

<b>Course:</b>	<b>Organic Chemistry 2 – CHE232</b>
<b>Term:</b>	<b>Spring 2012</b>
<b>Instructor:</b>	<b>Name: Dr. D. R. Buffinger</b> <b>Email Address: <a href="mailto:dbuffing@wilberforce.edu">dbuffing@wilberforce.edu</a></b> <b>Phone Number: (937) 708-5639</b>
<b>Catalog Description:</b>	A continuation of Organic Chemistry I with the emphasis on the chemical and physical properties of the major organic families containing oxygen and nitrogen. The use of spectroscopic methods (NMR, IR, and Mass Spec) for structural determination are also introduced.
<b>Prerequisites</b>	<i>CHE 231 and CHE 231L</i> <i>Co-requisite: CHE 232L</i>
<b>Course Level Learning Outcomes:</b>	A student in this class will accomplish the following: <ol style="list-style-type: none"><li>1. Be able to identify the molecular ion peak and base peak in a mass spectrum</li><li>2. Be able to analyze a mass spectrum and elucidate the structures of the fragments causing significant peaks</li><li>3. Be able to explain the two factors that affect the absorption of infrared radiation</li><li>4. Be able to analyze an infrared spectrum and determine the significant functional groups present</li><li>5. Be able to explain the upfield and downfield chemical shifts observed for signals in the <math>^1\text{H}</math> and <math>^{13}\text{C}</math> NMR spectra</li><li>6. Be able to explain the splitting patterns observed for NMR signals</li><li>7. Be able to analyze an NMR spectrum and elucidate the structure of the compound causing the spectrum</li><li>8. Be able to name organic compounds (specifically aromatics, alcohols, ethers, aldehydes, ketones, carboxylic acids, acid derivatives, and amines) using IUPAC nomenclature as well as common names were relevant</li><li>9. Be able to describe the four criteria needed for aromaticity</li><li>10. Be able to determine if a structure is aromatic or not</li><li>11. Be able to draw the electron arrow pushing mechanism for electrophilic aromatic substitution reactions, nucleophilic addition reactions, nucleophilic acyl substitution and organometallic reactions</li><li>12. Be able to predict the products of electrophilic aromatic substitution reactions, nucleophilic substitution reactions,</li></ol>

	<p>organometallic reactions, oxidation reactions, reduction reactions, nucleophilic addition reactions, nucleophilic acyl substitution reactions and acid/base reactions</p> <p>13. Know several common oxidizing and reducing agents used in organic chemistry</p> <p>14. Be able to determine the relative acid strength of a compound based upon the trend of the relative acid strengths of the organic functional groups</p> <p>15. Be able to determine the relative base strength of a compound based upon the trend of relative base strengths of the functional groups</p> <p>16. Be able to determine a reasonable organic synthetic path given a starting material and a final chemical target</p>															
<b>Materials:</b>	<p><b>Organic Chemistry</b>, 7<sup>th</sup> edition, J. McMurray</p> <p>A scientific calculator</p>															
<b>Grading:</b>	<p>Grading Scale</p> <p>87 - 100% = 571 – 660 pts = A  76 - 86% = 498 – 570 pts = B  65 - 75% = 426 – 497 pts = C  54 - 64% = 353 – 425 pts = D  Below 53% = 0 – 352 pts = F</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Exams</td> <td style="width: 40%;">4 worth 100 pts each</td> <td style="width: 30%; text-align: right;">= 400 pts</td> </tr> <tr> <td>Class Participation</td> <td></td> <td style="text-align: right;">= 36 pts</td> </tr> <tr> <td>Homework problems (30 problems)</td> <td></td> <td style="text-align: right;">= 24 pts</td> </tr> <tr> <td>Final Exam</td> <td></td> <td style="text-align: right;"><u>= 200 pts</u></td> </tr> <tr> <td></td> <td></td> <td style="text-align: right;">660 pts</td> </tr> </table>	Exams	4 worth 100 pts each	= 400 pts	Class Participation		= 36 pts	Homework problems (30 problems)		= 24 pts	Final Exam		<u>= 200 pts</u>			660 pts
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	<p>A student's proficiency in course work is measured in terms of the following Alphabetical symbols. Minuses and pluses are not accepted.</p> <p>A: Excellent</p> <p>B: Good</p> <p>C: Satisfactory (Grade C or better required in major courses).</p> <p>D: Poor (passing, except in major courses).</p> <p>F: Earned Failure. (Removed only by repeating the course). Upon successfully passing the course, the first grade is "excluded" from grade point average. The second grade is "included in the recalculation of the grade point average."</p>
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	<p>I: Incomplete (student performing satisfactorily, but unable to complete coursework due to valid reason).</p> <p>N: Used in cases where grades are not yet submitted.</p> <p>W: Withdrew before course drop deadline.</p> <p>WP: Student withdraws from University. Withdrew passing after course drop deadline (2 weeks after mid-term).</p> <p>WF: Student withdraws from University. Withdrew failing after course drop deadline (2 weeks after mid-term. WF is treated as an F (punitive grade).</p> <p>CR: Credit/pass</p> <p>NC: No credit/fail</p> <p>Z: Failed course for non-attendance/unofficial withdrawal (treated the same as an F grade). Last date of attendance is reported by faculty.</p>
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<p><b>Activities:</b></p>	<ol style="list-style-type: none"> <li>1. There are five (5) tests used to assess your performance in this class. Four of these are held during the laboratory hours. The lowest scored exam will be dropped at the end of the semester. Each exam is essay/short answer/problem solving. Partial credit is often given so no question should be left blank.</li> <li>2. A review session is typically scheduled prior to each examination. This review session is mainly in the late afternoon and is not mandatory. However, attendance is STRONGLY recommended. In addition to answering questions from students, sample questions from previous exams will be presented and solved.</li> <li>3. A short homework is assigned approximately every day. You should attempt these problems to assist you in practicing for the examinations. You will receive ½ point for submitting the problem on time and ½ point for a correct solution.</li> </ol>
<p><b>Policy Statements:</b></p>	<ol style="list-style-type: none"> <li>1. All cell phones are to be either turned off or on vibrate during class. No cell phone is permitted to be answered during a lecture. If this policy is ignored, I will assess a reduction of two points from an exam for offenders. Cell phones are not allowed in class during exams. They must be off and stored in purses, backpacks, etc. Failure to abide by this rule will cause a penalty of 10 points to be removed from your examination.</li> <li>2. During examinations all electronic devices including i-pods,</li> </ol>

	<p>laptops, etc must off and stowed. The only exception is a calculator. Please note that you MAY NOT use your cell phone as a calculator.</p>
<b>University Policies:</b>	<p><u>Academic Honesty:</u> Plagiarism and cheating are completely unacceptable in an institution of higher education and learning. Such behavior deprives the student involved of the desired education and development of an appropriate value system. It is extremely unfair to other students, and it severely diminishes the value and integrity of a University degree.</p> <p>Plagiarism occurs whenever another's work is submitted as one's own. This includes the use of information from an Internet site or from a published author's ideas and words without proper attribution or documentation. It also includes the copying of term papers, other unpublished works, homework, case reports, computer programs and spreadsheets, and any other course assignments which are submitted for course credit as the student's own effort.</p> <p>Each instructor shall state the specific penalties for plagiarism and cheating in the course syllabus. The instructor has final responsibility for assessing the penalty in such cases regarding the course grade.</p> <p>All cases of plagiarism and cheating will be referred to the Vice President for Academic Affairs for possible further action. Additional penalties may be imposed for the egregious cases of plagiarism and cheating.</p>

	<p><u>Drops and Withdrawals</u></p> <p><b>Dropping Courses:</b>  A course may be dropped up through the end of the second week of the semester without any record on the transcript. After this date, a course may be dropped up to two weeks after mid-term grade reports are due, with a W appearing on the transcript. Withdrawals after mid-terms must be approved by the Vice-president of academic Affairs.</p> <p>In certain General Studies core courses, students' assignments to course sections may be changed by faculty with written notification given to the Registrar. In all other cases, a student wishing to move from one section of a course to another must accomplish this by using a drop-add form to drop the old section and add the new section.</p> <p><b>Withdrawal/Grading Policies</b>  The following procedures will apply to all students withdrawing from the University. Grades will be given in regard to the time of withdrawal. Contact the Registrar's Office for forms and assistance.</p> <ul style="list-style-type: none"> <li>• <b>W</b> (official withdrawal initiated by the student): To be given when a student withdraws between the first day of class/registration and the last day to drop courses, this is two weeks after mid-term exams.</li> <li>• <b>AW</b> (unofficial withdrawal not initiated by the student): The student does not inform anyone that he/she is leaving campus (the student walks out). The university may also administratively withdraw a student for disciplinary reasons, academic legal anytime during the semester.</li> </ul> <p><u>Special Accommodations:</u>  A student who is ill or who has or develops medical conditions including but not limited to illness, physical or other disability or pregnancy must notify the Director of Health Services immediately.</p>
<p><b>Course Schedule :</b></p>	<ol style="list-style-type: none"> <li>1. This course meets from 2:00 to 2:50 MWF</li> <li>2. The new University Class Make-up Policy states that any missed class for whatever reason must be made up. For this course, any missed classes will be rescheduled for an agreed upon evening.</li> <li>3. My Office Hours are as follows: <ul style="list-style-type: none"> <li>MWF 1:00 – 1:50</li> <li>MW 3:00 – 4:00</li> <li>T 4:00 – 6:00</li> </ul> </li> </ol>

**Course Policies :**

1. Attendance will be taken each day at the very beginning of the class. If you are not present, I will mark you absent. You may miss three days without any penalty. However, after the fourth absence, your grade will be dropped one letter grade. Please note that these three absences include excused absences. If you are going to be absent, please email me. Your class participation points are based upon attendance.
2. **THERE ARE NO MAKE-UP EXAMS. NO EXCEPTIONS.** This is why one exam is dropped at the end of the semester. The final exam cannot be dropped.
3. There is a CD on reserve in the library that has all of my PowerPoint Lectures. You should copy each lecture's presentation. Please note that the presentations provide a framework for the discussion, but additional information/problems will be given in class. Therefore, these are not to be used in place of attendance in lecture.
4. You will be assigned specific sections of the text to learn independently from lecture. The best way to accomplish this task is to read the section, write a brief outline of the section and copy down any terms/conceptions with their definitions. I will assign specific homework to assist you in learning the material. The concepts in these sections will be on the exams. If you have questions about the independent material, you must submit these in writing along with a copy of the section(s) outline and a glossary of new terms.
5. To succeed in this class, I recommend a minimum of two (2) study hours per hour of lecture. During this time you should rewrite lecture notes, prepare flash cards, read the chapter, etc.
6. It is often helpful to have study partners to assist you in understanding the material.
7. Cheating is totally unethical and will not be tolerated in this class. First offense is an F for that assignment or exam. The second offense will net you an F for the course.
8. In accordance with the Americans with Disabilities Act (ADA), please inform the instructor of any special learning needs you may have at the beginning of the semester so that reasonable accommodations may be provided. Please present documentation of the same to the instructor.

**Weekly Schedules:**

DATE	LEC	ACTIVITY	HOMEWORK
Jan 6		Introduction to Course	
Jan 9	1	<b>Chapter 12</b> - Theory of Mass spectroscopy (MS)	
Jan 11	2	Analyzing a MS spectrum	
Jan 13		Analyzing a MS spectrum continued	

	<b>Jan 16</b>		<b>No School – Martin Luther King Jr. Birthday</b>	
	Jan 18	3	Theory of infrared spectroscopy (IR)	#1 (12.23)
	Jan 20	4	Analyzing an IR spectrum	
	Jan 23	5	<b>Chapter 13</b> – Theory of NMR spectroscopy	#2 (12.33)
	Jan 25	6	Analyzing an Hydrogen-1 NMR spectra for number of signals, chemical shift of the signal from TMS and integration of the signal	
	Jan 27	7	Splitting patterns of NMR signals	#3 (13.38)
	Jan 30	8	Carbon-13 NMR spectroscopy	#4 (13.58)
	Feb 1		Carbon-13 NMR spectroscopy continued	
	<b>Feb 3</b>		<b>EXAM 1 – Chapters 12 and 13</b>	#5 (13.57)
	Feb 6	9	<b>Chapter 15</b> – Nomenclature of Benzene derivatives and Theory of Aromaticity	
	Feb 8	10	Theory of aromaticity related to the annulenes and heterocyclic compounds	#6 (15.18)
	Feb 10	11	Aromaticity as related to various ions and IR/NMR spectroscopy of benzene compounds	#7 (15.39)
	Feb 13	12	<b>Chapter 16</b> – Electrophilic Aromatic Substitution Reactions (halogenation, nitration, sulfonation, and alkylation)	#8 (15.46)
	Feb 15	13	Electrophilic aromatic substitution reaction of acylation, and the effects of substituents on incoming group orientation and rate of reaction	#9 (16.47)
	Feb 17	14	Effects of substituents on further reactions and electrophilic aromatic substitution of other aromatic compounds (naphthalene, pyridine, furan, pyrrole and thiophene)	#10 (16.30)
	Feb 20	15	Reactions involving the substituents of aromatic rings	#11 (16.52)

Feb 21		<b>EXAM 2 – Chapters 15 and 16</b>	
Feb 22	16	<b>Chapter 17</b> – Nomenclature and physical properties of alcohols	#12 (16.36)
Feb 24	17	Synthesis of alcohols	#13 (17.25)
Feb 27	18	Reactions of alcohols	#14 (17.36)
Feb 29	19	Reactions of alcohols and introduction to phenols	#15 (17.37)
Mar 2	20	<b>Chapter 18</b> – the chemistry of thiols	#16 (17.57)
<b>Mar 5</b>		<b>No School – Spring Break</b>	
<b>Mar 7</b>		<b>No School – Spring Break</b>	
<b>Mar 9</b>		<b>No School – Spring Break</b>	
Mar 12	21	The chemistry of ethers	
Mar 13		<b>EXAM 3 – Chapters 17 and 18</b>	
Mar 14	22	<b>Chapter 19</b> – Nomenclature of aldehydes and ketones	#17 (18.28)
Mar 16	23	Synthesis of aldehydes and ketones <b>Last Day to Drop Class with a W</b>	
Mar 19	24	Reactions of aldehydes and ketones	#18 (19.32)
Mar 21	25	Reactions of aldehydes and ketones	#19 (19.37)
Mar 23	26	Reactions of aldehydes and ketones	#20 (19.66)
Mar 26		Review for EXAM 3	
Mar 27		<b>EXAM 4 – Chapter 19</b>	
Mar 28	27	<b>Chapter 20</b> – Nomenclature and physical properties of carboxylic acids	#21 (19.42)
Mar 30	28	Synthesis and reactions of carboxylic acids	#22 (20.25)
Apr 2	29	<b>Chapter 21</b> – Nomenclature of acid derivatives	#23 (20.36)
Apr 4	30	Synthesis and reactions of Acyl Halides	#24 (21.32)
<b>Apr 6</b>		<b>No School – Good Friday</b>	
<b>Apr 9</b>		<b>No School – University Institute</b>	
Apr 11	31	Synthesis and reactions of anhydrides and esters	#25 (21.37)
Apr 13	32	Reactions of esters continued	
Apr 16		Reactions of Ester continued	

	Apr 18	33	Reactions of esters and synthesis / rxns of amides	#26 (21.36)
	Apr 20	34	<b>Chapter 24</b> – Nomenclature and physical properties of amines	#27 (21.70)
	Apr 23	35	Synthesis and reactions of amines	#28 (24.32)
	Apr 24		<b>EXAM 5 – Chapters 20, 21 and 22</b>	#29 (24.45)
	Apr 25	36	Reactions of amines Last Day of Class	#30 (24.42)
	Apr 27			
	<b>MAY</b>		<b>FINAL EXAM on ??? at ???</b>	
<b>Advising &amp; Tutorial Support:</b>				