

HM-255N; R 2:00pm-4:50pm

Instructor: Dr. Katti

Phone Number: 524-5589 (2-3days)

Room: 251 N

Email: akatti@vsu.edu (24 hrs)

Course Description: Analytical Chemistry II Laboratory covers hands on experience learning and applying modern instrumentation to solve problems using quantitative analysis. Analytical Chemistry Laboratory II is a Chemistry course which meets one of the requirements for a degree in Chemistry from Virginia State University. The course has a co-requisite lecture. The course will apply investigation of the use of equipment in the laboratory to write standard operating procedures and to test experiments requiring the quantitation of samples. This course will cover Molecular Spectroscopy, Atomic Spectroscopy, Mass Spectrometry, Electroanalytical Chemistry (e.g. potentiometry) and Separation methods including GC, HPLC and if time permits GC-MS. The practical application of instrument to understand its sensitivity, detection limit, precision, and limitations is emphasized.

Pre or Corequisite: Chemistry 411-01 (Analytical Chemistry II) is a corequisite. CHEM-301 is a prerequisite.

Office Hours: M: 1:45-2:15 pm, T,R: 10:30-11:30am, F: 3:00-5:00am W, 3:15-4:45pm

Course Requirements and Grade Determination:

40 % Laboratory Reports: See Analytical Chemistry Report Guideline.

10 % Laboratory Notebook, Laboratory Technique, Attendance, Effort and Creativity

Purpose

Procedure

Data

Observations

Results

Conclusions

Header and Witness Signatures Completed

Students are also evaluated on their professionalism and competence in the lab.

30 % Equipment SOP: Each person will be assigned a piece of equipment for which a standard operating procedure is written. Two grades will be given. One for the first draft and another for the final draft obtained after peer review. If time permits, the equipment, procedures and results will be given as a power point presentation.

10 % Mid Term: An advisory examination will be covering approximately the first half of the course.

10 % Final: A comprehensive final examination will be given and will include all topics covered from the beginning to the end of the laboratory course.

Grading :

The Grading scale is in accord with "University Policies"
 $\geq 90\% = \mathbf{A}$ $89\% \leq 80\% = \mathbf{B}$ $79\% \leq 70\% = \mathbf{C}$ $69\% \leq 60\% = \mathbf{D}$ $< 60\% = \mathbf{F}$

Target Schedule of Laboratory Experiments

Week	Topics	Experiments
Jan. 10	Introduction, Using Labworks	Set-up, Learn how to use. Start Exp. #1: Colorimeter
Jan. 24	Molecular Spectroscopy	Exp. #1: Colorimeter-Calibration Cuve And Method of Standard Additions
Jan. 31	Molecular Spectroscopy	Exp. #2: Mixture Analysis: 2 component
Feb. 7	Electroanalytical	Exp. #3: Titration Curve
Feb. 14	Exam #2	Exp. #4: Battery & Voltametry
Feb. 21	Atomic Spectrosopy	Exp. #5 Start FAAS Instrument
Feb. 28	Mass Spectrometry	Exp. #6 Analysis of Samples- Calibration & Unknown
Mar. 7	Exam #3	Midterm Exam
Mar. 14	SPRING BREAK	
Mar. 21	Separation Methods-Chromatography	Exp. #7. GC-Start-up
Mar. 28	GC	Exp. #8 HPLC Start-up
April 4	LC	Exp. #7 & 8 Continued
April 11	Exam #4	Exp. #9 GC-MS Start-up
April 18	SFC	Exp. # 7,8,9 Continued
April 25	Capillary Electrophoresis	Presentations
May 2	Exam #5	Final Exam

LAB GLASSES

The purchase of lab safety **glasses** is the responsibility of the student. The bookstore and home improvement stores have lab glasses.

LAB NOTE BOOK

There is no specific *text* to purchase. The Text for lecture will be extremely useful. The laboratory experiments will be posted on Blackboard. The student need to purchase the Student Laboratory Notebook, Top Bound, 50 Set, (Hayden- McNeil).

"A laboratory notebook is one of a scientist's most valuable tools. It contains the permanent written record of the researcher's mental and physical activities for experiment and observation, to the ultimate understanding of physical phenomena. The act of writing in the notebook causes the scientist to stop and think about what is being done in the laboratory. It is in this way an essential part of doing good science." "The foremost reason for using a bound notebook rather than a loose-leaf binder or spiral notebook is that the pages are permanently and strongly attached together. The date of a particular entry is less subject to question if notes are recorded in a chronological order with no blank or missing parts. The industrial researcher, whose work may lead to patents, has no choice except to use a bound notebook for all laboratory notetaking."

from Writing the Laboratory Notebook by Howard M. Kanare; American Chemical Society 1985

BLACKBOARD

Students will be expected to use the blackboard system and check for new announcements every day. **If you can not access blackboard, you must notify the instructor.** Lab assignments, experiments, grades and important announcements will be posted via this system.

ATTENDANCE

Students must attend during their scheduled lab period. **There will be no “makeup” labs or attending a lab at a different time other than scheduled.** There are no “makeup” exams (midterm or final). The lowest lab grade is dropped.

SAFETY In addition to the safety rules you will be given in a separate handout, the following rules will be followed

- Lab Glasses are donned **before** entering the laboratory and worn at all times.
- Book bags and personal items need to be placed out of traffic areas.
- Students need to wear proper clothing covering the toes, feet, ankles, calves, knees, thighs, buttocks, waist, stomach, chest and shoulders. Students are to enter the laboratory with their safety glasses donned.

Individual caught breaking the safety rules may be given a warning, asked to leave for that lab period or be asked to withdraw from the course. Please report dangerous behavior they observe in the lab. Please see “University Policies” for further information (attached).

LEARNING OUTCOMES, ACTIVITIES AND EVALUATION PROCEDURES:

KNOWLEDGE: Students will know...

- Demonstrate following advanced procedures for operating quantitative analysis experiments.
Evaluation: The grading of laboratory reports and lab notebooks.
- How to collect and organize complex experimental data.
Evaluation: The grading of laboratory reports and lab notebooks
- The operation of modern analytical instrumentation.
Evaluation: Administer midterm and final examinations.
- Development of procedures for operating analytical equipment.
Evaluation: The grading of laboratory reports and midterm and final examinations.
- The important safety precautions that should be practiced in the laboratory.
Evaluation: Administer midterm and final examinations.
- Proper and professional manner in which to present graphical data
Evaluation: The grading of laboratory reports and midterm and final examinations.
- How to explain the equipment principles, procedures, data, results and conclusions?
Evaluation: The grading of the presentation
- How to report equipment principles, procedures, data, results and conclusions?
Evaluation: The grading of laboratory reports

SKILLS: Students will demonstrate ...

- The capability to use modern analytical instrumentation.
- The capacity to collect and evaluate experimental data.

- The competence to write a scientific laboratory report.
- A comprehension of analytical instrumentation through hands on use.
Evaluation (all of the above): The grading of laboratory reports and lab notebooks.

ABILITIES: Students will be able to ...

- Develop and conduct experiments utilizing analytical instrumentation.
- Organize data gathered in the chemistry laboratory to produce meaningful reports.
- Draw appropriate conclusions based on the analysis of data collected in the laboratory.
Evaluation (all above): The grading of laboratory reports and notebook.
- Display a thorough understanding of the laboratory instruments studied.
Evaluation: Administer a midterm and final examination.