

**Discovering Chemistry with Lab
CHE 105L-011
LAB SYLLABUS**

Discovering Chemistry with Lab

Spring 2008

Section 11 W 11:00-12:50 SC 462

Instructor: Vinay Kumar	Office Hours: MWF 9:00-10:00a
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PREREQ: None CO REQ: CHE 105-001,002

PURPOSE: This course stresses discovery-based learning in a laboratory environment and will complement and enhance the lecture content presented in CHE 105. The lab offers an opportunity for students to develop reasoning and analytical skills that are essential for teachers under the Kentucky Education Reform Act (KERA). The funding for the development of this course was provided by DOE/Kentucky EPSCoR.

REQUIRED TEXT: Discovering Chemistry with Lab: CHE 105 Laboratory Manual; Vinay Kumar and Julia Y. Bedell ; Spring 2008 edition, Northern Kentucky University.

Notes: 1. All items on this syllabus are subject to change by the instructor.
2. Students are responsible for reading and understanding all items on this syllabus. Any items not understood must be brought to the attention of the instructor within the first two weeks of class.

MAJOR LEARNING OBJECTIVES:

1. Make mass and volume measurements; record, and use this data to determine density of water.
2. Plot mass volume data manually to determine density of a US penny and identify the metal it is made of.
3. Write a [student-designed protocol](#) and carry out separation of a mixture consisting of salt, sand, iron filings, and Styrofoam pellets.
4. Know how to write a formal lab report for 'Separation of a Mixture' experiment.

5. Build a Conductivity Detector and use it to classify acids, bases, and salts and several household materials as strong, weak or non- electrolytes.
6. Use LabPro and a [computer-interfaced](#) temperature sensor to collect, display, plot, and analyze data accompanying physical changes and chemical reactions.
7. Study four properties (conductivity, solubility, combustibility and melting point) of known inorganic and organic compounds, and use the observations to identify an unknown compound.
8. Use LabPro, a [computer-interfaced](#) temperature sensor, and a [calorimeter](#) to determine the heat content of peanut, cashew, marshmallow, and popcorn.
9. Carry out microscale determination [and calculate the amount](#) of vitamin C (ascorbic acid) in vitamin C tablet, orange juice and orange drink.
10. Use various methods, including use of a [computer-interfaced](#) pH sensor, to determine the pH of common lab reagents and household materials.
11. Synthesize two esters (methyl salicylate and isobutyl acetate) and four polymers (nylon, silly putty, [slime](#), and polystyrene).
12. [Carry out computer simulation of several acid-base titrations, study the corresponding titration curves, and compare various indicators.](#)
13. [Use the guided-inquiry approach to identify six common plastics based on the data/observations of their properties.](#)
14. [Be able to carry out basic laboratory experiments in a safe and effective manner.](#)

COURSE POLICIES AND REQUIREMENTS:

1. **Attendance** is mandatory for every laboratory session. Missed labs will be assigned a grade of zero. To make up a missed lab the student should get in touch with the instructor either before or soon after the missed lab. Only two make up labs will be allowed.
2. Wearing of safety glasses, compliance with safety procedures (including proper waste disposal), and upkeep of the lab area comprise part of the student's participation grade. Instructor-initiated withdrawal of a student will occur if a student's conduct in the lab is judged to be unsafe.
3. Prior to each experiment, there will be a pre-lab quiz. This quiz will be based on the introductory material, the objective, assigned readings, selected portions of the experimental procedure, and safety rules. **There will be no make-up quiz and a grade of zero will be assigned for a missed quiz.**
4. **Formal lab** reports will be required for some of the experiments. These experiments will be identified during the semester. The organization and presentation of the reports will be graded. All written work must be done independently to receive credit. Formal reports need to be typed and all written work in the report should be grammatically correct. Make sure all the pages must be stapled together.

CHE 105L

Spring 2008 Lab Schedule

Week No	Dates	Lab (Wed)
1	Jan. 16	Introduction, Check in, and Lab Safety video
2	Jan. 23	Exp 1 Measurements
3	Jan. 30	Exp 2 Separation of a Mixture
4	Feb. 6	Exp 4 Conductivity Detector
5	Feb. 13	Exp 5 Properties of Matter
6	Feb. 20	Exp 13 Energy of Physical Processes (Lab Pro/Calculator)
7	Feb. 27	Exp 6 Chem Reaction & Energy (Computer Interface Exp.)
8	Mar. 5	Lab Test 1(exps 1,2,4,5,13) & Lab Practical (TBA)
9	Mar. 12	Spring break
10	Mar. 19	Exp 7 Energy Content of Foods (Computer Interface Exp.)
11	Mar. 26	Exp 8 Vitamin C Analysis
12	April 2	Exp 9 Acids & Bases (CBL experiment)
13	April 9	Exp 10 Acid-base titration (Computer simulation Exp.)
14	April 16	Exp 11 Synthesis of Esters & Polymers
15	April 23	Exp 12 Identification of Plastics
16	April 30	Lab Test #2 (exps 6,7,8,9,10,11,12), LabPractical (TBA)