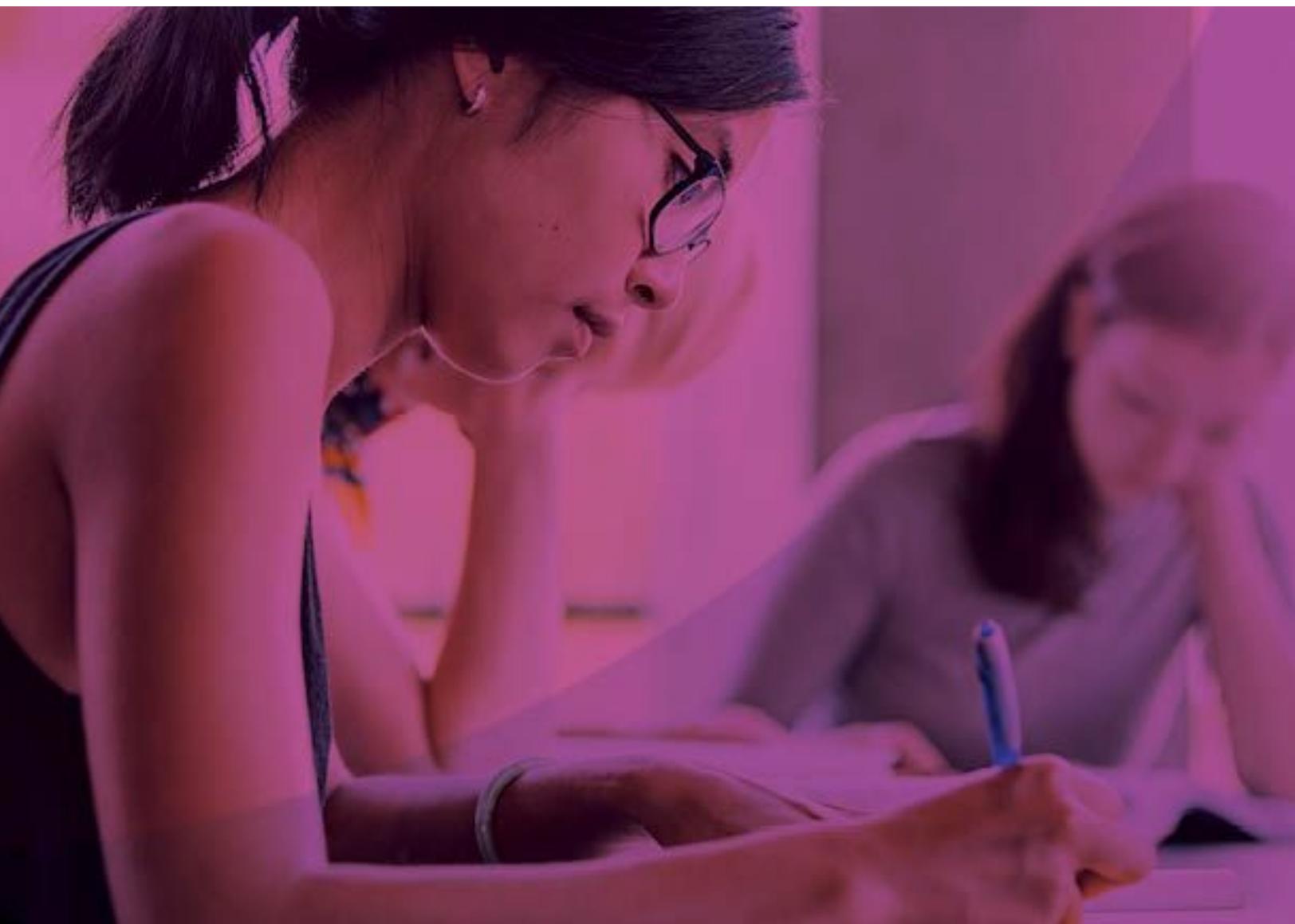




General, Organic, and Biochemistry

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Alta General, Organic, and Biochemistry is a one- or two-semester course intended for students whose professional goals require an understanding of chemistry, but not a mastery of it. Many students studying health-related majors will take this course. To develop this course, Knewton used several sources, including a Chemistry professor with a graduate degree from Cal State Northridge who has taught in various undergraduate settings but specializes in organic chemistry, along with a team of Subject Matter Experts (SMEs). The SMEs come from diverse backgrounds and are all accomplished academics in the Chemistry field.

Alta General, Organic, and Biochemistry has at least two instructional sequences for every learning objective, giving students multiple opportunities to learn new concepts. Between our instructional texts, videos, and SMEs, we were able to solicit ideas from chemistry instructors and students. Alta General, Organic, and Biochemistry covers the typical breadth of chemistry topics, and also provides the necessary depth to ensure the course is manageable and engaging for instructors and students alike.

General, Organic, and Biological Chemistry | Table of Contents

Chapter 1: Chemistry: The Science of Matter

1.1 Matter, Chemicals, and the Science of Chemistry

- Understand the scope, importance, and aim of chemistry
- Identify examples of chemistry encountered in daily life

1.2 The Scientific Method

- Understand the scientific method

Chapter 2: Measurements in Science

2.1 Metric and SI Systems

- Understand how to use the SI system for units names and abbreviations
- Identify and use SI units for length, volume, and mass
- Identify and use the SI units for time and temperature

2.2 Significant Figures

- Determine the number of significant figures in measurements
- Use significant figures when performing calculations

2.3 Prefixes and Scientific Notation

- Express numbers in standard notation using prefixes and in scientific notation

2.4 Conversion Factors

- Solve unit conversion problems using dimensional analysis: single step

2.5 Density and Specific Gravity

- Perform specific gravity and density calculations

Chapter 3: Properties of Matter and Energy

3.1 Types of Matter

- Classify matter as elements or compounds

3.2 Solids, Liquids, and Gases: Properties

- Compare and contrast the three states of matter

3.3 Temperature Scales

- Use Celsius, Fahrenheit, and Kelvin temperature scales and convert between them

3.4 Kinetic and Potential Energy

- Define the types of energy

3.5 Application of Energy Units in the Field of Nutrition

- Understand how to calculate caloric value of food

3.6 Specific Heat

- Understand how to use specific heat in heat changes in calculations

3.7 Transitions Between Different States of Matter

- Understand physical properties and physical changes
 - Understand chemical properties and chemical changes
-

Chapter 4 : Atomic Structure and the Periodic Table of Elements

4.1 Symbols and Names of Elements

- Read and identify chemical symbols

4.2 The Periodic Table of Elements

- Read and interpret element blocks on the periodic table
- Identify the group on the periodic table an element belongs to
- Understand how elements are arranged in the periodic table

4.3 Structure of Atom

- Identify and describe the subatomic particles that make up an atom
- Understand Dalton's Atomic Theory

4.4 Atomic Number and Mass Number

- Determine the number of protons, electrons, and neutrons in the atom by using the atomic and mass numbers

4.5 Isotopes

- Determine the number of protons, electrons, and neutrons in the isotope from the atomic symbol and write the atomic symbol for the specific isotope
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4.6 Electron Arrangement and Energy Levels

- Write electron arrangement for the first twenty elements in the Periodic Table of Elements

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- Determine the electron configuration of an element

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5.2 Nuclear Reactions and Equations

- Write and balance equations for alpha, beta, positron, and gamma decay

5.3 Radiation Measurements, Exposure, and Safety

- Understand how radiation activity is measured
- Convert between the different units of radiation activity
- Understand health effects of exposure to radiation

5.4 Nuclear Decay and Dating

- Understand how to determine the age of an object by using radioisotopes
- Conduct calculations involving half-life of a radioisotope

5.5 Nuclear Medicine

- Understand how nuclear decay is used in modern medicine

5.6 Nuclear Power

- Describe nuclear fission
 - Describe nuclear fusion
 - Understand the operation of a nuclear power plant
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Chapter 6: Ions, Compounds, and Molecules

6.1 Simple Ions

- Define ions and distinguish between monatomic and polyatomic ions
- Understand physiological and metabolic functions of biologically important ions

6.2 Ionic Compounds with Simple Ions

- Describe the properties of ionic compounds
- Write the name and formula of an ionic compound with a simple ion

6.3 Ionic Compounds with Polyatomic Ions

- Write the name and formula of a polyatomic ion or compound containing it

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- Understand the type of bonding between atoms in a molecular compound
- Write the name and formula of a molecular compound

6.5 Lewis Structures

- Read and draw Lewis structures for an atom
- Understand how to use the octet rule to draw Lewis structures for covalent compounds

6.6 Types of Bonds and Electronegativity of Atoms

- Determine the type of bond by evaluating electronegativity
- Compare and contrast covalent non-polar, covalent polar, and ionic bonds

6.7 VSEPR Theory and Molecular Geometry

- Understand how to use VSEPR theory to determine molecular shape

6.8 Molecular Geometry and Polarity

- Understand the role that molecular geometry plays in the polarity of a compound

6.9 Intramolecular Forces and Properties of a Compound

- Compare and contrast intermolecular and intramolecular forces
- Define, identify, and describe dipole-dipole attractions between molecules
- Understand the relationship between the intermolecular forces and the melting point of a compound
- Define, identify, and describe hydrogen bonding

Chapter 7: Chemical Reactions and Mass Relationships

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- Derive the number of atoms from an element's mass

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 - Write and balance chemical reactions
-

7.4 Types of Chemical Reactions

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- Write balanced chemical equations for acid-base reactions
- Understand oxidation and reduction

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- Calculate the molar ratios from balanced equations

7.6 Mass Ratios in Chemical Equations

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8.3 Charles's Law

- Perform calculations with Charles's Law

8.4 Gay-Lussac's Law

- Perform calculations with Gay-Lussac's Law

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- Perform calculations using Avogadro's law

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- Perform calculations with Dalton's Law

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9.1 Solutions

- Recognize solutions and distinguish between solute and solvent
- Describe the formation and properties of solutions

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- Describe the characteristics of ionic electrolytes
- Describe covalent electrolytes

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- Explain the differences between saturated, unsaturated, and supersaturated

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- Understand how to calculate concentrations of diluted solutions

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- Explain acid-base equilibrium using the concept of reversible reactions

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- Understand the effect that changes in temperature have on equilibrium
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- Read and write equations for the self ionization of water and for acid and base ionization reactions
- Calculate concentrations of hydronium and hydroxide ions

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- Perform calculations that relate pH and pOH

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-

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