I. CATALOG INFORMATION
   A. Discipline: CHEMISTRY
   B. Subject Code and Number: CHEM M01A
   C. Course Title: General Chemistry I
   D. Credit Course units:
      Units: 5
      Lecture Hours per week: 4
      Lab Hours per week: 3
      Variable Units: No
   E. Student Learning Hours:
      Lecture Hours:
      Classroom hours: 70 - 70
      Laboratory/Activity Hours:
      Laboratory/Activity Hours 52.5 - 52.5
      Total Combined Hours in a 17.5 week term: 122.5 - 122.5
   F. Non-Credit Course hours per week
   G. May be taken a total of: X 1 2 3 4 time(s) for credit
   H. Is the course co-designated (same as) another course: No X Yes
      If YES, designate course Subject Code & Number: 
   I. Course Description:
      Studies atomic theory and stoichiometry; nomenclature and chemical reactions; thermochemistry; quantum theory and the electronic structure of atoms; chemical bonding and molecular structure; physical behavior of gases; states of matter and phase equilibria; and solutions. Addresses, through laboratory activities, spectroscopy; distillations; quantitative, qualitative and statistical analyses; titrations; thermochemistry; gravimetric and volumetric analyses; and colligative properties.
   J. Entrance Skills
      *Prerequisite: No X Yes Course(s)
      CHEM M12, CHEM M12H or CHEM M11 or one year of high school chemistry or equivalent with grade of C or higher or MATH M03 and two years of high school algebra or equivalent with a grade of C or higher or
      *Corequisite: No X Yes Course(s)
      Limitation on Enrollment: No X Yes
Recommended Preparation:  No [x] Yes [ ] Course(s)

Other:  No [x] Yes [ ]

K. Other Catalog Information:

C-ID: CHEM 110 & CHEM 120S

II. COURSE OBJECTIVES

Upon successful completion of the course, a student will be able to:

<table>
<thead>
<tr>
<th></th>
<th>Methods of evaluation will be consistent with, but not limited by, the following types or examples.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>analyze and apply the scientific method to chemistry problems, including developing a hypothesis, hypothesis testing, evaluation, and modeling; list the basic units of measurement in the metric and English systems, perform unit conversions within and between systems, and express results appropriately with significant figures and in scientific notation; classify matter, distinguish between physical/chemical changes and properties, and comprehend the principles of chemical reactions and energy relationships.</td>
</tr>
<tr>
<td>2</td>
<td>use dimensional analysis to perform mathematical conversions and solve problems involving stoichiometry, thermochemistry, quantum mechanics, solids, liquids, gases, and solutions.</td>
</tr>
<tr>
<td>3</td>
<td>identify the symbols of common elements, the structures of molecules and ions; name/write formulas for various elements, acids, salts, bases and inorganic compounds as well as simple organic compounds.</td>
</tr>
<tr>
<td>4</td>
<td>write balanced molecular, ionic, and net-ionic equations for synthesis, decomposition, combustion, single-replacement, double-replacement, and oxidation-reduction reactions; identify the various types of electrolytes and their behavior in chemical reactions.</td>
</tr>
<tr>
<td>5</td>
<td>solve stoichiometry and solution concentration problems involving limiting reactants, theoretical and percent yields, dilutions, titrations, gases, liquids, solids, and colligative properties.</td>
</tr>
<tr>
<td></td>
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<tr>
<td>---</td>
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</tr>
<tr>
<td>6</td>
<td>state the various gas laws, their historical development and applications, the postulates and mathematical relationships of the kinetic molecular theory of gases, why real gases differ from ideal gases; quantify real gas behavior via the van der Waals equation.</td>
</tr>
<tr>
<td>7</td>
<td>explain and solve thermochemistry problems by considering potential and kinetic energies, internal energy, specific heat and specific heat capacity, calorimetry, the First Law of Thermodynamics, and Hess's Law.</td>
</tr>
<tr>
<td>8</td>
<td>describe the quantum mechanical model and construct the historical development of the nuclear atom; explain the nature of atomic spectra and Bohr's model; conceptualize and utilize the Planck-Einstein equation, Rydberg equation, de Broglie equation, and the Heisenberg Uncertainty Principle; state and apply the quantum numbers to wave mechanics; apply the Aufbau principle to writing electron configurations; account for trends in chemical periodicity involving atomic and ionic radii, ionization energy, metallic character, electron affinity, and electronegativity.</td>
</tr>
<tr>
<td>9</td>
<td>identify the different types of chemical bonding; apply Lewis and VSEPR (Valence Shell Electron Pair Repulsion) theories to draw structures and shapes, label electronic geometries, molecular geometries, and bond angles, and predict polarities for molecules and ions including resonance and structural isomers; understand and incorporate the use of Valence Bond Theory to explain and identify various hybridizations; explain the fundamental basis of Molecular Orbital Theory for diatomic species to predict electron configurations, bond orders, and magnetic properties.</td>
</tr>
<tr>
<td>10</td>
<td>list and describe the distinguishing characteristics of solids, liquids, gases, and solutions.</td>
</tr>
<tr>
<td>11</td>
<td>conduct various quantitative and qualitative experiments with adherence to safety protocols, record observations and express numerical values using appropriate significant figures, analyze acquired data, apply statistical analysis and formulate proper conclusions through written expression of results.</td>
</tr>
<tr>
<td></td>
<td>define and describe the different types of intermolecular forces and their effects on matter; calculate the energy involved with</td>
</tr>
<tr>
<td>Topic</td>
<td>Learning Outcomes</td>
</tr>
<tr>
<td>-------</td>
<td>-------------------</td>
</tr>
<tr>
<td><strong>temperature and phase changes; construct and interpret phase diagrams for different substances; identify unit cells for crystalline solids.</strong></td>
<td>applications (including written expression of results and conclusions), cumulative final exam.</td>
</tr>
<tr>
<td><strong>perform calculations using concentration terms that include molarity, molality, normality, parts per million, and percent by mass; understand what affects solubilities and the concepts of colligative properties, perform quantitative calculations, and make qualitative comparisons; explain the liquid-vapor equilibrium and its effect on colligative properties; describe the behavior of electrolytes and nonelectrolytes in solution.</strong></td>
<td>quizzes, examinations, laboratory-based applications (including written expression of results and conclusions), cumulative final exam.</td>
</tr>
</tbody>
</table>

### III. COURSE CONTENT

<table>
<thead>
<tr>
<th>Estimated %</th>
<th>Topic</th>
<th>Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>5.00%</strong></td>
<td>Matter and Measurement: Scientific Method; Properties and Classification of Matter; Measurements - Types, Units, and Conversion Factors; Density and Percent - Definitions and Calculations; Uncertainty and Significant Figures.</td>
<td>1, 2, 11</td>
</tr>
<tr>
<td><strong>6.00%</strong></td>
<td>Atoms and Atomic Theory: Conservation of Mass and Constant Composition; Dalton’s Atomic Theory; Cathode Rays and Radioactivity; Thomson and Rutherford’s Models of the Atom; Atomic Number, Atomic Mass, Mass Number, and Isotopes; Elements and the Periodic Table; Mole Concept and Avogadro’s Number</td>
<td>1, 2, 3</td>
</tr>
<tr>
<td><strong>10.00%</strong></td>
<td>Chemical Compounds: Chemical Compounds, Formulas, and the Mole Concept; Percent Composition, Empirical and Molecular Formulas; Oxidation States; Nomenclature of Inorganic and Simple Organic Compounds</td>
<td>1, 2, 3, 11</td>
</tr>
<tr>
<td><strong>11.00%</strong></td>
<td>Reactions in Aqueous Solutions: Electrical Conductivity Properties of Solutions; Precipitation and Acid-Base Reactions; Net Ionic Equations; Oxidation-Reduction Reactions</td>
<td>4, 13</td>
</tr>
<tr>
<td><strong>12.00%</strong></td>
<td>Chemical Reactions and Calculations: Chemical Reactions and Balanced Equations; Stoichiometry and the Factor Label Method of Problem Solving; Limiting Reactant and Percent Yields; Solution Concentration Terms; Molarity and Dilutions; Solution Stoichiometry</td>
<td>4, 5, 11</td>
</tr>
<tr>
<td><strong>10.00%</strong></td>
<td>Physical Properties of Solutions: Solutions - Types and Terminology; Solution Concentration - Qualitative and Quantitative; The dissolving Process; Factors Affecting Solubility; Colligative Properties of Solutions; Henry’s and Raoult’s Laws; Freezing and Boiling Points of Solutions; Colloids</td>
<td>10, 12, 13</td>
</tr>
<tr>
<td><strong>8.00%</strong></td>
<td>Thermochemistry: Kinetic and Potential Energy; Heat, Temperature Change, Specific Heat and Heat Capacity; Calorimetry; 1st Law of Thermodynamics; Heats of Reaction and Hess’s Law</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Gases: Properties and Measurement of Gases; Simple, Combined, and Ideal Gas Laws; Gas Stoichiometry; Gas Mixtures and Dalton’s Law</td>
<td></td>
</tr>
<tr>
<td>Percentage</td>
<td>Topic</td>
<td>Lab (must total 100%)</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------------------------------------------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>10.00%</td>
<td>of Partial Pressure; Kinetic Molecular Theory of Gases and Ideal Gases; Nonideal (Real) Gases and van der Waals Equation; Molecular Effusion and Diffusion</td>
<td>10</td>
</tr>
<tr>
<td>10.00%</td>
<td>Electrons and the Periodic Table: Nature of Light and Electromagnetic Radiation; Atomic Spectra, Bohr Atom, Quantum Mechanics and Atomic Orbitals; Many-Electron Atoms; Electron Configurations and the Periodic Table; Classification of Matter and the Periodic Law; Periodic Table Trends</td>
<td>8</td>
</tr>
<tr>
<td>12.00%</td>
<td>Chemical Bonding: Type and Nature of Chemical Bonds; Lewis Theory and Structures; Resonance and Structural Isomers; VSEPR and Molecular Geometry, Polarity, and Bond Angles; Valence Bond Theory, Hybrid Orbitals, and Molecular Orbital Theory</td>
<td>9</td>
</tr>
<tr>
<td>6.00%</td>
<td>States of Matter and Intermolecular Forces: Properties of Liquids and Solids; Vapor Pressure; Boiling; Phase Diagrams; Van der Waal Forces, Hydrogen Bonding; Structures of Solids and Unit Cells; Properties and Bonding of Metals</td>
<td>10, 12</td>
</tr>
<tr>
<td></td>
<td><strong>Lab (must total 100%)</strong></td>
<td></td>
</tr>
<tr>
<td>3.00%</td>
<td>Safety in the laboratory.</td>
<td>11</td>
</tr>
<tr>
<td>17.00%</td>
<td>Introductory experimentation involving graphical representation of data, statistical analysis of data, and techniques such as crystallization</td>
<td>1, 11</td>
</tr>
<tr>
<td>29.00%</td>
<td>Stoichiometry, chemical reactions, and characterization of products labs such as: Weight Analysis of a Copper Oxide; Determination of Avogadro's Number from Electrodeposition; Synthesis of Copper(II) Compounds; Preparation of Banana Oil and Characterization using Infrared (IR) Spectroscopy; Qualitative Analysis - The Ten Test Tube Mystery</td>
<td>1, 5, 11</td>
</tr>
<tr>
<td>11.00%</td>
<td>Gas Law labs such as: Molecular Weight of an Unknown Volatile Liquid; Molar Volume of a Gas and Percent KClO&lt;sub&gt;3&lt;/sub&gt; in an Unknown Sample</td>
<td>1, 5, 6, 11</td>
</tr>
<tr>
<td>6.00%</td>
<td>Thermochemistry lab such as: Calorimetry and the Law of Dulong and Petit</td>
<td>1, 7, 11</td>
</tr>
<tr>
<td>17.00%</td>
<td>Quantum Mechanics, chemical bonding, and classification of substance labs such as: Emission Spectra of Hydrogen, Helium, and Mercury; Geometrical Structures of Molecules and Ions using Molecular Models; Classification of Chemical Substances</td>
<td>1, 8</td>
</tr>
<tr>
<td>17.00%</td>
<td>Laboratory Final Exam: In this multi-week lab, each student performs an organic synthesis, where an unknown compound &quot;X&quot; is converted into compound &quot;Y&quot;. A series of subsequent tests and characterizations (i.e., solubility, pH, melting point, freezing point depression, combustion analysis) are performed in order to deduce the structural formulas of both unknown compounds along with analyses of mass spectra and IR spectra. A formal lab report is written which outlines all observation, data, analysis, and conclusions based on a department rubric</td>
<td>1, 3, 4, 5, 9, 11, 12, 13</td>
</tr>
</tbody>
</table>
### IV. TYPICAL ASSIGNMENTS

#### A. Writing assignments

<table>
<thead>
<tr>
<th>Writing assignments are required. Possible assignments may include, but are not limited to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. problem solving exam questions.</td>
</tr>
<tr>
<td>2. essay and short exam questions.</td>
</tr>
<tr>
<td>3. describe observations and answer questions from laboratory experiments.</td>
</tr>
<tr>
<td>4. reflect on readings from the newspaper, journal articles, and/or Internet sources.</td>
</tr>
</tbody>
</table>

#### B. Appropriate outside assignments

<table>
<thead>
<tr>
<th>Appropriate outside assignments are required. Possible assignments may include, but are not limited to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. read material from the textbook and laboratory manual.</td>
</tr>
<tr>
<td>2. homework problems selected from the textbook.</td>
</tr>
<tr>
<td>3. additional problem sets provided by the instructor.</td>
</tr>
<tr>
<td>4. readings from the newspaper, journal articles, and/or Internet sources.</td>
</tr>
<tr>
<td>5. online homework assigned through MasteringChemistry or similar online system.</td>
</tr>
</tbody>
</table>

#### C. Critical thinking assignments

<table>
<thead>
<tr>
<th>Critical thinking assignments are required. Possible assignments may include, but are not limited to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. class discussions on select example and homework problems.</td>
</tr>
<tr>
<td>2. describe and apply a series of steps for obtaining the solution to quantitative chemical problems.</td>
</tr>
<tr>
<td>3. compare and contrast different methods of solution to a particular problem.</td>
</tr>
<tr>
<td>4. apply chemical principles to discuss various environmental and consumer issues such as air pollution, toxic wastes, energy sources, etc.</td>
</tr>
</tbody>
</table>
V. METHODS OF INSTRUCTION

Methods of instruction may include, but are not limited to:

- Distance Education – When any portion of class contact hours is replaced by distance education delivery mode (Complete DE Addendum, Section XV)
- Lecture/Discussion
- Laboratory/Activity
- Other (Specify)
  Chemical demonstrations performed by instructor, student group work, online tutorials, homework, and study aids

VI. METHODS OF EVALUATION

Methods of evaluation may include, but are not limited to:

- Essay Exam
- Problem Solving Exam
- Objective Exams
- Classroom Discussion
- Reports/Papers/Journals
- Projects
- Skill Demonstration
- Participation
- Other (specify)

Multi-week lab experiment with formal report
Online homework with standardized grading through textbook publisher that allows comparisons to national norms

VII. REPRESENTATIVE TEXTS AND OTHER COURSE MATERIALS


VIII. STUDENT MATERIALS FEES

- No
- Yes

IX. PARALLEL COURSES

<table>
<thead>
<tr>
<th>College</th>
<th>Course Number</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>UC Berkeley</td>
<td>CHEM 1A &amp; 1AL</td>
<td>General Chemistry</td>
<td>3/1</td>
</tr>
<tr>
<td>UC Los Angeles</td>
<td>CHEM 20A</td>
<td>Chemical Structure</td>
<td>4</td>
</tr>
</tbody>
</table>
X. MINIMUM QUALIFICATIONS

Courses Requiring a Masters Degree:
Master's in chemistry OR Bachelor's in chemistry or biochemistry AND Master's in biochemistry, chemical engineering, chemical physics, physics, molecular biology, or geochemistry OR the equivalent.

XI. ARTICULATION INFORMATION

A. Title V Course Classification:
   1. This course is designed to be taken either:
      - □ Pass/No Pass only (no letter grade possible); or
      - □ Letter grade (P/NP possible at student option)

   2. Degree status:
      - Either □ Associate Degree Applicable; or □ Non-associate Degree Applicable

B. Moorpark College General Education:
   1. Do you recommend this course for inclusion on the Associate Degree General Education list?
      Yes: □ No: □ If YES, what section(s)?
      □ A1 - Natural Sciences - Biological Science
      □ A2 - Natural Sciences - Physical Science
      □ B1 - Social and Behavioral Sciences - American History/Institutions
      □ B2 - Social and Behavioral Sciences - Other Social Behavioral Science
      □ C1 - Humanities - Fine or Performing Arts
      □ C2 - Humanities - Other Humanities
      □ D1 - Language and Rationality - English Composition
      □ D2 - Language and Rationality - Communication and Analytical Thinking
      □ E1 - Health/Physical Education
      □ E2 - PE or Dance
      □ F - Ethnic/Gender Studies

C. California State University(CSU) Articulation:
   1. Do you recommend this course for transfer credit to CSU? Yes: □ No: □

   2. If YES do you recommend this course for inclusion on the CSU General Education list?
      Yes: □ No: □ If YES, which area(s)?
      □ A1 □ A2 □ A3 □ B1 □ B2 □ B3 □ B4 □
      □ C1 □ C2 □ D1 □ D2 □ D3 □ D4 □ D5 □
      □ D6 □ D7 □ D8 □ D9 □ D10 □ E □
D. University of California (UC) Articulation:

1. Do you recommend this course for transfer to the UC? Yes: X No: 

2. If YES do you recommend this course for the Intersegmental General Education Transfer Curriculum (IGETC)? Yes: X No: 

**IGETC Area 1: English Communication**

- [ ] English Composition
- [ ] Critical Thinking-English Composition
- [ ] Oral Communication

**IGETC Area 2: Mathematical Concepts and Quantitative Reasoning**

- [ ] Mathematical Concepts

**IGETC Area 3: Arts and Humanities**

- [ ] Fine Arts
- [ ] Humanities

**IGETC Area 4: Social and Behavioral Sciences**

- [ ] Anthropology and Archaeology
- [ ] Economics
- [ ] Ethnic Studies
- [ ] Gender Studies
- [ ] Geography
- [ ] History
- [ ] Interdisciplinary, Social & Behavioral Sciences
- [ ] Political Science, Government & Legal Institutions
- [ ] Psychology
- [ ] Sociology & Criminology

**IGETC Area 5: Physical and Biological Sciences (mark all that apply)**

- [ ] Physical Science Lab or Physical Science Lab only (non-sequence)
- [ ] Physical Science Lecture only (non-sequence)
- [ ] Biological Sciences
- [ ] Physical Science Courses
- [ ] Physical Science Lab or Biological Science Lab Only (non-sequence)
- [ ] Biological Science Courses
- [ ] Biological Science Lab course
- [ ] First Science course is a Special sequence
- [ ] Second Science course in a Special Sequence
- [X] Laboratory Activity
- [X] Physical Sciences
1. analyze and apply the scientific method to chemistry problems, including developing a hypothesis, hypothesis testing, evaluation, and modeling.

2. list the basic units of measurement in the metric and English systems, perform unit conversions within and between systems, and express results appropriately with significant figures and in scientific notation.

3. use dimensional analysis to perform mathematical conversions and solve problems involving density, energy, stoichiometry, quantum mechanics, solids, liquids, gases, and solutions.

4. classify matter, distinguish between physical/chemical changes and properties, and comprehend the principles of chemical reactions and energy relationships.

5. list and describe the distinguishing characteristics of solids, liquids, gases, and solutions.

6. describe the quantum mechanical model and construct the historical development of the nuclear atom, explain the nature of atomic spectra, and account for trends in chemical periodicity involving atomic and ionic radii, ionization energy, and electronegativity.

7. identify the symbols of common elements, the structures of molecules and ions, and name various inorganic compounds.

8. write balanced molecular, ionic, and net-ionic equations for synthesis, decomposition, combustion, single-replacement, double-replacement, and oxidation-reduction reactions.

9. apply Lewis and VSEPR theories to draw structures and shapes, label electronic and molecular geometries, and predict polarities for
molecules and ions.

10. state the general principles of Arrhenius and Bronsted-Lowry acid/base theories, explain the nature of the pH scale as well as perform pH calculations, and identify buffer solutions.

11. conduct various quantitative and qualitative experiments with adherence to safety protocols, record observations and express numerical values appropriately, analyze acquired data, and formulate proper conclusions through written expression of results.

☐ B. Standard Prerequisite or Corequisite required by universities.

☐ C. Corequisite is linked to companion lecture course.

☐ D. Prerequisite or Corequisite is authorized by legal statute or regulation.
   Code Section: __________

☐ E. Prerequisite or Corequisite is necessary to protect the students' health and safety.

☐ F. Computation or communication skill is needed.

☐ G. Performance courses: Audition, portfolio, tryouts, etc. needed.

Requisite Justification for CHEM M12H

☑ A. Sequential course within a discipline.

1. analyze and apply the scientific method to chemistry problems, including developing a hypothesis, hypothesis testing, evaluation, and modeling.

2. list the basic units of measurement in the metric and English systems, perform unit conversions within and between systems, and express results appropriately with significant figures and in scientific notation.

3. use dimensional analysis to perform mathematical conversions and solve problems involving density, energy, stoichiometry, quantum mechanics, solids, liquids, gases, and solutions.

4. classify matter, distinguish between physical/chemical changes and properties, and comprehend the principles of chemical reactions and energy relationships.

5. list and describe the distinguishing characteristics of solids, liquids, gases, and solutions.
6. describe the quantum mechanical model and construct the historical development of the nuclear atom, explain the nature of atomic spectra, and account for trends in chemical periodicity involving atomic and ionic radii, ionization energy, and electronegativity.

7. identify the symbols of common elements, the structures of molecules and ions, and name various inorganic compounds.

8. write balanced molecular, ionic, and net-ionic equations for synthesis, decomposition, combustion, single-replacement, double-replacement, and oxidation-reduction reactions.

9. apply Lewis and VSEPR theories to draw structures and shapes, label electronic and molecular geometries, and predict polarities for molecules and ions.

10. state the general principles of Arrhenius and Bronsted-Lowry acid/base theories, explain the nature of the pH scale as well as perform pH calculations, and identify buffer solutions.

11. conduct various quantitative and qualitative experiments with adherence to safety protocols, record observations and express numerical values appropriately, analyze acquired data, and formulate proper conclusions through written expression of results.

12. critically analyze and discuss practical applications of and recent developments in chemistry.

13. attend and participate in discussions related to chemistry and general science both at Moorpark College and in the greater community.

14. complete a semester project involving a term paper, poster, and class presentation based on extensive research, collaboration, and critical analysis, and using appropriate citations.

☐ B. Standard Prerequisite or Corequisite required by universities.

☐ C. Corequisite is linked to companion lecture course.

☐ D. Prerequisite or Corequisite is authorized by legal statute or regulation. Code Section: __________

☐ E. Prerequisite or Corequisite is necessary to protect the students' health and safety.

☐ F. Computation or communication skill is needed.

☐ G. Performance courses: Audition, portfolio, tryouts, etc. needed.
Requisite Justification for CHEM M11

A. Sequential course within a discipline.

  1. analyze and apply the scientific method to chemistry problems, including developing a hypothesis, hypothesis testing, evaluation, and modeling.

  2. calculate and measure mass, volume, and length using laboratory devices properly and know their relative precision.

  3. list the basic units of measurement in the metric and English systems, perform unit conversions within and between systems, and express results appropriately with significant figures and in scientific notation.

  4. classify matter, distinguish between physical and chemical changes, comprehend the principles of chemical reactions and energy relationships, and perform various stoichiometric calculations.

  5. list and describe the distinguishing characteristics of solids, liquids, gases, and solutions.

  6. analyze saturated hydrocarbons, unsaturated hydrocarbons, cyclic compounds, alcohols, aldehydes, ketones, amines, and carboxylic acids and their derivatives.

  7. conduct various quantitative and qualitative experiments with adherence to safety protocols, record observations and express numerical values appropriately, analyze acquired data, and formulate proper conclusions through written expression of results.

B. Standard Prerequisite or Corequisite required by universities.

C. Corequisite is linked to companion lecture course.

D. Prerequisite or Corequisite is authorized by legal statute or regulation.  
   Code Section: __________

E. Prerequisite or Corequisite is necessary to protect the students' health and safety.

F. Computation or communication skill is needed.

G. Performance courses: Audition, portfolio, tryouts, etc. needed.

or
Requisite Justification for one year of high school chemistry or equivalent with grade of C or higher

☐ A. Sequential course within a discipline.

☒ B. Standard Prerequisite or Corequisite required by universities.

UCLA, UC Berkeley, UCSB

☐ C. Corequisite is linked to companion lecture course.

☐ D. Prerequisite or Corequisite is authorized by legal statute or regulation. Code Section: _________

☐ E. Prerequisite or Corequisite is necessary to protect the students' health and safety.

☐ F. Computation or communication skill is needed.

☐ G. Performance courses: Audition, portfolio, tryouts, etc. needed.

or

Requisite Justification for MATH M03

☐ A. Sequential course within a discipline.

☒ B. Standard Prerequisite or Corequisite required by universities.

☐ C. Corequisite is linked to companion lecture course.

☐ D. Prerequisite or Corequisite is authorized by legal statute or regulation. Code Section: _________

☐ E. Prerequisite or Corequisite is necessary to protect the students' health and safety.

☐ F. Computation or communication skill is needed.
G. Performance courses: Audition, portfolio, tryouts, etc. needed.

Requisite Justification for two years of high school algebra or equivalent with a grade of C or higher

A. Sequential course within a discipline.

B. Standard Prerequisite or Corequisite required by universities.

C. Corequisite is linked to companion lecture course.

D. Prerequisite or Corequisite is authorized by legal statute or regulation.
   Code Section: _________

E. Prerequisite or Corequisite is necessary to protect the students' health and safety.

F. Computation or communication skill is needed.

G. Performance courses: Audition, portfolio, tryouts, etc. needed.

XIV. WORKPLACE PREPARATION

CHEM M01A: Not Applicable

XV. DISTANCE LEARNING COURSE OUTLINE ADDENDUM

1. Mode of Delivery
   
   □ Online (course will be delivered 100% online)
   
   □ Online with onsite examinations (100% of the instruction will occur online, but examinations and an orientation will be scheduled onsite)
   
   X □ Online/Hybrid (a percentage of instruction will be held online and the remaining percentage of instruction will be held onsite)
   
   X □ Lab activities will be conducted onsite
   
   □ Televideo (Examinations and an orientation will be held onsite)
   
   □ Teleconference
   
   □ Other

2. Need/Justification

   Improve general student access.
3. Describe how instructors teaching this course will ensure regular, effective contact with and among students.

Onsite (40%) - Students will require an online orientation as well as introduction to the course; three to four written examinations plus cumulative final exam will be administered; hands-on laboratory and discussion activities. Online (60%) - Instructor homepage will contain all lecture notes and supplementary handouts along with practice quiz/exam problems, course discussion board and/or chatroom, and class-wide emails as well as emails to individual students.

4. Describe how instructors teaching this course will involve students in active learning.

Instructors will have regular contact with students through onsite laboratory and discussion activities to monitor student progress, address student questions, and guide student learning in person. Instructor will also take advantage of online resources (email, discussion boards, etc.) to maintain direct contact with enrolled students when not in the classroom, answer student questions, and provide support

5. Explain how instructors teaching this course will provide multiple methods of content representation.

In addition to online contact, instructors will have regular contact in the laboratory and discussion sections. As such, students will be given hands-on access to material in addition to visual access online. Instructors may also choose to include audio and video files to supplement lecture material online.

6. Describe how instructors teaching this course will evaluate student performance.

Student grades will be evaluated similar to a traditionally taught course including quizzes (15%), online participation and discussion questions (10%), examinations (50%), laboratories (20%), and reports/papers (5%).

XVI. General Education Course Outline Addendum

General Education Division of Learning [check all applicable boxes):

- Natural Sciences
  - Biological Science
- Physical Science

- Social and Behavioral Sciences
  - American History/Institutions
  - Other Social Science

- Humanities
  - Fine or Performing Arts
  - Other Humanities

- Language and Rationality
  - English Composition
  - Communication and Analytical Thinking
Option #1: Moorpark College has already received approval from the CSU and/or UC systems for this course to fulfill a GE requirement. Note: This option applies only to technical revisions and updated courses.

Option #2: Moorpark College has not received approval from the CSU and/or UC systems for this course to fulfill a GE requirement. This option applies to all new and substantively revised courses.