CHEM 312 **Syllabus** **Summer 2005**

Organic Chemistry II

Purpose of Course: This is the second part of a two-semester organic chemistry course. In this semester, we will learn the naming, properties, reactions, and reaction mechanisms for the more complex organic functional group families. In addition, mass spectrometry, infrared spectroscopy, and nuclear magnetic spectroscopy will be examined.

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Lecture:	**Monday**	**Tuesday**	**Wednesday**	**Thursday**
Section 20	11:00 AM-1:50 PM	11:00 AM-1:50 PM	11:00 AM-1:50 PM	11:00 AM-1:50 PM

Laboratory:	**Tuesday**	**Wednesday**	**Thursday**
Section 20	8:00 AM-10:50 AM (NC 430)	8:00 AM-10:50 AM (NC 430)	8:00 AM-10:50 AM (NC 430)
Section 21	2:30 PM-5:20 PM (NC 430)	2:30 PM-5:20 PM (NC 430)	2:30 PM-5:20 PM (NC 430)

Required Material:
Organic Chemistry: McMurry (6th ed., Brooks/Cole 2004).
Study Guide & Solutions Manual: McMurry (6th ed., Brooks/Cole 2004) (optional).
Organic Chemistry Laboratory Manual: Glagovich & Shine (3rd ed., CCSU Press).
Techniques in Organic Chemistry: Mohrig, Hammond, Schatz, & Morrill (H. Freeman & Company 2003).
Mead Composition Notebook (for laboratory).
Laboratory Coat (for laboratory).
Safety Goggles (for laboratory).

Course Grade:

Opportunity	**Value**
Quizzes (lowest dropped)	60%
Laboratory	25%
Final Exam	15%
Total	100%

Letter Grade:

Point Range	**Letter Grade**	**Point Range**	**Letter Grade**
90-100	A	76-80	C+
87-90	B+	70-75	C
83-87	B	64-70	C-
80-83	B-	60-64	D

Grade Sample:

Opportunity	**Grade (%)**		**Points (% of Final Grade)**
Quizzes	75 (ave.)		45.0
Laboratory	87 (ave.)		21.8
Final Exam	48		7.2
		Total:	**74.0 (C)**

Course Policies: Special Needs If you need course adaptations or accommodations because of a disability, if you have emergency medical information to share with me, or if you need special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible.
Attendance in lecture and laboratory is mandatory.
There will be ***NO*** make-up quizzes or laboratories under any circumstances. Missed quizzes and laboratories count as a zero.

Laboratory Policies

1. Eye protection is required by state law. Safety goggles, which fit over prescription eyeglasses, are required. This eye protection can be purchased in the campus bookstore. Contact lenses are forbidden in lab. A laboratory coat (also available from the bookstore) is required in the laboratory. Pay special attention to the safety rules when they are explained in the laboratory. Failure to comply with these rules will result in dismissal from the laboratory. You will receive a zero for that laboratory. Please be safety conscious. Wear your safety goggles at all times, wear disposable gloves when working with corrosive or poisonous chemicals, wear a laboratory coat at all times, use the hoods at all times, and avoid inhaling vapors or gases or contaminating room air.

2. Attendance in laboratory is mandatory, as no make-up labs are available. If you know, in advance, that you will miss an upcoming lab, it is your responsibility to perform that laboratory during the same week in one of the other laboratory sections. Make sure to arrange this with the laboratory instructor.

3. Be sure to read the material related to each experiment before coming to the laboratory. Also, since pre-lab discussions occur at the beginning of the period, please get to lab on time.

4. Page numbers under the **READING** column are pages in ***Organic Chemistry Laboratory Manual*** that provide the actual experimental directions. Page numbers under the **ADDITIONAL READING** column are pages in ***Techniques in Organic Chemistry*** that provide background information about the laboratory techniques employed in that specific experiment.

5. Products for experiments, when indicated, must be turned in to the instructor in a properly labeled sample vial. In addition, a **report sheet** will be required for each experiment. Report sheets are due in the next laboratory period, unless otherwise indicated.

6. You are required to prepare for the experiments in advance. That means reading all instructions and writing up the appropriate information in your laboratory notebook (see below). You are not permitted to use the laboratory manual during lab, so everything you need to perform the lab must be written in your notebook.

7. A laboratory notebook **(Mead Composition Notebook)** must be present with you in the laboratory at all times. The following format should be followed:

    a. Write in **ink**.

    b. All experiment write-ups should include:

        i. ***Title***
        ii. ***Purpose***
        iii. ***Chemical Reaction and Mechanism*** (determine formulas for all reagents) (if applicable)
        iv. ***Reagent Table*** (list of chemicals used and quantities thereof) (if applicable)
        v. ***Procedure*** (including apparatus sketch) - **in your own words**
        vi. ***Calculations*** (MW's, moles, percent yield, etc...)
        vii. ***Results*** (including all data collected and conclusions)

    c. Lab notebooks should have a Table of Contents and Page Numbers. Use only the right facing page for writing, and leave extra pages blank, as needed, for data accumulated in the lab.

    d. All equipment used should be identified by name.

    e. Diagrams of apparatus must be accurate, and must have all parts appropriately labeled.

    f. All notebooks will be due at completion of the last scheduled lab experiment.

8. It is the duty of each and every student to be sure that all areas of the laboratory (bench tops, hoods, balances, lab cart, sinks, and weighing areas) are left in good order.

Homework Assignments

These problems are excellent exercises to determine whether or not you understand the material in the chapter. You will need the Study Guide to check your answers. *Please be aware that there are errors in the study guide.*

Chapter 17:	1, 2, 3, 4, 6, 7, 8, 9, 10, 12, 13, 14, 15, 17, 18, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 43, 44, 46, 50, 52, 53, 57
Chapter 18:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 15, 17, 18, 24, 25, 26, 27, 28, 29, 30, 32, 34, 35, 36, 37, 41, 45, 49, 50, 51, 52
Chapter 19:	1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 13, 16, 17, 18, 19, 20, 28, 29, 30, 31, 32, 33, 34, 36, 37, 38, 39, 40, 41, 43, 44, 45, 46
Chapter 20:	1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, 36, 37, 38, 40, 41, 42, 44, 45, 46, 47, 49, 50
Chapter 21:	1, 2, 3, 4, 5, 6, 8, 10, 11, 13, 15, 16, 17, 18, 19, 20, 21, 22, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 42, 43, 45, 46, 49, 50, 52, 53, 54

Molecular Spectroscopy Problems

Chapter 12:	1, 3, 4, 5, 9, 10, 11, 12, 13, 17, 18, 19, 21, 22, 23, 25, 27, 38, 29, 31, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 45, 46, 47, 48, 49, 50, 51
Chapter 13:	3, 4, 5, 14, 16, 17, 18, 19, 20, 21, 23, 24, 28, 29, 30, 31 ^{1}H only, 35, 37, 39, 40, 41, 42, 43, 44, 46, 49, 50, 51, 52
Chapter 15:	43, 44, 45, 46
Chapter 17:	19, 20, 58, 59, 60, 61, 62, 63
Chapter 18:	19, 53, 54, 56
Chapter 19:	21, 22, 23, 59, 60, 61, 62, 63, 6467, 68
Chapter 20:	14, 51, 52, 54, 55, 56
Chapter 21:	26, 27, 63, 64, 65, 66
Chapter 22:	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 14, 15, 17, 21, 22, 23, 24, 25, 26, 27, 28, 29, 31, 32, 33, 34, 36, 37, 38, 39, 40, 43, 44, 46
Chapter 23:	1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 14, 15, 16, 17, 19, 20, 21, 22, 27, 28, 35, 36, 37, 39, 42, 45, 46, 49, 50, 51
Chapter 24:	1, 2, 3, 4, 5, 6, 7, 8, 10, 12, 13, 14, 16, 17, 18, 19, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 45, 49, 50, 58, 59, 60, 62, 63, 66, 67, 68
Chapter 25:	1, 2, 3, 6, 7, 8, 9, 11, 12, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 32, 33, 34, 36, 39, 40, 41, 42, 43, 44, 47, 48
Chapter 26:	1, 2, 5, 7, 8, 10, 11, 16, 17, 18, 29, 30, 33, 36, 56, 60

Tentative Lecture Outline

Date		Text Chapter	Topic
June	20	17	Alcohols
	21 (Q1)	18	Ethers
	22 (Q2)	19	Aldehydes & Ketones
	23 (Q3)	20	Carboxylic Acids
	27 (Q4)	21	Carboxylic Acid Derivatives
	28 (Q5)	12	MS & IR
	29 (Q6)	13	NMR
	30 (Q7)	13	NMR
July	*4*	*Holiday*	*no class*
	5 (Q8)	22	α-Substitution Reactions
	6 (Q9)	23	Carbonyl Condensation Reactions
	7 (Q10)	24	Amines
	11 (Q11)	25	Carbohydrates
	12 (Q12)	26	Amino Acids
	13 (Q13)	Review	
	14	**Final Exam**	**Cumulative**

Tentative Laboratory Outline

Date		Topic	Reading[†]	Additional Reading[‡]
June	21	15. Reduction of a Ketone	87-89	Technique 9 (pp. 78-92) Technique 10 (pp. 93-103)
	22	14. Grignard Synthesis	81-86	Technique 7 (pp. 48-56)
	23	14. Grignard Synthesis (cont.)	81-86	Technique 8 (pp. 56-78)
	28	17. Infrared Spectroscopy	95-97	Technique 18 (pp. 197-223)
	29	18. Instrumental Analysis	99-130	Technique 19 (pp. 224-283)
	30	18. Instrumental Analysis 11. Coenzyme Synthesis of Benzoin	99-130 69-72	Technique 19 (pp. 224-283)
July	5	11. Coenzyme Synthesis of Benzoin (cont.)	69-72	Technique 9 (pp. 78-92)
	6	12. Synthesis of Benzil	73-75	Technique 9 (pp. 78-92)
	7	19. Carbonyl Condensation Reaction	131-134	Technique 7 (pp. 48-56)
	12	Finish Work		
	13	Check-Out		
	14	no lab		

[†] *Organic Chemistry Laboratory Manual*: Glagovich & Shine (3rd ed., CCSU Press).
[‡] *Techniques in Organic Chemistry*: Mohrig, Hammond, Schatz, & Morrill (H. Freeman & Company 2003).