CHM 2450
Chemistry for Early and Middle Childhood Education
Course Syllabus

I. Wright State University, College of Science and Mathematics
Department of Chemistry

II. Course Information
Course Title: **Chemistry for Early and Middle Childhood Education**
Course Abbreviation and Number: **CHM 2450**
Course Credit Hours; **3.5**
Course Cross Listing(s) Abbreviation and Number:
Check ("x") all applicable:
General Education Course___X__ Writing Intensive Course____ Service Learning Course_____
Laboratory Course____ Ohio TAG (Transfer Assurance Guide) Course _____
Ohio Transfer Module Course_____ Others (specify)_____

III. Course Registration
Prerequisites: **MTH 1260 or MPL 4**
Corequisites:
Restrictions:
Other:

IV. Student Learning Outcomes

2. Element 6 Learning Objectives

a. Understand the nature of scientific inquiry
   - The entire course addresses the nature of scientific inquiry. Careful attention is placed upon the acquisition of scientific knowledge including experimental design, data collection, and evaluation of outcomes through evidence-based reasoning.

b. Critically apply knowledge of scientific theory and methods of inquiry to evaluate information from a variety of sources
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c. Distinguish between science and technology and recognize their roles in society
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d. Demonstrate an awareness of theoretical, practical, creative and cultural dimensions of scientific inquiry
   - This course will present major scientific experiments and findings (such as Dalton's atomic theory), highlighting the theoretical, practical, creative, and cultural aspects of scientific inquiry. In all investigations students will have hands-on experience of the theoretical, practical and creative sides of scientific inquiry.

e. Discuss fundamental theories underlying modern science
   - Students will investigate and learn the fundamental chemical theories related to stoichiometry, reactivity, and other chemical properties of matter.

Course Objectives

1. To provide a firm basis in physical science subject areas of properties of matter, heat and temperature, heat transfers, phase changes and energy. To develop student understanding and application of these basic science concepts in a variety of real-life situations.
2. To develop student understanding and application of science process, problem-solving, and critical analysis skills not only in science situations, but in everyday life situations.
3. To strengthen student cooperative and communication skills.
4. To strengthen student mathematical skills and understanding through integration of mathematics with science activities.
5. To develop student abilities to utilize multiple representations while organizing and solving problems.
6. To develop student understanding of and ability to effectively utilize constructivist and cooperative learning environments.
7. To develop student understanding of national and state science standards and scientific literacy.
8. To develop student understanding of the impact of attitudes about science and science learning. Specifically, to develop student attitudes toward science and science teaching, including the understanding of science as an ongoing process of questioning, designing experiments, implementing these experiments, and evaluating the results as opposed to a set of facts or procedures to be memorized.
9. To develop student learning practices and habits of mind to facilitate students becoming self-directed, self-motivated, effective life-long learners.

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V. Course Materials

"Chemistry in Focus: A Molecular View of Our World", Brooks/Cole

VI. Method of Instruction

Lecture, collaborative and inquiry-based

VII. Evaluation and Policy

Students will work in cooperative groups of 3-5 on inquiry science units. Understanding during each unit is periodically checked. Homework is assigned frequently and consists of problems relating to further development of conceptual understanding and application; application of science process and mathematical skills to interdisciplinary and real-life problems; journal questions pertaining to science attitudes, and, learning relative to science standards. Whole-class discussions about homework solutions or concepts are held occasionally for the purpose of solidifying understanding of science concepts and processes. As an activity-based course with frequent individualized attention for students in groups, there is no formal lecture.

The activities are somewhat self-paced. However, activities for a unit need to be completed by the designated time, as determined by the instructor. If you and your group do not complete the activities by the designated time, extra laboratory time may be allowed by the discretion of the instructor.

The subject matter of this course has been carefully revised and chosen to reflect the National Science Education Standards. This course has been tailored to address the needs of the early childhood educators in physical and chemical science.

Evaluation: Pre- and post-testing of understanding of science concepts and processes is done for each science unit, at the discretion of the instructor. Surveys addressing learning styles and attitudes are given. Post-tests will be announced at least a week in advance.

Attendance: Since course content is acquired through class activities, it is imperative for students to attend class and actively participate in inquiry activities. Attendance and participation points are awarded to encourage students to actively participate. Participation points are determined by cooperative group behaviors, activity notebooks, attentiveness (beyond of just being there), and group and individual success at staying "on task".

In the event of a documented illness or emergency, students may make-up a missed class by either attending the other section of the class or checking out equipment. Students who check-out equipment in order to do activities outside of class may check-out equipment at the discretion of the instructor.

Homework: Homework is assigned at least two days in advance of the due date. Homework will mostly be individually graded and occasionally group-graded. In group-grading, one group member's homework will be randomly selected and graded with that grade being assigned to all group members. Group members who do not turn in homework will not receive a group grade. This method is to encourage group accountability. Homework submitted past the due date will not be accepted.

Exams: Exams will be announced one week in advance. They will consist of traditional and authentic assessment techniques. Exams including a group portion will be group-graded (one paper selected at random from the group to be graded, all group members receive this grade).

Group Activity Projects: Your activity should have the ultimate goal of getting students to understand physical and chemical science concepts through an inquiry activity utilizing process skills within a context that is interesting for an early childhood student. The activity should integrate the various concepts introduced in the course. The activity will be presented and facilitated to the class. The grade for the project will be based upon the outline, questions, facilitation and inquiry activities of the project.

Grading:

Attendance and Participation	50 pts	
Homework	50 pts	
Exams (3 @ 100 pts)	300 pts	
Final Exam	100 pts	
	Total	500 pts

VIII. Grading Policy

It is expected that grades will be assigned according to the following performance levels.

>90% = A 80-89% = B 70-79% = C 60-69% = D <60% = F

IX. Suggested Assignments and Course Outline

Recitation:

Week 1: Introduction; getting to know student questionnaire; math exploratory quiz; Calculations
Week 2: Observation; Measurement and Units

Week 3: Uncertainty
Week 4: Matter and its properties; Phase changes
Week 5: Gas laws
Week 6: Energy
Week 7: Atomic structure
Week 8: Periodic table and trends
Week 9: Types of Reactions
Week 10: Chemical Composition
Week 11: Stoichiometry; Balancing chemical reactions
Week 12: Synthesis
Week 13: Acids and Bases; chemical analysis
Week 14: Projects

X. Other Information

Approved:
Undergraduate Curriculum and Academic Policy Committee _____
Faculty Senate _____