Syllabus for
CHE 212--Organic Chemistry II Laboratory
1.0 Credit Hour
Spring 2012

I. COURSE DESCRIPTION

Emphasizes the analysis of unknown organic mixtures. These mixtures are representative of the major functional group differences. Uses various spectroscopic instrumental methods in the analysis, (NMR, IR, UV, and mass spectrometry). (One hour recitation per week immediately followed by a 3-hour lab.)
Prerequisites: CHE 211 Lecture and Lab.
Corequisite: CHE 212 Lecture.
Lab fee: $45.

Organic Chemistry 212 lab is an inseparable and indispensable part of CHE 212 lecture. This is a second-semester course in organic chemistry laboratory that is especially designed to illustrate the chemical reactions and properties of molecules discussed in lecture, and to help students learn them. Many basic reaction mechanisms are discussed and demonstrated in the laboratory. This course consists of organic qualitative analysis, and interpretation of various kinds of spectra (NMR, IR, UV and MS).

II. COURSE GOALS

The purpose of this course is to equip the student with the ability to demonstrate proficiency in making scientific observations and in using scientific instruments and techniques. Upon completion of this course, the student will gain a proficiency in controlling and directing chemical reactions.

III. STUDENT LEARNING OUTCOMES FOR THIS COURSE

Terminal Objectives
As a result of successfully completing this course, the student will be able to do the following:

A. Synthesize a **Grignard reagent** and perform a subsequent reaction utilizing it.
   1. Describe the reaction to prepare the Grignard reagent.
   2. Write the reactions and the mechanisms involved.
   3. Interpret infrared spectra of reactant and product.

B. Conduct a **benzoin condensation synthesis**.
   1. Describe the chemical reaction involved in benzoin condensation.
   2. Interpret infrared spectra of benzoin and benzaldehyde.

C. Conduct a microscale **aldol** condensation.
   1. Write the reaction and explain the mechanism.
   2. Explain difference between aldol and crossed aldol condensations.
   3. Interpret the infrared spectra of the product.

D. Conduct a Green Chemistry solid state reaction.
   1. Synthesize **an alkene by a solid state Wittig reaction**.
   2. Review mechanism of the reaction..
   3. Interpret TLC, and infrared and nmr spectra of the product.

E. Analyze different compounds using **spectroscopic** techniques.
   1. Explain the theory and application of NMR, IR and UV-vis spectroscopy.
   2. Use spectroscopy to identify the structure of unknown compounds.

F. Conduct a **qualitative organic analysis** on unknown compounds.
   1. Identify the structure and name of unknown compounds, using a variety of tests.
   2. Use spectral data provided to aid in the identification of the unknowns.

IV. TEXTBOOKS AND OTHER LEARNING RESOURCES

A. Required Materials
Textbook
Pavia, Donald., Lampman, Gary, Kriz, George; and Engel, Randall. Introduction to Organic LaboratoryTechniques. Orlando: Saunders, 2007. ISBN: 978495016304.

B. Optional Materials
Laboratory notebook (bound notebook)
Laboratory coat or apron (to be provided)

V. POLICIES AND PROCEDURES

A. University Policies and Procedures
   1. Attendance at each class or laboratory is mandatory at Oral Roberts University. Excessive absences can reduce a student's grade or deny credit for the course.
   2. Students taking a late exam because of an unauthorized absence are charged a late exam fee.
   3. Students and faculty at Oral Roberts University must adhere to all laws addressing the ethical use of others' materials, whether it is in the form of print, electronic, video, multimedia, or computer software. Plagiarism and other forms of cheating involve both lying and stealing and are violations of ORU's Honor Code: "I will not cheat or plagiarize; I will do my own academic work and will not inappropriately collaborate with other students on assignments." Plagiarism is usually defined as copying someone else's ideas, words, or sentence structure and submitting them as one's own. Other forms of academic dishonesty include (but are not limited to) the following:
      a. Submitting another's work as one's own or colluding with someone else and submitting that work as though it were his or hers;
      b. Failing to meet group assignment or project requirements while claiming to have done so;
      c. Failing to cite sources used in a paper;
      d. Creating results for experiments, observations, interviews, or projects that were not done;
      e. Receiving or giving unauthorized help on assignments.

      By submitting an assignment in any form, the student gives permission for the assignment to be checked for plagiarism, either by submitting the work for electronic verification or by other means. Penalties for any of the above infractions may result in disciplinary action including failing the assignment or failing the course or expulsion from the University, as determined by department and University guidelines.

4. Final exams cannot be given before their scheduled times. Students need to check the final exam schedule before planning return flights or other events at the end of the semester.
5. Students are to be in compliance with University, school, and departmental policies regarding the Whole Person Assessment requirements. Students should consult the Whole Person Assessment handbooks for requirements regarding general education and the students' majors.
   a. The penalty for not submitting electronically or for incorrectly submitting an artifact is a zero for that assignment.
   b. By submitting an assignment, the student gives permission for the assignment to be assessed electronically.

B. School and /or Department Policies and Procedures

1. The department adheres to the Assessment policy concerning plagiarism as described in the University Catalog, "Written assignments using sources must demonstrate ethical and accurate use of source material. Plagiarism and any unethical or inappropriate use of sources will not be tolerated."

2. The following assessment actions will be taken in the of event of documented instances of plagiarism on written assignments, copying of homework assignments, or cheating during examinations:
   a. An automatic zero will be given for the assignment or exam.
   b. The original assignment or exam will be kept in the student file and a copy will be given to the student. This could have a negative impact on letters of reference and admission to graduate schools and other postgraduate programs.
   c. The Department will take repeated offences as grounds for further action.
3. Any Whole Person Assessment activity required in this course must be completed and assessed prior to the end of the semester to receive credit for that assignment, otherwise the assignment will receive a grade of zero.

C. Course Policies and Procedures

1. Evaluation Procedures

		Points
a.	Unknown identification, laboratory experiments, and reports	700
b.	Exams and quizzes	150
c.	Notebook	50
d.	Laboratory technique	100
	Total Points	1000

   e. The semester's grade based on A - F is determined by the following scale:

A	90 – 100%
B	80 – 89%
C	70 – 79%
D	60 – 69%
F	Below 60%

   The instructor reserves the right to change the syllabus.
2. Whole Person Assessment
   Chemistry Whole Person Assessment [CHE, BMC majors only]
   Chemistry and BMC majors must submit a life impact statement to the Whole Person Assessment.

3. Other Policies and/or Procedures
   a. If a student misses the scheduled laboratory period, the student receives a zero for that lab and is not allowed to make up the work. Protective wear is mandatory in the laboratory.
   b. The student is responsible for the material and should make arrangements with the instructor to go over the material should there be any questions.
   c. The student is allowed to drop the lowest quiz score, for grading purposes, and an excused absence is not held against the student.

VI. COURSE CALENDAR

WEEK		EXPERIMENTS*
(PART I)		
1.	Check in and general guidelines	
2.	Grignard reagent: Synthesis of Triphenylmethanol	38A
3.	Coenzyme Synthesis of Benzoin	36A
4.	Aldol Condensation	41
5.	Wittig Reaction	Handout
6.	Spectroscopy	Handout
7.	Biginelli Synthesis Introduction to Part II	Handout 54
(PART II)		
8. – 13.	Organic Qualitative Analysis Read and Study carefully the Chapter 54A to 54I	
14.	Check out, and Final Exam	

*Experimental numbers correspond to chapters in the textbook. For Part II, refer to Expt. 54 and the appendices in Pavia, Lampman, Kriz, and Engel.

Course Inventory for ORU's Student Learning Outcomes

CHE 212 - Organic Chemistry II Laboratory
Spring 2012

This course contributes to the ORU student learning outcomes as indicated below:
Significant Contribution – Addresses the outcome directly and includes targeted assessment.
Moderate Contribution – Addresses the outcome directly or indirectly and includes some assessment.
Minimal Contribution – Addresses the outcome indirectly and includes little or no assessment.
No Contribution – Does not address the outcome.

The Student Learning Glossary at http://ir.oru.edu/doc/glossary.pdf defines each outcome and each of the proficiencies/capacities.

OUTCOMES & Proficiencies/Capacities	Significant Contribution	Moderate Contribution	Minimal Contribution	No Contribution
1 **Outcome #1 – Spiritually Alive** Proficiencies/Capacities				
1A Biblical knowledge			X	
1B Sensitivity to the Holy Spirit			X	
1C Evangelistic capability			X	
1D Ethical behavior		X		
2 **Outcome #2 – Intellectually Alert** Proficiencies/Capacities				
2A Critical thinking	X			
2B Information literacy	X			
2C Global & historical perspectives		X		
2D Aesthetic appreciation			X	
2E Intellectual creativity	X			
3 **Outcome #3 – Physically Disciplined** Proficiencies/Capacities				
3A Healthy lifestyle				X
3B Physically disciplined lifestyle				X
4 **Outcome #4 – Socially Adept** Proficiencies/Capacities				
4A Communication skills		X		
4B Interpersonal skills	X			
4C Appreciation of cultural & linguistic differences		X		
4D Responsible citizenship		X		
4E Leadership capacity		X		