

**Warren County School District**  
**PLANNED INSTRUCTION**

**COURSE DESCRIPTION**

**Course Title:** Advanced Chemistry (Honors)

**Course Number:** 00333

**Course Prerequisites:** Successful Completion of Academic Chemistry or permission of the principal

**Course Description:**

Advanced Chemistry provides able and motivated students with the opportunity to pursue college-level chemistry studies while still in high school. This rigorous preparatory course is designed for students who will study chemistry or a related field at the college level. Advanced Chemistry is a one-year, one-credit honors course. Topics include: crystallography, ideal gases, nuclear chemistry, thermodynamics, quantum mechanics, bonding and coordination chemistry, as well as career exploration within the field of chemistry.

**Suggested Grade Level:** Grades 11-12

**Length of Course:**    ☐ One Semester                      ☒ Two Semesters                      ☐ Other (Describe)

**Units of Credit:** 1 (Insert *None* if appropriate)

**PDE Certification and Staffing Policies and Guidelines (CSPG) Required Teacher Certifications:**  
CSPG 34 Chemistry

**Certification verified by WCSD Human Resources Department:** ☒ Yes    ☐ No

**TEXTBOOK AND SUPPLEMENTAL MATERIALS**

**Continue using Board approved textbook?** ☒ Yes    ☐ No *(If yes, then complete the information below.)*

**Board Approved Textbooks, Software, Supplemental Materials:**

**Title:** Chemistry: The Central Science 14<sup>th</sup> Edition

**Publisher:** Pearson

**ISBN #:** 978-0134414232

**Copyright Date:** 2018

**Date of WCSD Board Approval:** Click or tap to enter a date.

**BOARD APPROVAL:**

**Date Written:** 3/17/2018

**Date Approved:** Click or tap to enter a date.

**Implementation Date:** 2018-2019

## **SPECIAL EDUCATION AND GIFTED REQUIREMENTS**

The teacher shall make appropriate modification to instruction and assessment based on a student's Individual Education Plan (IEP) or Gifted Individual Education Plan (GIEP).

### **COURSE OVERVIEW**

*(List the content to be taught)*

#### **A. Gases**

1. Avogadro's Hypothesis
2. Molar volume
3. Ideal Gas Law
4. Gas reaction Stoichiometry

#### **B. Limiting reactants**

#### **C. Solids**

1. Crystal systems
2. Unit cells
3. Closest packing
4. Semiconductors
5. Liquid crystals
6. Amorphous substances
7. Hydrates

#### **D. Nuclear chemistry**

1. Types of radiation
3. Elementary particles
4. Quark theory
5. Balancing nuclear equations
6. Decay and half-life
7. Nuclear reactions
  - a. Fission
  - b. Fusion

#### **E. Thermodynamics**

1. Enthalpy
2. Entropy
3. Free energy

#### **F. Oxidation-reduction**

1. Oxidation
2. Reduction
3. Balancing Redox equations

## G. Electrochemistry

1. Electrolytic conduction
2. Metallic conduction
3. Electrolysis
4. Voltaic cells
5. Nernst equation

## H. Quantum-mechanical model of the atom

1. Bohr atom
2. De Broglie's Hypothesis
3. Heisenberg Uncertainty Principle
4. Schrodinger's Wave Equation
5. Quantum numbers
6. Pauli Exclusion Principle

## I. Molecular structure

1. VSEPR
2. Atomic orbital overlap
3. Hybridization
4. Resonance
5. Molecular orbitals

## J. Coordination Chemistry

1. Nomenclature
2. Coordinate covalent bonds
3. Ligand Field Theory

## K. Laboratory Time: Throughout course

### Academic Standards

#### **3.1 Unifying Themes**

12B Apply concepts of models as a method to predict and understand science and technology.

12C Assess and apply patterns in science and technology.

#### **3.2 Inquiry and Design**

12B Evaluate experimental information for appropriateness and adherence to relevant science processes.

12C Apply the elements of scientific inquiry to solve multi-step problems.

#### **3.4 Physical Sciences, Chemistry and Physics**

12A Apply concepts about the structure and properties of matter.

12B Apply and analyze energy sources and conversions and their relationship to heat and temperature.

#### **4.3 Environmental Health**

12A Analyze the complexity of environmental health issues.

12B Analyze the local, regional and national impacts of environmental health.

#### **Common Core Standards:**

CC.3.5.11-12 Reading Informational Text

CC.3.6.11-12 Writing

## ASSESSMENT

**Portfolio Assessment:** ☐ Yes ☒ No

**District-Wide Common Final Examination Required:** ☒ Yes ☐ No

**Course Challenge Assessment (Describe):** Must score a minimum of an 80% on the final exam.

**WRITING TEAM:** Warren County School District Teachers

## WCSD STUDENT DATA SYSTEM INFORMATION

1. Is there a required final examination? ☒ Yes ☐ No  
*\*Warren County School District Policy 9741 and 9744 state, "All classes in grades 9-12 shall have a final exam."*
2. Does this course issue a mark/grade for the report card? ☒ Yes ☐ No
3. Does this course issue a Pass/Fail mark? ☐ Yes ☒ No
4. Is the course mark/grade part of the GPA calculation? ☒ Yes ☐ No
5. Is the course eligible for Honor Roll calculation? ☒ Yes ☐ No
6. What is the academic weight of the course?  

☐ No weight/Non credit☐ Standard weight☒ Enhanced weight