numerical problems 62. Convert between Kelvin and Celsius scale 63. Relate vapour pressure to the boiling point of a liquid	XI. Gases	Chang,R. & Overby J. (2011). General Chemistry. Singapore: Mc Graw Hill Gases. https://www.mcvts.net/cms/lib/NJ01911694/Centricity/Domain/136/chap13.pdf	Video Presentation. The students will be asked to make a presentation about some applications of Gas Laws Socratic Paideia	Problem Set (Messenger) Quizzes (LMS)	Laptop (Google Meet) Powerpoint Presentation	2 weeks



STA. TERESA COLLEGE

Bauan, Batangas
College Department

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64. Define the terms associated with phase changes 65. Solve problems involving changes of phase 66. Interpret phase diagrams 67. Define Intermolecular Forces of Attraction	XII. Liquids and Solids	Chang,R. & Overby J. (2011). General Chemistry. Singapore: Mc Graw Hill			Laptop (Google Meet) Projector Powerpoint Presentation	1 week
68. Define acids and bases operationally 69. State and apply the Arrhenius, Bronsted-Lowry definitions of acids and bases 70. Define the term conjugate acid-base pairs and recognize these pairs in an acid base reaction 71. Define the terms Lewis acid and Lewis base and apply these concepts 72. Define the terms pH and pOH and apply the concept 73. Indicate which salts are likely to produce acidic, basic or neutral solution when dissolve in water	XIII.Acids and Bases	Chang,R. & Overby J. (2011). General Chemistry. Singapore: Mc Graw Hill	Experiment 6 of Compound: Acids, Bases and Salt	Problem Set (Messenger) Board Work Quizzes (LMS) FINAL EXAMINATION (LMS)	Writing Tablet	2 weeks

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