

JOHN JAY COLLEGE OF CRIMINAL JUSTICE
The City University of New York

CHEMISTRY 201 ORGANIC CHEMISTRY --- Fall 2013
Sections 01-08

Instructor: Gloria Proni

Office Location: 5.66.12 NB

Contact hours: Tue 12.15-1.15 pm

Phone: 212-237-8284

Email address: gproni@jjay.cuny.edu

Laboratory/Recitation Instructors and their contacts:

Recitation Instructor: Dr. G. Proni – gproni@jjay.cuny.edu

Recitation Instructor: Dr. Guoqi Zhang

Laboratory Instructors: Ms. Alison Domzalski, Ms. Amanda Vasquez, Ms. Elaan Lukasiewicz

Course Description

Today's qualified forensic scientist must acquire a capacity for logical reasoning, an imaginative approach to solving problems and a flexibility that allows adaptation to a changing world. CHEM 201 aims to develop these qualities in the area of introductory organic chemistry. Goals of the course are, also, essential experimental laboratory skills and fundamental knowledge in the foundations of organic chemistry.

In particular, CHEM 201 is a systematic introduction to the chemistry of carbon compounds. It encompasses theory and reactions of hydrocarbons and functional group derivatives. Included are bonding and structure, nomenclature, stereochemistry, synthesis, mechanism, and spectroscopic analysis. The laboratory work focuses on techniques of synthesis, isolation, purification, and analysis. The laboratory component of this course consists of fourteen double-John Jay sessions over the semester. The recitations, held in a single John Jay period weekly, will be dedicated to explaining difficult topics, answering student questions, reviewing the material discussed in the lectures.

Learning Outcomes

Assessed by: exams' and laboratory's performances and/or evaluation of notebook data and lab reports and/or lab tests.

The student will demonstrate the ability to use the appropriate problem-solving techniques to solve a scientific problem such as an organic synthesis comprised of one or more steps, or a determination of the structure of a compound based on spectroscopy (IR, NMR, MS) and/or chemical evidence.

When conducting a laboratory experiment, the student will follow written procedures commonly used in the organic lab (such as reflux,

distillation, extraction, recrystallization, and melting-point determination) accurately and safely. When completing a lab report, the student will apply the scientific method correctly by being able to state a hypothesis, take careful measurements, estimate uncertainties and draw appropriate conclusions based on gathered data and scientific principles.

The student will explain observable phenomena using appropriate scientific theories, such as writing a reaction mechanism consistent with observed facts or utilizing appropriate structures to represent different types of organic molecules and species.

Reasoning

- Predict the major product in an organic reaction, such as those involving hydrocarbons, alcohols, alkyl halides and alkenes
- Write synthetic schemes for the production of different classes of these compounds
- Analyze spectroscopic data to solve the structures of organic compounds.
- Perform retrosynthetic analysis
- Analyze spectroscopic data to solve the structures of organic compounds.
- Predict the optical activities and stereochemistry properties for different classes of compounds
- Analyze the structure of a given compound and predict the type of bonding, hybridization state, and effect of the structure on the physical properties of such compound.
- Draw conclusions from experimental data gathered during laboratory sessions.

Knowledge

- Recognize main functional groups in organic compounds
- Name organic compounds using the IUPAC nomenclature
- Recognize nucleophiles, electrophiles and their reactivity in order to predict the course of a reaction.
- Interpret laboratory instructions, safety sheets and experimental protocols
- Define the structures and properties of organic compounds
- Describe basic organic chemistry mechanisms (S_N1 , S_N2 , E_1 , E_2 ...).
- Explain the theory behind basic spectroscopic methods
- Use appropriate current technology in the laboratory to obtain data and understand the impact that recent technologies have on the field

Practical skills

- Apply basic synthetic skills
- Illustrate basic spectroscopic techniques
- Standardize and operate laboratory instruments to identify reactants and products and to separate mixtures of compounds
- Obtain information about chemical compounds from all possible sources;
- Apply this information for the safe handling, use and disposal of such compounds in a safe and environmentally responsible manner

Communication

- Give small presentation on organic compounds
- Prepare laboratory reports in accordance with current forensic reports' styles

Course prerequisites or co-requisites

ENG 101 and CHE 104

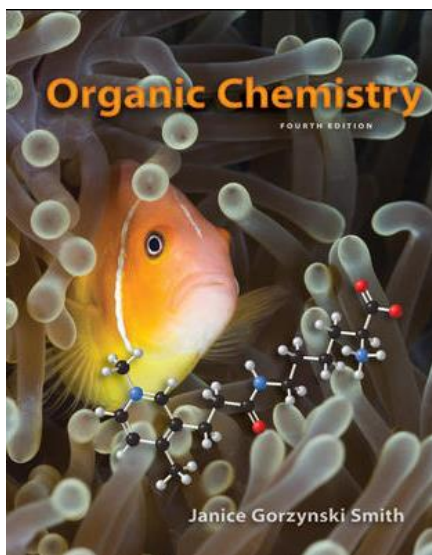
Requirements / Course Policies

Students enrolled in this course are **required** to attend all lecture, recitation, and laboratory sessions of the section for which they registered. There are two lecture sessions, one recitation session, and one laboratory session per week. If a student needs to miss classes he/she may do so, but the instructor may ask to withdraw from the course. More than 3 absences in the labs, lectures or recitation classes will result in an unofficial withdrawal grade. The information missed is vital to your future profession. Attendance, enthusiasm, and active class participation are observed, recorded, and reflected in the student's final grade. Late arrival to the lab WILL NOT be tolerated (students will be penalized if late): such behavior has direct consequences upon the safety in the lab. Attendance is taken solely from roll sheets circulated at the beginning and/or end of each session or by the clickers. Lateness or early departure counts as ½ absence. Students missing more than 30 minutes of a session will be counted as absent. Obviously there is no penalty for students when classes are canceled.

Required Texts

Lecture Text:

Required Materials: Smith *Organic Chemistry* 4e, Custom Edition for John Jay w/ **Connect Plus** and **Poll Everywhere** Access



ISBN: **1259148114**. This text is only available at the John Jay Bookstore and contains all package components necessary for this course.

Connect Plus: To register, go to http://connect.mcgraw-hill.com/class/proni_section1-6

- Click the "Register Now" button
- Enter your John Jay e-mail address
- Enter the Connect Access Code found bound into your textbook
- Complete the Registration Form and click "Submit"
- For technical issues with registration, call **800-331-5094** or go to www.mhhe.com/support

Poll Everywhere: To register, go to www.poll everywhere.com/redeem

- Enter the 7-digit code found bound into your textbook and link to instructor's Poll Everywhere account (using instructor's email address or last name)

- Create an ID (optional) and register your cell phone number (**required**)

Lab Manual: (The lab manual must be brought to each laboratory session.)

Introduction to Organic Laboratory Techniques: A Microscale Approach, 4th Edition
 Donald L. Pavia | Gary M. Lampman | George S. Kriz | Randall G. Engel

Necessary for recitation and during the lecture exams: Molecular structure models [the instructor recommend models from HGS Molecular Structure model but you are free to get different models that satisfy you].

Other required material (to be brought to each laboratory session):

Splash-resistant safety goggles or safety glasses meeting the ANSI Z87.1-1989 standard. All students must wear safety glasses or goggles in lab. Students requiring corrective lenses must wear safety glasses or goggles over the corrective lenses.

A non-programmable scientific calculator that can be removed from its case (available at most electronic stores).

The John Jay library (212-237-8200) owns several copies of the textbook and so does the Math and Science Tutoring Center (646-557-4595). In addition, videos have been recorded of the majority of the lecture classes for your review in case you have missed classes and are available in the Math and Science Tutoring Center.

Grading

This course has three components -- lecture, recitation, and laboratory. Each component has a separate grading policy, which contributes a percentage to the overall course grade. In general, the course grade is the sum of the grades earned in the lecture (60%) recitation (15%) and laboratory (25%) sessions. However, since the lab sessions are an integrated component of the course, where lab safety skills and dexterity are taught for use in subsequent science courses, for safety reasons, a minimum lab grade of 60% is required to pass the course. In order to pass the lecture portion of the course a minimum of 240 points out of 400 points in the four lecture exams are necessary. Unethical/unprofessional conduct will result in a failing course grade and referral for additional action.

Lecture: During the lecture sessions, four exams are given (each of them counts 21% of the lecture grade and last 1 hour and 05 minutes). **There are no make-up exams.** Unexcused absences from exams will result in a grade of zero. Excused absences will not lead to a penalty but remaining exams will be weighted correspondingly more. Missing three (3) exams automatically constitutes a grade of F for the course. During the final exam's week the American Chemical Society (ACS) standardized test (which lasts two hours) is given which counts as 15% of the final grade of the lecture grade. It is a cumulative exam and it needs to be taken in the date dictated by the instructor (based on ACS regulations all students need to take the exam together). If a student misses the ACS standardized test in the final week of exams (with an excused absence) and he is passing the course up to that point, he will receive a grade that corresponds to the average of the other four exams. If he is missing the ACS exams during the final week of exams and he is not passing the course up to that point a grade of "F" will be assigned. **THERE WILL BE NO MAKE-UPS OF THE ACS EXAM or OF ANY OTHER EXAMS.** It is important to understand that it is **students' responsibility** to come to class and take the exams. During the exams books remain closed. A non-programmable, scientific calculator may be used during exams if it is removed from its case.

Recitation and Homework: During the recitation sessions, students are encouraged to participate in discussions and activities related to the lecture material and homework. Active participation by all students benefits all students, providing varying approaches to mastering the subject material, incentive, and progress evaluation. Consequently, absences or failure to meaningfully participate will result in a significant course grade penalty. Students' grade will be based on the homework assigned by the recitation/lecture instructors (10%) and participation/attendances in the recitation class (5%). Students, during recitation and lecture sessions, are required to come to the board and do exercises in front of their colleagues in order to get credit for their participation. No computer-based homework will be corrected or graded if handed in a paper copy.

Laboratory:

Pre lab questions	8-15 points	
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Post lab questions	8-15 points	
Safety	5-10 points	References must be included.
Results/observations	15-25 points	All results must be clearly stated and all observations recorded.
Calculations	5-15 points	Correct units must be used. All yields must be reported. All numbers must be explained
Explanation/discussion/conclusion	30-50 points	This is a crucial part of the lab report. Detailed explanations of all your results and observations must be included. Your writing must be concise and easy to understand. The conclusion has to be thorough and you must demonstrate that you understood the principles of the lab.

Remember: **There is no wrong or right.** If results are different from what is expected DO NOT INVENT. Instead, try to find logical explanations for what happened. This will be taken into account and your grade will not suffer from it, as long as you provide a reasonable justification. This is the opportunity to develop your critical thinking abilities and your writing skills.

Reports written by Forensic Scientists must be clear, concise, and unambiguous. Consequently, when a question in the test/quiz/laboratory report assigned requires a written explanation, spelling, grammar, and clarity of expression will be considered in determining the “correctness” of the answer proffered. It is important that careful attention is directed to writing what you mean and meaning what you write. If the grade on the first two laboratory reports is below B, students will be referred to the Writing Center Services (212-237-8659).

College Wide Policies for Undergraduate Courses (see the Undergraduate Bulletin, Chapter IV Academic Standards)

Americans with Disabilities Act (ADA) Policies

Sample syllabus statement: “Qualified students with disabilities will be provided reasonable academic accommodations if determined eligible by the Office of Accessibility Services (OAS). Prior to granting disability accommodations in this course, the instructor must receive written verification of a student’s eligibility from the OAS which is located at L66 in the new building (212-237-8031). It is the student’s responsibility to initiate contact with the office and to follow the established procedures for having the accommodation notice sent to the instructor.”

Source: *Reasonable Accommodations: A Faculty Guide to Teaching College Students with Disabilities*, 4th ed., City University of New York, p.3.
 (http://www.jjay.cuny.edu/studentlife/Reasonable_Accommodations.pdf)

Statement of the College Policy on Plagiarism

Plagiarism is the presentation of someone else's ideas, words, or artistic, scientific, or technical work as one's own creation. Using the ideas or work of another is permissible only when the original author is identified. Paraphrasing and summarizing, as well as direct quotations require citations to the original source.

Plagiarism may be intentional or unintentional. Lack of dishonest intent does not necessarily absolve a student of responsibility for plagiarism.

It is the student's responsibility to recognize the difference between statements that are common knowledge (which do not require documentation) and restatements of the ideas of others. Paraphrase, summary, and direct quotation are acceptable forms of restatement, as long as the source is cited.

Students who are unsure how and when to provide documentation are advised to consult with their instructors. The Library has free guides designed to help students with problems of documentation. (*John Jay College of Criminal Justice Undergraduate Bulletin*, <http://www.jjay.cuny.edu/academics/654.php>, see Chapter IV Academic Standards)

Ethics

Ethics principles in chemical research will be discussed during the lecture sessions.

Tutoring

Tutoring is available free of charge for this course in the Mathematics & Science Resource Center (MSRC). The center also has a computer lab with internet access and a room for quiet study.

How do you get the most out of a tutoring session?

- i. *Start right away.* Students who begin tutoring from the beginning of the semester typically do better than those who wait.
- ii. *Book your appointments early.* During peak times, you may need to book at least a week in advance to get the times you want. To book your own appointments over the web, first read the instructions on the MSRC web site, then log on to TutorTrac at the URL below.
- iii. *Come prepared.* Please bring your class notes and textbook. Look over the reading and try the problems. If you can, bring a list of specific questions. The more you prepare, the more you will get out of the session.
- iv. If you miss a class, please get notes from a classmate *before* your session. Tutoring is not a substitute for attending class.
- v. If you are repeating the course (previous grade of "F" or "W"), you are eligible to participate in the Math Advancement Program (MAP) which provides weekly one-on-one tutoring with an experienced tutor. The deadline to sign up for the MAP program is Monday, September 9, 2013. Please see Ms. Michele Doney in room 01.94 NB by 5:00 PM on September 9 for details.

Contact Information for the MSRC, room 01.94 NB:

Phone: [\(646\) 557-4635](tel:6465574635)

Email: msrc@jjay.cuny.edu

MSRC Website: <http://www.jjay.cuny.edu/academics/592.php>

TutorTrac (for scheduling appointments): <https://ijctutortrac.jjay.cuny.edu>

Course Calendars: in this order lecture, laboratory and recitation

SESSION	DATES	TOPICS	CHAPTER	HOMEWORK
	August-September			

1	29-August	Structure and Bonding	1	Online Homework and in text exercises
2	3-September		1	
3	10	Acids and Bases	2	Online Homework and in text exercises
4	12		2	
5	17	Introduction to Organic Molecules and Functional Groups	3	Online Homework and in text exercises
6	19		3	
7	24	EXAM 1		
8	26	Alkanes	4	Online Homework and in text exercises
October				
9	01		4	
10	03	Stereochemistry	5	Online Homework and in text exercises
11	08		5	
12	10	Understanding Organic Reaction	6	
13	15		6	Online Homework and in text exercises
14	17	Alkyl Halides and Nucleophilic Substitution	7	
15	22	EXAM 2		
16	24		7	Online Homework and in text exercises
17	29	Alkyl Halides and Elimination Reactions	8	
18	31		8	
November				
19	05	Alcohols, Ethers and Epoxide	9	Online Homework and in text exercises
20	07		9	
21	12	Alkenes	10	
22	14	EXAM 3		
23	19		10	Online Homework and in text exercises
24	21	Alkynes	11	
25	26		11	
December				
26	03	Oxidation and Reduction	12	Online Homework and in text exercises
27	05		12	
28	10	EXAM 4		
FINAL WEEK		ACS EXAM – NO MAKE UP EXAMS GIVEN		ACS EXAM WILL BE TUE DEC 17 all sections

Tuesday	Thursday	Laboratory Experiment	Procedure Pages	Required Reading
3-Sep	29-Aug	Check - In , Lab Safety, Procedures, Glassware	n/a	Techniques 1, 2, 3, 4, 29
10-Sep	12-Sep	Exp 2A, 2C, 3A Solubility, Crystallization, Melting Point Determination	13 - 25	Techniques 8.3, 8.5, 9.2, 9.4, 9.7, 9.8, 10.1, 10.2, 11.1, 11.2, 11.3, 11.8, 11.9
17-Sep	19-Sep	Exp 4B,C,E Extraction	32 - 41	Techniques 12.1 - 12.6, 12.8 - 12.10
24-Sep	26-Sep	Exp 5A,B Thin-Layer Chromatography	42 - 46	Technique 20
01-Oct	03-Oct	Exp 5C Thin-Layer Chromatography	46 - 48	Technique 11, 20
08-Oct	10-Oct	Exp 6B Simple and Fractional Distillation, Refractive Index Analysis	51 - 57	Techniques 14.1 - 14.3, 15.1 - 15.3, 24
22-Oct	17-Oct	Exp 14/15 (+) and (-) Limonene Extraction from Lemon and Pine Needle	112-114 119-123 124-128	Essay: "Stereochemistry Theory of Odor" Techniques 7.10, 12.4, 12.9, 18
29-Oct	24-Oct	Exp 14/15 (+) and (-) Limonene HPLC and IR analysis	124-128	Techniques 21, 25
05-Nov	31-Oct	Exp 35A Oxidation-Reduction Scheme: Borneol, Camphor, Isoborneol, IR analysis	288 - 295	Techniques 7.1 - 7.4, 7.10, 8.3, 9.7, 9.8, 12.4, 25
12-Nov	07-Nov	Exp 35B Oxidation-Reduction Scheme: Borneol, Camphor, Isoborneol, IR analysis	295	Techniques 7.1 - 7.4, 7.10, 8.3, 9.7, 9.8, 12.4, 25
19-Nov	14-Nov	Exp 21A, B Nucleophilic Substitution Reactions: Competitive Nucleophiles	180 - 187	Techniques 7.2, 7.4, 7.5, 7.8, 12.5, 12.9, 12.11
26-Nov	21-Nov	Exp 21A, B Nucleophilic Substitution Reactions: Competitive Nucleophiles	187	Technique 22
03-Dec	05-Dec	ChemDraw	Handout	Handout
10-Dec	12-Dec	Lab Final , Check out	n/a	Review all materials
Tuesday	Thursday	Laboratory Experiment	Procedure Pages	Required Reading

