

# SOUTHEAST MISSOURI STATE UNIVERSITY

## COURSE SYLLABUS

Department of Chemistry

Course No. CH 618

Title of Course: Topics in Chemistry Education

New: Summer 2000

### **I. Catalog Description and Credit Hours of the Course:**

A review of the basic content of chemistry coupled with pedagogical models appropriate for teaching in the elementary or secondary classroom. This course is not intended for students with an undergraduate or graduate chemistry major. (3)

### **II. Prerequisites or Corequisites**

Graduate student status and permission of instructor.

### **III. Purposes or Objectives of the Course**

This course will provide a fundamental background in chemistry for those wishing to be effective teachers, curriculum designers and science coordinators. Another purpose of this course is to strengthen the chemistry knowledge of teachers who are certified in areas other than chemistry. Students will be introduced to a variety of teaching strategies while they are involved in 'learning by doing' experiences in the classroom. Students will subsequently apply the instructional methods modeled in this course to their own settings by developing appropriate lesson plans to teach a selected topic and/or to develop a needed curriculum. The content covered in this course reflects the current needs for chemistry education as reflected in the National Standards and the Missouri Frameworks.

### **IV. Expectations of Students**

1. Students are expected to read and complete assignments made.
2. Students will engage actively in classroom activities designed to develop scientific concepts.
3. Students will participate in the Web Bulletin Board discussions and assignments.
4. Students will complete an outside project related to teaching chemistry. This will entail a Concept Activity plan for the development of a specific topic.
5. Students will successfully complete a midterm exam and a final exam.

## V. Course Content or Outline

Week		Hours
1	<u>Introduction</u> An overview of the discipline to include design of the course; student expectations; pre-test on chemistry content; chemistry as a discipline; basic mathematical review; classroom/laboratory safety.	3
2	<u>Physical Properties of Matter</u> Feedback on homework and introduction to the Ultimate Bulletin Board (UBB); intrinsic/extrinsic properties; density; and description of project specifics. Students will work on the activities and follow up with group work on a 'Practice Problem Set.'	3
3	<u>The Periodic Table &amp; Atomic Structure</u> Periodic trends and useful information from the Periodic Chart, relating the chart to atomic structure, and using the information about atoms to generate simple formulas. Group work will include a Practice Problem Set.	3
4	<u>Chemical Equations</u> An overview of reaction types, balanced equations, the mole, and mathematical relationships found in equations.	3
5	<u>Chemical Reactions</u> Exploration of how chemists distinguish chemical changes from physical changes; types of reactions.	3
6	<u>Exam I and Project Update</u> Students will report on their project and reflect on modeling techniques used in the class activities.	3
7	<u>Chemical Reactions (cont.)</u> Introduction to rates and equilibrium; energetics of reactions.	3
8	<u>Matter &amp; Molecules</u> Properties of substances such as density, polarity, surface tension, and miscibility will be covered and the Inquiry Technique will be modeled.	3
9	<u>Acids &amp; Bases</u> Modeling of Concept Attainment to introduce acids and bases. Topics to be addressed include neutralization, titration, and pH.	3

10	<u>Polymers</u> Student modeling activities will introduce the concepts of monomers, initiators, polymers, and cross linking; these are followed by activities showing properties of polymers.	3
11	<u>Chemistry in Personal Living</u> Discussion will center on ways to integrate chemistry into other subject areas as well as the context of topics that could be covered in classrooms.	3
12	<u>Chemistry in Society (Environmental Chemistry)</u> Activities and instruction will focus on acid rain and water quality.	3
13	<u>Topic of Choice</u> Content coverage and activity presentation of a topic previously chosen by the class to study.	3
14	<u>Exam II and Post Test</u>	3
15	<u>Concept Activity Plan Presentations</u>	3
16	Concept Activity Plan Presentations	3

## **VI. Textbook and/or Other Materials or Equipment Required**

General, Organic and Biochemistry: Connecting Chemistry to Your Life by Blei & Odian., 1<sup>st</sup> edition, W. H. Freeman & Co. 2000.

## **VII. Basis of Student Evaluation (grades)**

Participation in class activities	25%
Homework	25%
Student presentation and Concept Activity plan	20%
Exams	30%

## **VIII. Programs Served by this Course**

Required core course of the MNS in Science Education degree option.  
MNS in Biology, Physics or Geosciences for students with an interest in education.  
MA in Elementary or Secondary Education for students with an interest in science education.