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: ☒ Two Semesters

Units of Credit: 1

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

Certification verified by WCSD Human Resources Department: ☒ Yes

TEXTBOOK AND SUPPLEMENTAL MATERIALS

Continue using Board approved textbook? ☒ Yes

Board Approved Textbooks, Software, Supplemental Materials:
Title: Chemistry: The Central Science 14th Edition
Publisher: Pearson
ISBN #: 978-0134414232
Copyright Date: 2018
Date of WCSD Board Approval: 5/14/2018

BOARD APPROVAL:

Date Written: 3/17/2018
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
   2. Elementary particles
   3. Quark theory
   4. Balancing nuclear equations
   5. Decay and half-life
   6. 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