

**Clackamas Community College**

## Online Course/Outline Submission System

---

 Show changes since last approval in red**Section #1 General Course Information****Department:** Sciences**Submitter**First Name: **Eden**Last Name: **Francis**Phone: **3352**Email: **edenf**

---

**Course Prefix and Number:** CH - 112

---

**# Credits:** 4**Contact hours**

Lecture (# of hours): 33

Lec/lab (# of hours):

Lab (# of hours): 33

Total course hours: 66

For each credit, the student will be expected to spend, on average, 3 hours per week in combination of in-class and out-of-class activity.

---

**Course Title:** Chemistry for Health Sciences**Course Description:**

One-term preparatory chemistry course for students who want to take BI-231, Anatomy and Physiology and/or BI-234, Introductory Microbiology. Includes measurement; atomic structure; periodic table, bonding; nomenclature; heat; molecular and ionic interactions in solids, liquids and solutions; chemical reactions including acid-base; organic chemistry; and biochemistry.

---

**Type of Course:** Lower Division Collegiate

Is this class challengeable?

**No**

Can this course be repeated for credit in a degree?

**No**

Is general education certification being sought at this time?

**Yes**

**Check which General Education requirement:**

**✓ Science & Computer Science**

Is this course part of an AAS or related certificate of completion?

**No**

Are there prerequisites to this course?

**Yes**

**Pre-reqs:** Pass MTH-065 with a C or better or placement in MTH-095

**Have you consulted with the appropriate chair if the pre-req is in another program?**

**No**

Are there corequisites to this course?

**Yes**

**Co-reqs:** BI-112 Strongly recommended

Are there any requirements or recommendations for students taken this course?

**No**

Are there similar courses existing in other programs or disciplines at CCC?

**No**

Will this class use library resources?

**Yes**

**Have you talked with a librarian regarding that impact?**

**No**

Is there any other potential impact on another department?

**No**

Does this course belong on the Related Instruction list?

**No**

**GRADING METHOD:**

A-F or Pass/No Pass

**Audit: Yes**

When do you plan to offer this course?

- ✓ **Summer**
- ✓ **Fall**
- ✓ **Winter**
- ✓ **Spring**

Is this course equivalent to another?

If yes, they must have the same description and outcomes.

**No**

Will this course appear in the college catalog?

**Yes**

Will this course appear in the schedule?

**Yes****Student Learning Outcomes:**

Upon successful completion of this course, students should be able to:

1. describe the scientific method and the procedures used in generating hypotheses and solving scientific questions in the context of chemistry, (SC1) (SC2) (SC3)
  2. analyze problems and apply appropriate problem-solving methods, including the correct use of experimental data, units and significant figures; (SC1) (SC2)
  3. illustrate the current model of atomic structure and relate atomic structure to the principles of bonding between atoms, (SC1) (SC2)
  4. describe the relationship between chemical structure at the atomic- and molecular-level and observable physical properties, (SC1) (SC2)
  5. clearly communicate and comprehend basic scientific principles and concepts important to an understanding of major topics in introductory chemistry, (SC1)
  6. demonstrate understanding of fundamental concepts of chemistry by definition, explanation, and use of these ideas in examinations and laboratory exercises; (SC1) (SC2)
  7. critically examine the fundamentals of chemistry in their role as applied to human biology and medicine. (SC3)
-

**AAOT/ASOT GENERAL EDUCATION OUTCOMES  
COURSE OUTLINE MAPPING CHART**

**Mark outcomes addressed by the course:**

- Mark "C" if this course completely addresses the outcome. Students who successfully complete this course are likely to have attained this learning outcome.
- Mark "S" if this course substantially addresses the outcome. More than one course is required for the outcome to be completely addressed. Students who successfully complete all of the required courses are likely to have attained this learning outcome.
- Mark "P" if this course partially addresses the outcome. Students will have been exposed to the outcome as part of the class, but the class is not a primary means for attaining the outcome and assessment for general education purposes may not be necessary.

***As a result of completing the AAOT/ASOT general education requirements, students will be able to:***

**WR: Writing Outcomes**

1. Read actively, think critically, and write purposefully and capably for academic and, in some cases, professional audiences.
2. Locate, evaluate, and ethically utilize information to communicate effectively.
3. Demonstrate appropriate reasoning in response to complex issues.

**SP: Speech/Oral Communication Outcomes**

1. Engage in ethical communication processes that accomplish goals.
2. Respond to the needs of diverse audiences and contexts.
3. Build and manage relationships.

**MA: Mathematics Outcomes:**

- P** 1. Use appropriate mathematics to solve problems.
- P** 2. Recognize which mathematical concepts are applicable to a scenario, apply appropriate mathematics and technology in its analysis, and then accurately interpret, validate, and communicate the results.

**AL: Arts and Letters Outcomes**

1. Interpret and engage in the Arts & Letters, making use of the creative process to enrich the quality of life.
2. Critically analyze values and ethics within range of human experience and expression to engage more fully in local and global issues.

**SS: Social Science Outcomes**

1. Apply analytical skills to social phenomena in order to understand human behavior.
2. Apply knowledge and experience to foster personal growth and better appreciate the diverse social world in which we live.

**SC: Science or Computer Science Outcomes**

- S** 1. Gather, comprehend, and communicate scientific and technical information in order to explore ideas, models, and solutions and generate further questions.
- S** 2. Apply scientific and technical modes of inquiry, individually, and collaboratively, to critically examine the influence of scientific and technical knowledge on human society and the environment.

**S**

3. Assess the strengths and weaknesses of scientific studies and critically examine the influence of scientific and technical knowledge on human society and the environment.

**CL: Cultural Literacy Outcome**

1. Identify and analyze complex practices, values, and beliefs and the culturally and historically defined meanings of difference.

---

**Outcomes Assessment Strategies:**

:

**Major Topic Outline:**

1. Scientific method.
2. Measurements, atoms and elements.
  - a. Measurements: units, prefixes and equalities.
  - b. Measured numbers and significant figures.
  - c. Conversion factors and problem solving.
  - d. Density.
  - e. Classification of matter.
  - f. Elements and symbols.
  - g. Periodic table: arrangement and significance, periodic trends.
  - h. Atoms: structure, atomic number and atomic mass.
3. Compounds and their bonds.
  - a. Octet rule
  - b. Ionic compounds: nature of ionic bonding, naming and writing ionic formulas.
  - c. Covalent compounds: nature of covalent bonding, naming and writing covalent formulas.
  - d. Electronegativity, bond polarity, and polarity of molecules.
4. Chemical reactions and quantities, energy and matter.
  - a. Representing chemical changes and chemical equations.
  - b. Identifying types of chemical reactions.
  - c. Concept of moles: determining molar mass and relating moles to balanced equations.
  - d. Differences and relationship of heat and temperature.
  - e. Energy and nutrition.
  - f. Energy and chemical reactions.
5. Solutions.
  - a. Components of a solution.
  - b. Water as a solvent.
  - c. Formation of a solution and interactions between solute and solvent particles.
  - d. Concentration, both qualitative and quantitative (% concentration and M).
  - e. Properties of solutions, including osmosis and dialysis.
6. Acids and bases.
  - a. Definitions and nomenclature of acids and bases.
  - b. Identifying conjugate acid-base pairs.
  - c. Strengths of acids and bases.
  - d. The auto-ionization of water and relationship to the pH scale.
  - e. Determining pH of solutions.
  - f. Common reactions of acids and bases.
  - g. Describe and identify buffer solutions.
7. Introduction to organic chemistry.

- a. Define organic chemistry and describe bonding in organic compounds.
- b. Identify functional groups and types of organic compounds
- c. Relate the structure of organic compounds to their physical properties.
- d. Identify selected organic reactions (combustion, hydrogenation, hydration, oxidation of alcohols and aldehydes, dehydration, hydrolysis).
8. Carbohydrates.
  - a. Chemical structure of carbohydrates.
  - b. Importance of chiral carbons in carbohydrates.
  - c. Chain and cyclic structures of carbohydrates.
  - d. Hydrolysis of poly- and disaccharides into monosaccharides.
  - e. Structural differences of some polysaccharides and resulting functional differences.
9. Nucleic acids.
  - a. Chemical structures of the components of DNA and RNA.
  - b. Structural differences and similarities between DNA and RNA.
  - c. Relationship between the structures of nitrogen bases and the formation of base pairs in the DNA double helix.
10. Lipids.
  - a. Types of lipids.
  - b. Physical properties of lipids.
  - c. Chemical properties of triacylglycerols.
  - d. Hydrolysis and saponification of triacylglycerols.
11. Amino acids, proteins and enzymes.
  - a. Functions of proteins.
  - b. Structures and chemical properties of amino acids.
  - c. Formation of polypeptides.
  - d. Levels of protein structure.
  - e. Relationship between structure and function of enzymes.
  - f. Factors affecting enzyme activity.

Does the content of this class relate to job skills in any of the following areas:

- |                                      |           |
|--------------------------------------|-----------|
| 1. Increased energy efficiency       | <b>No</b> |
| 2. Produce renewable energy          | <b>No</b> |
| 3. Prevent environmental degradation | <b>No</b> |
| 4. Clean up natural environment      | <b>No</b> |
| 5. Supports green services           | <b>No</b> |

Percent of course: 0%

## Section #2 Course Transferability

Concern over students taking many courses that do not have a high transfer value has led to increasing attention to the transferability of LDC courses. The state currently requires us to certify that at least one OUS school will accept a new LDC course in transfer. Faculty should communicate with colleagues at one or more OUS schools to ascertain how the course will transfer by answering these questions.

1. Is there an equivalent lower division course at the University?
2. Will a department accept the course for its major or minor requirements?
3. Will the course be accepted as part of the University's distribution requirements?

If a course transfers as an elective only, it may still be accepted or approved as an LDC course, depending on the nature of the course, though it will likely not be eligible for Gen Ed status.

Which OUS schools will the course transfer to? (Check all that apply)

**PSU (Portland State University)**

**OSU (Oregon State University)**  **UO (University of Oregon)**

Identify comparable course(s) at OUS school(s)

CH LDT Chemistry for Health Sciences (OSU)  
CH LD (PSU)  
CH 120T (UO)

How does it transfer? (Check all that apply)

**general education or distribution requirement**  
 **general elective**

:

Provide evidence of transferability: (minimum one, more preferred)

**Other. Please explain.**

OSU Course Equivalencies List online  
Transferology (PSU, UO)

First term to be offered:

**Next available term after approval**

:

---