

FCH153 Course Syllabus

Spring 2018

Faculty Instructor: Dr. Neal M. Abrams

Office: 422 Jahn

E-mail: nmabrams@esf.edu

Phone: 470-4723

Office hours (*subject to change*): Monday, 1:50pm – 2:45pm

Thursday, 9:30am – 10:20am

Other days/times by appointment

Recitation instructor: **Ms. Joy Logan**

and Lab coordinator *Office:* 419 Jahn or 135 Jahn

E-mail: sjlogan@esf.edu

Phone: 470-4811

Description of the course

Three hours of laboratory per week. Concepts of chemical kinetics and equilibrium processes will be reinforced through experiments in titrimetric analyses, determinations of K_a and K_{sp} values, investigation of rate constants and reaction orders, buffer preparations, oxidation/reduction reactions and qualitative analyses. Spring.

Prerequisites: FCH 150, FCH 151. Co-requisite: FCH 152.

The FCH153 lab course builds on many of the techniques and procedures you learned in the first semester FCH151 course. Fewer procedural details will be given in these lab experiments, as there is an increased emphasis on more independent work. You will be asked to develop experimental procedures to solve a problem or answer a question and gather corresponding data. Labs will also become increasingly more quantitative as you will use concepts from kinetics, equilibrium, and chemical reactions to solve problems.

Course learning outcomes

After completing the course, students should be able to:

1. Practice the manipulation of chemical materials in a personally safe and environmentally responsible manner.
2. Understand how to carry out basic chemical measurements for both qualitative and quantitative purposes.
3. Apply the broad principles of chemical reactivity, the structure of molecular compounds, and the stoichiometric requirements of chemical reactions.
4. Produce and analyze data, interpret the information, and effectively communicate the results of analysis.

Program learning outcomes

- Integrate a sound understanding of the fundamental chemical principles and underlying theories in the core areas of chemistry with an emphasis on critical thinking and problem-solving.

- Practice hands-on skills and apply knowledge of safe practices in the experimental and instrumental aspects of chemistry through laboratory course experience.
- Demonstrate competency in the scientific “tools” required for the successful practice of chemistry: math, statistics, computer applications and information technology.
- Develop an understanding of the interdisciplinary connections between chemistry and other disciplines.

College learning outcomes

- Scientific reasoning: Students will be able to demonstrate understanding of modern science and the implications of scientific discoveries, apply the scientific method, and use science to address contemporary problems.
- Quantitative reasoning: Students will be able to effectively describe, interpret, apply, and evaluate quantitative information.
- Technological and information literacy: Students will be able to: use critical thinking skills to determine the information needed to solve a problem, access information using appropriate technologies, and effectively and appropriately use information to accomplish a specific purpose.
- Critical thinking: Students will be able to: identify, analyze, evaluate, and develop well-reasoned arguments.

Textbooks and supplies

Course-specific materials and supplies are provided through the laboratory course fee assessed at the start of each semester. This includes a laboratory manual, laboratory notebook, and safety glasses. All students are also required to have a scientific calculator (minimum) and a pen.

The link between lab experiments and concepts from lecture

In lecture, you will learn about the theories and principles of chemistry, but sometimes it is too easy to forget about the “real world”. The laboratory experiments chosen for this course have been specifically designed and placed into this course so that they enhance learning and deepen the understanding of concepts presented in lecture. Wherever possible, experiments have been chosen that exemplify how chemists learn about the world around them through measurement, analysis, and observation.

Critical thinking

Critical thinking skills are essential in the general chemistry lab. The following criteria are used to promote and assess critical thinking:

1. Information acquisition: Identify and differentiate questions, problems, and background statements.
2. Application: Assess the suitability of various methods of reasoning and confirmation when approaching a problem. Develop hypotheses and support or negate them based on available information.
3. Analysis: Identify and analyze assumptions and use logical reasoning to evaluate results.
4. Synthesis: Formulate questions and problems, construct arguments to address those questions, and effectively communicate conclusions through written and oral discourse.
5. Communication: In instances of alternative points of view, criticize or defend arguments with the use of logical reasoning and evidence.
6. Evaluation: Assess the quality of available data to draw reasonable conclusions.

Teaching assistants (TAs)

Along with the course Instructor, a number of teaching assistants will be used in this course. The Instructor and TAs work as a team to bring the lab to you throughout the semester. The teaching assistants are comprised graduate students here at ESF and all receive the same training and are held to the highest of standards. The primary role of a TA is to supervise the laboratory section by demonstrating laboratory skills, providing guidance during laboratories, grading, and holding office hours. Contact information for each TA will be posted at the beginning of the laboratory course and on Blackboard. Since all of the TAs are skilled and knowledgeable in all aspects of the lab course, you are encouraged to attend any of the office hours that suit your schedule.

Lab support

The General Chemistry Lab Coordinator, Joy Logan, provides reagent and materials preparation. She also instructs one section of the lab recitation. Ms. Logan is oftentimes in the lab and she is happy to assist with any immediate technical issues. She is also able to meet appointment if needed, salogan@esf.edu.

Technology

We use several pieces of technology to bring this course to you. Blackboard is probably the largest component as it is a repository for your grades and all course related information. We also use cloud services (Dropbox) to facilitate data-sharing among sections, YouTube videos of several lab techniques, and 2D barcodes to access several online resources. The 2D barcodes can be read on any smartphone with a free reader app. Note: Success in this course DOES NOT require you to have a smartphone or other fancy gadgets, but you will need access to email and a computer. **E-mail is the primary means of communicating messages to the hundreds of students in this course, so be sure you check your syr.edu email address daily or forward emails from this course to another email address of your choice.**

Grading and evaluations

Grading for the FCH 153 course is based on several pieces of the course. These include effort in running the lab, the notebook record, submitted lab write-ups, submitted prelab assignments, lab practical, recitation attendance, and a general evaluation from your TA.

All written lab assignments have a specified due date. Late lab reports turned in late will be assessed a penalty of **15% per day**. Late prelab assignments will generally not be accepted for credit.

- Laboratory reports will typically be due one week after completion of the lab experiment, unless specified otherwise.
- Pre-laboratory assignments will be submitted online are due by the beginning of your assigned lab period. You will not be permitted to participate in lab if your prelab is not complete.

Note: No individual report grades will be dropped. The class-wide report average will be used as a deduction to the total point report grade allocation for the semester. Since this number cannot be predicted ahead of time, **assume your earned grade is your final grade.**

All work has an assigned point value by section; pre-laboratory assignments, post-laboratory assignments/lab reports, recitation, and evaluation. The points in each section will be summed at the end of the semester and divided by the total number of points available. That value will then be fraction of your final grade according to the breakdown below:

Break down for the final lab grade:	Pre-lab assignments =	15 %
	Lab reports and practical =	70 %
	Overall TA evaluation =	10 %
	Lab recitation =	5%
	Total =	100 %

For example, the total points for the report section may total 225. If you receive a total of 205 points, that would be equivalent to a 91. That report grade is 70% of the total grade, or a 68. A complete example is shown below:

Section	Earned points	Total points	Section grade	Fractional value	Final points (/100)
Reports	205	225	91	0.7 (70 %)	64
Prelab	43	55	78	0.2 (15 %)	12
Evaluation	63	70	90	0.1 (10 %)	9
Recitation	18	20	90	0.05 (5 %)	5
Final grade					90 (A-)

Use this example as you compute your final grade for the semester. There should be no surprises since all of your grades will be posted on Blackboard.

Grading Scale

A	A-	B+	B	B-	C+	C	C-	D	F
(93 – 100)	(90 – 92)	(87 – 89)	(83 – 86)	(80 – 82)	(77 – 79)	(73 – 76)	(70 – 72)	(60 – 69)	(≤ 59)

Attendance Policy

Laboratory

Attendance at your scheduled lab session each week is mandatory. Attending your normally scheduled lab is critical to your success. **Two or more absences will result in an automatic failure or incomplete grade for the course.** If you must miss a lab, you may be allowed to reschedule by permission of the lab instructor, Dr. Abrams. You must make it up before the end of the week during another lab session. Labs run Monday – Thursday, typically three times per day. A missed lab will result in zero (0) for that lab report. There are no “dry lab” reports (you cannot obtain data from someone else). **Valid excuses for requesting a makeup lab are limited to illness, family emergency, religious observance, and academic commitments. Again, there are no excused absences.**

Recitation

Recitations are held on Monday and Wednesday mornings and are associated with your enrolled lab. Labs meeting on M and T will have the Monday morning recitation; labs meeting on W or Th will have the W recitation. **Only attend the recitation for which you are scheduled.** The recitation will review both the upcoming lab as well review the previous experiment. Attendance is another critical to success in the course and will be graded as a percentage of total attendances during the semester.

	Point allocations based on total recitation attendance.					
Attendance %	100-80%	70-80%	60-70%	70-60%	60-40%	<40%
Points	20 points	16 points	12 points	8 points	6 points	0 points

Lab Makeup Procedure

It is your responsibility to contact your TA and Dr. Abrams about making up a lab session. Unless contacted first, you will be permitted to participate in a makeup lab. If you miss a lab, you must make it up by attending another scheduled lab session. See the Class Schedule in this lab manual and on Blackboard for a listing of rooms and times. Once your rescheduled lab is approved by Dr. Abrams, you will be permitted to makeup the lab. You will be a guest in this lab section, so the TA will assign you a drawer, locker, and lab partner. You will need to access your glasses before starting the lab.

FCH 153 class schedule, Spring 2013 (subject to change)

Section	Day	Day/time	Location
Section 1	Monday	9:30 am – 12:35 pm	Jahn Hall 138
Section 2	Monday	12:45 pm – 3:35 pm	Jahn Hall 130
Section 3	Monday	3:45 pm – 6:35 pm	Jahn Hall 138
Section 5	Tuesday	12:30 pm – 3:20 pm	Jahn Hall 130
Section 6	Tuesday	3:30 pm – 6:20 pm	Jahn Hall 130
Section 7	Wednesday	9:30 am – 12:35 pm	Jahn Hall 138
Section 8	Wednesday	12:45 pm – 3:35 pm	Jahn Hall 130
Section 9	Wednesday	3:45 pm – 6:35 pm	Jahn Hall 138
Section 11	Thursday	12:30 pm – 3:20 pm	Jahn Hall 130
Section 12	Thursday	3:30 pm – 6:20 pm	Jahn Hall 130
Recitation 1 (M/T labs)	Monday	8:25 – 9:20 am	Baker 146
Recitation 2 (W/Th labs)	Wednesday	8:25 – 9:20 am	Baker 146

Late/Tardy Policy

The laboratory begins on-time, and it is therefore imperative that, at a minimum, you show up at the time class begins. It is preferred and recommended that you show up 5-10 minutes early so you can place materials in your locker, turn in assignments, and get your equipment ready to begin the experiment. If you are late to lab, it is up to the discretion of the TA and/or Dr. Abrams whether or not you can participate in lab. A missed lab will result in a zero for the assignment and be counted as an absence.

Students with learning and physical disabilities

SUNY-ESF works with the Office of Disability Services (ODS) at Syracuse University, who is responsible for coordinating disability-related accommodations. Students can contact ODS at 804 University Avenue- Room 309, 315-443-4498 to schedule an appointment and discuss their needs and the process for requesting accommodations. Students may also contact the ESF Office of Student Affairs, 110 Bray Hall, 315-470-6660 for assistance with the process. To learn more about ODS, visit <http://disabilityservices.syr.edu>. Authorized accommodation forms must be in the instructor's possession one week prior to any anticipated accommodation. Since accommodations may require early planning and generally are not provided retroactively, please contact ODS as soon as possible.

Academic Integrity

During the laboratory period, you will frequently work with other students in gathering and exchanging data. Sharing of information and discussion of this data with your lab partner and TAs is encouraged in the course. All submitted and graded material, however, **must be your own independent work and in your own words**. A lab report reflects your own understanding of the material. Academic integrity is taken very seriously in this course. Any instances of cheating or plagiarism will be brought to the attention of the instructor and may result in an immediate zero for the lab. The offense will also be documented and Student Affairs will be notified. Egregious cases of cheating may result in failure of the course and expulsion from ESF.

By registering for courses at ESF you acknowledge your awareness of the ESF Code of Student Conduct (<http://www.esf.edu/students/handbook/StudentHB.05.pdf>), in particular academic dishonesty includes but is not limited to plagiarism and cheating, and other forms of academic misconduct. The Academic Integrity Handbook contains further information and guidance (<http://www.esf.edu/students/integrity/>). Infractions of the academic integrity code may lead to academic penalties as per the ESF Grading Policy (<http://www.esf.edu/provost/policies/documents/GradingPolicy.11.12.2013.pdf>).

Civility

Please be respectful at all times towards your classmates and instructors. Treat others as you wish to be treated and behave as you would in a professional setting. The lab is a shared learning environment and respect is as important as the science. If you encounter a conflict in the course, please bring it to the attention of Dr. Abrams or a Teaching Assistant. We will do what we can to mitigate the situation. Do not let conflicts manifest themselves in the lab.

When sending emails, write courteous and grammatically correct messages. Your instructors reserve the right to request a rewrite before writing a reply.

Statement on Inclusion and Excellence

As an institution, we embrace inclusive excellence and the strengths of a diverse and inclusive community. During classroom discussions, we may be challenged by ideas different from our lived experiences and cultures. Understanding individual differences and broader social differences will deepen our understanding of each other and the world around us. In this course, all people (including but not limited to, people of all races, ethnicities, sexual orientation, gender, gender identity and expression, students undergoing transition, religions, ages, abilities, socioeconomic backgrounds, veteran status, regions and nationalities, intellectual perspectives and political persuasion) are strongly encouraged to respectfully share their unique perspectives and experiences. This statement is intended to help cultivate a respectful environment, and it should not be used in a way that limits expression or restricts academic freedom at ESF.

Tips for Success *(taken from EFB 101)*

It is our hope that every student in this class will be successful. There are a number of resources available to you that will help you be successful.

- Dr. Abrams, along with graduate teaching assistants, will be supervising your work in the laboratory. We all hold regular office hours. Stop by for a visit and get to know us and don't hesitate to regularly attend office hours for out-of-class assistance. Feel free to set up an appointment outside of our regular office hours if they conflict with your class schedule.
- If you anticipate conflicts or academic difficulties please see one of us at your earliest convenience in order to avoid severe problems further down the line.
- Read your textbook and lab manual often, regularly, and repeatedly. Ideally you should read assignments PRIOR to lab in order to prepare for the information we will be covering.
- Find a study partner or group to discuss classroom and laboratory materials. Share and compare notes. Teach one another.
- Come prepared to participate in laboratory. ASK QUESTIONS!

Assigned work areas

Each student in the General Chemistry lab is assigned a lab drawer for use during the semester. Students in many different sections use these drawers, so it is your responsibility to keep glassware and materials clean. If any glassware breaks or items are missing, it is your responsibility to contact the TA immediately. Do not use the drawer as a personal storage area.

Hood and balance

Each student is assigned a specific hood and balance area to use for the duration of the semester. The numbers on the hoods and balances correspond to your assigned bench drawer. It is your responsibility to properly maintain the hoods during your lab session by keeping the area clean and uncluttered.

Hallway Locker

Benches and floor space must be kept clear in the lab at all times. To assist with this, each student is assigned a locker in the hallway on the first floor of Jahn. The locker assignment and combination can be found on the inner right side of your bench drawer. All superfluous materials should be stored in these lockers during your session. This includes coats, backpacks, and books. Larger items may be stored in a separate designated area. You cannot store materials on the floor in the lab as this poses a safety hazard. **Lockers are for use during your lab session ONLY. The General Chemistry Lab team is not responsible for any lost or stolen items.**

Cleanup procedures

It is your responsibility to clean up any items used during your lab session. This includes capping reagents as well as cleaning glassware, benches, balances and hoods. Almost all of the materials and items used in the lab are for community use, so please be kind to your peers!

Required materials

- 1) Lab manual – This is what you are reading right now. The lab experiments have been assembled as a complete laboratory manual and will last the entire semester.
- 2) Safety glasses – Must be worn during all experimental laboratories while the lab is in progress. Only an instructor has the authority to let you know if your safety glasses can be removed. There may be times when safety glasses are also employed for safety reasons.
- 3) Lab notebook – A proper chemistry lab notebook is required for use during lab. We use carbonless copy lab notebooks from Hayden-McNeil. You will use the same notebook as last semester unless you are new to the course and a new lab manual will be given to you.
- 4) Calculator – You should supply your own calculator for use during lab. It must be either a scientific or graphing style.
- 5) Pen – Since all work in your lab notebook is to be written in pen, please bring a ballpoint pen, blue or black ink, with you for every lab.

Lab documentation and assignments

Blackboard

Along with the printed lab manual, this manual can also be found on Blackboard (<http://blackboard.syr.edu>) under FCH.153.Merged. You are welcome to print out these pages and use them in lab in the event that your manual is lost or stolen. You can also access this site to review lab resources, take quizzes, turn in assignments, and view your grades in the course.

Pre-laboratory assignments

Most pre-laboratory assignments (prelabs) are located in the lab manual, but will be submitted most of them on Blackboard before lab. Since the prelabs will often assist you in running the lab, you are encouraged to keep notes on your calculations so they can be used as a reference during lab. Pre-laboratory assignments must be submitted prior to the beginning of your normally scheduled lab session. If a lab is made up *before* the normally scheduled lab, prelabs need to be handed in at that time (i.e. a Tuesday pre-makeup for a Thursday lab). **You may not be allowed to participate in lab if your prelab assignment is not complete.**

Spring 2018 Course Outline

(subject to change)

Week number	Dates	Lab Experiment	Lecture topic
1	1/15-1/19	No lab. Recitation does not meet.	<i>Review</i>
2	1/22 – 1/26	Exp #1 – Introduction to FCH153 lab	<i>Review Organic</i>
3	1/29 – 2/2	Exp #2 – Freezing point depression	<i>Organic</i>
4	2/5 – 2/9	Exp #3 – Fragrant esters	<i>Polymers</i>
5	2/12 – 2/16	Exp #4a – Biodiesel	<i>Kinetics</i>
6	2/19 – 2/23	Exp #4b – Biodiesel calorimetry	<i>Nuclear</i>
7	2/26 – 3/2	Exp #5 – Polymers and metal polyacrylates <i>Biodiesel peer review in recitation</i>	<i>Equilibrium</i>
8	3/5 – 3/9	Exp #6a – Kinetics of peroxide decomposition <i>Complete Biodiesel lab report due No recitation</i>	<i>Acid/Base Equilibrium</i>
9	3/12 – 3/16	No Lab (<i>Spring break</i>)	<i>No lab</i>
10	3/19 – 3/23	Exp #6b – Kinetics data workup <i>in computer lab</i>	<i>Buffers/Titrations</i>
11	3/26 – 3/30	Exp #7 – Chemical Equilibrium	<i>Ionic Equilibrium</i>
12	4/2 – 4/6	Exp #8 – Acid standardization and pH	<i>Thermodynamics</i>
13	4/9 – 4/13	Exp #9 – Buffering Capacity of Natural Waters	<i>Thermodynamics</i>
14	4/16 – 4/20	Exp #10 – Aluminum Extraction and Analysis <i>Peer review</i>	<i>Review</i>
15	4/24 – 4/28	Lab Proficiency exam	<i>Review</i>

