I. Course Title
Organic Chemistry Laboratory

II. Course Prefix/Number
CHEM 322L

III. Credit Hours
1

IV. Prerequisites
CHEM 321 and 321L

V. Catalog Description
CHEM 322L is designed to complement the lecture course (CHEM 322) by giving the student practical experience with many of the concepts through laboratory experiments. The lab will include preparative and mechanistic studies, an introduction to qualitative analysis, and independent project work. One lab lecture and three hours of laboratory per week.

VI. Curricular Relationships
Required for all BA and BS Chemistry degrees (except the BS in Chemical Physics), BS Biology degrees (Cellular and Molecular emphasis and Organismal emphasis), and for students who are pursuing the pre-medicine, pre-veterinary medicine, pre-dentistry, prep-harmacy, and pre-optometry curricula.

VII. Student Learning Outcomes
• Students will be able to use additional spectroscopic techniques required for product analysis/characterization.
• Students will demonstrate an ability to successfully complete several typical preparative organic experiments.
• Students will demonstrate an ability to perform qualitative analysis of an unknown organic substance and to communicate the results of their analysis in oral fashion.
• Students will demonstrate an ability to work together to collect and analyze data from a variety of sources (including computer-based molecular modeling) in order to answer specific mechanistic questions pertaining to a typical organic reaction.
• Students will demonstrate an ability to work independently on a “mini-research” project involving multistep synthesis or isolation of an organic molecule.
Students will demonstrate effective technical writing skills.

VIII. Content Outline
1. Structure-Property Relationships by Molecular Modeling and Laboratory Measurements
2. Nuclear Magnetic Resonance Spectroscopy
3. Nucleophilic Substitution
4. Diels-Alder Cycloaddition
5. Electrophilic Aromatic Substitution
6. Grignard Reaction
7. Esterification
8. Oxidation
9. Qualitative Organic Analysis
10. Independent Projects

IX. Course Procedures/Policies/Grading Scale
Students are required to attend all laboratory sessions. A lab notebook must be kept, and lab reports must be turned in for each experiment. One multi-week group project lab, which requires a formal typed report rather than just a lab notebook report, is conducted. The qualitative analysis requires an oral report. The independent project requires a formal typed laboratory report. Two laboratory examinations (written/practical) are given.

Normal grading is used for this course.
Grading Scale: >90 = A; 80-89 = B; 70-79 = C; 60-69 = D; <60 = F

X. Required/Recommended Readings
The typical text used for the laboratory portion of the course is Introduction to Organic Laboratory Techniques: A Microscale Approach, by Pavia, Lampman, Kriz, and Engel.

XI. Issues Unique to this Course
Students typically are required to spend additional time outside scheduled laboratory hours to complete product characterization by instrumental techniques.

XII. Additional Departmental Issues
The independent project formal laboratory report constitutes the Chemistry Program’s writing assessment.