

SOUTHERN MAINE COMMUNITY COLLEGE

South Portland, Maine 04106

Title: Chemistry for Emergency Response w/Lab **Catalog Number:** CHEM 103
Credit Hours: 4 with required lab **Total Contact Hours:** 45/30
Instructor: Rob Lindstedt. **Email:** rlindstedt@smccme.edu
Office: 200 Howe Hall
Office Hours: By appointment **(O) 207-741-5750**
Class Time: Monday (zoom) and Wednesday (LIVE) 10:30 A.M until 12:00 P.M with special
Lab Time from 12:15-1:15 on both Monday (zoom) and Wednesday (live)

Course Syllabus – Chemistry for Emergency Response w/Lab-Spring 2022

Co-requisite MATH 130 or 140, ENGL-075

Required Materials:

- Text: FEMA Publications, Chemistry for Emergency Response 3rd Edition **(This Text will be provided for you free of charge)**
- _ Labpaq for Chemistry for Emergency Response (I have e-mailed the information to all registered students, if you missed it, send me an email and I will resend it to you).

In Spring 2022 this course will be offered in hybrid mode, with weekly Zoom class meetings, online discussions and assignments, and weekly classroom lecture/hands-on sessions. Student engagement in all sessions will be required and documented. Strict procedures for screening and social distancing will be followed during any face to face class meetings.

Fire Science Learning Outcomes

Successful completion of an associate degree in Fire Science from Southern Maine Community College will prepare students to:

- 1) Analyze and apply proactive fire prevention and control methods for safe and cost-effective fire protection.
- 2) Analyze and apply reactive fire and emergency scene operations for safe and cost-effective fire protection.
- 3) Examine and appraise principles of supervision and management necessary for effective leadership and administration in the fire/rescue service.

COURSE DESCRIPTION

Course Description: This survey laboratory course is designed to acquaint the student with the broad principles of chemistry as they relate to application and hazards in the firefighting field. The survey includes basic chemical terminology, structure of matter, atomic bonding, molecular theory of matter, chemical and physical change, and the general states of matter, gases, liquids and solids. This course consists of a continued discussion of the more common hazmat elements, compounds they form, their uses, and their associated hazards. This course is completed with a thorough investigation into chemical and physical characteristics of hazardous materials as well as research into acid/base reactions and neutralization. Labs will be conducted by the student independent of scheduled class time.

Course Objectives

After successfully completing the course, the student will be able to:

- Have a conversant understanding of Chemical terminology
- Name an element name when given a chemical symbol.
- Identify a chemical symbol when given an element name.
- Explain the periodic table and its subdivisions.
- Describe the parts of an atom.
- Relate electron structure to chemical periodicity
- Identify the types of molecular bonding.
- Differentiate a compound as a salt or non-salt based on name or chemical formula.
- Classify salt and non-salt compounds based on sub-classification and associated hazards.
- Classify pure hydrocarbon and hydrocarbon derivative compounds with associated hazards when given chemical names or formulas.
- Identify chemical and physical properties of hazardous materials and their interrelationship.
- Evaluate compounds based on the chemical and physical properties.
- Learn typical skills associated with the handling, quantifying, and transferring of solids and liquids.
- Carry out chemical reactions while accurately noting and recording observations, make and report conclusions based on observations
- Graphically present data, and provide interpretation of the graphed data

Course Requirements

Students are expected to complete pre-class assignments, attend all classes, take notes, and actively participate in classroom discussions and any group assignments. There are weekly written assignments, and individual (and/or group) presentations. Quizzes and tests will also be used to assess student academic progress.

Student Classroom Behavior & Expectations

- ***Students are expected to attend all classes. You are expected to arrive to class on time, with your pre-class work done.*** See details below.
- ***Students are expected to stay engaged in class, whether via Zoom or in person.*** Stay on task. Keep your camera on. Please do not be distracted by personal discussions, electronic devices, etc. during class.
- ***Students are expected to submit original work unless other sources are clearly credited.*** Students are expected to equitably share the load in group work. Cheating will not be tolerated. Student's found cheating may result in penalizing actions up to and including a failing grade in this course following policies in the student code of conduct.
- ***Students are expected to prepare for class and complete all assignments.*** Readings and homework provide the foundation for class lectures, discussions, and projects. Weekly quizzes will be given over the assigned readings. Homework will be assigned each week and must be submitted at beginning of the next class. *You cannot pass this course without doing your homework every week!*
- ***Students are expected to take notes during class.*** Notes and handouts should be organized in your Task Book binder. You will be allowed to use your Task Book Binder for Exams.
- ***Students are expected to respect the class environment, fellow students and faculty.*** Listen thoughtfully when others speak, even if you disagree with what they are saying. Challenge your own notions. Defend your positions with facts.
- ***Students are expected to actively participate and think critically.*** This is necessary for knowledge sharing and to get the most from practice/application opportunities.
- ***Students are expected to set pagers, or cell phones on vibrate*** during class time and ignore unless emergency.
- ***Students are expected to not use tobacco of any kind in the classroom.*** Food and drinks should be used respectfully of others and the facility.
- ***Students are expected to doff hats and not wear any distracting attire*** during class time.

- ***Students will be held accountable.*** ... For working hard, staying engaged, persisting, asking for help as needed (earlier, rather than later), taking responsibility and holding yourself accountable, meeting expectations + mastering course materials.

Homework and Written Assignments

Assignments, typed in specified formats (APA, etc.) will be due as indicated in Brightspace. . All work not completed by the due date will automatically be reduced by 50% of the earned grade for the assignment. There will be a limited 1 week “Grace Period” for students to turn in any work not submitted on time. No credit will be awarded for work completed after the end of the 1 week “Grace Period”.

All written assignments (other than your class notes) are to be typed neatly, spell- and grammar-checked, and in PDF format before you submit them. There will be occasions where students will be asked to submit “hard copies” of assignments.

You will NOT be allowed to submit work (in Brightspace) in “PAGES” format. I can’t open them at my end.

Topical Outline of Instruction

1. Chemical Foundations
Scientific Method, and Classifying matter, hazard/risk assessment, and protective measures.
2. Atoms, Molecules, and Ions
Historical Chemistry, Atomic Structure, Molecules and ions, Periodic Table, Naming Compounds
3. Atomic Structure and Periodicity
Electromagnetic Radiation, Bohr Atom, Quantum Mechanics and Quantum Numbers, Atomic Orbitals, Electron Configuration, Periodic Trends. Bonding: General Concepts
Chemical Bonds, Electronegativity, Ionic and Covalent Bonds, Lewis Structures and the Octet Rule, Bond Resonance, the VSEPR Model.
4. Inorganic Chemistry: SALTS
Compounds, ions, cations, complex ions, nomenclature, bonding, hazards, Empirical Formulas
5. Inorganic Chemistry: NON-SALTS
Compounds, ions, cations, complex ions, nomenclature, bonding, hazards, Empirical Formulas
6. Organic Chemistry: Pure Hydro Carbons
Nomenclature, bonding, structure, Radicals and hazards
7. Hydrocarbon Derivatives
Nomenclature, bonding, structure, and hazards
8. Chemical and Physical Characteristics of Hazardous Materials
Implications on hazards, effect/cause,
9. Acid Base Reactions, Ph, Concentrations, and Neutralization

The general expectation is that one lab per week will be completed during the 16 week semester.
See Lab sequence for more information

Topical Outline of Independent Labs: Lab Sequence.....

Week	Lab title	
Week 1	Getting Started: 3 hours estimated (prerequisite)	
Week 2	Laboratory Safety: estimated 2 hours (prerequisite)	
Week 3	Laboratory Techniques and Measurements – estimated 4 hours	
Week 4	Separation of a Mixture of Solids – 1 overnight drying period + 3 hours	
Week 5	Anions, Cations, and Ionic Reactions – 3.5 hours	
Week 6	Oxidation-Reduction Activity Series – 3 hours	
Week 7	Observations of Chemical Changes – 3.5 hours	
Week 8	Identification of Gases – 3.5 hours	
Week 9	Equilibrium and Le Châtelier's Principle – 4.5 hours	
Week 10	Beer's Law – 3 hours	
Week 11	Colligative Properties and Osmotic Pressure – 4 hrs	
Week 12	Titration for Acetic Acid in Vinegar – 3 hours	
Week 13	Using Buffers – 3 hours	
Week 14	Caloric Content of Food – 2.5 hours	
Week 15	Chromatography of Food Dyes – 3 hours EXTRA CREDIT	
Week 16	Stoichiometry of a Precipitation Reaction - 1 overnight drying period + 3 hours EXTRA CREDIT	

Grading

Your final grade for this course will be based on the following:

1. Laboratory Lab reports – 15%
2. Two examinations – 30% (total-midterm and a comprehensive final)

Exam 1: On or about Week 8

Exam 2: On or about Week 16

Exam dates are estimates. These exams will be cumulative, material included will be announced in class before the exam. Each exam will be one class period long. Make up exams will be given only in extreme situations and with specific permission from the instructor. No more than one exam may be taken as a make-up during the semester.

3. Chapter Quizzes “BIG Quizzes” – 20%

There will be 6 to 7 major announced quizzes. These will be given in class.

4. Small Quizzes- 10%

The professor reserves the option to give additional announced or unannounced smaller weekly quizzes. These Quizzes will be based on Guided Pre-class Note Taking Guides (open note) and zoom lecture content.

5. Case Study Reports(writing assignments)-15%

Throughout the semester students will be asked to do some fundamental research related to Emergency response, hazardous material, and Chemistry.

6. GPCNTG: 10%: it is imperative that students attend zoom sessions and classroom sessions prepared. The best method of preparation is to read the assigned material and take meaningful notes regarding the content. Due to the very technical nature of the course content the professor will provide a GUIDE covering the assigned reading’s most important components.

7. **Extended absences (3) will result in you being dropped from the class. Additionally each late arrival to class or early departure from class will count as ½ of an absence. Absences totaling to (3) will result in an (AF) grade for the course. Your presence, and participation in this course is critical to your understanding of the course content.**

Grading Synopsis:

Labs:	15%
Exams(2):	30% (15% each)
Chapter Quizzes:	20%
Small Quizzes	10%
G-PCNTG:	10%
Reports:	15%

EXPECTATIONS

Attendance + Participation

Attendance and engagement will be recorded multiple times during Zoom and face to face classes and will affect student’s course grade. SMCC requires instructors to report the names of students to the registrar’s office who stop attending class. *Missing a portion of a Zoom or face to face class will be recorded as ½ an absence. Instructor will report students as no longer attending after two consecutive – or a total of three total absences from the class, resulting in a grade of “AF” being recorded for the student.*

FMI, please refer to the SMCC Student Handbook. Students are expected to notify the instructor, in advance, concerning absences. Students are responsible for all material – and deadlines – regardless of absences.

End-of-Course Evaluation

In order to gain access to final course grades, students must complete evaluations for each course attended at SMCC. Evaluations are submitted online and can be accessed through the student portal site. Students can access the course evaluation report beginning two weeks before the end of classes. The deadline for submission of evaluations occurs 24 hours after the last day of classes each semester. Instructors will announce when the online course evaluation is available.

ADA Statement

Southern Maine Community College is an equal opportunity/affirmative action institution and employer. For more information, please call [207-741-5798](tel:207-741-5798). **If you have a disabling condition and wish to request accommodations in order to have reasonable access to the programs and services offered by SMCC, you must register with the Disability Services Coordinator, Sandra Lynham, who can be reached at 741-5923.** Further information about services for students with disabilities and the accommodation process is available upon request at this number. Course policies about online testing are modified to suit each individual's accommodations.

SMCC Pay-for-Print Policy

This policy identifies the cost per page for black and white as well as color printing in varying page sizes. Specifics of the policy are outlined below:

Per Page Costs

Each semester students receive a \$20 printing credit. The balance resets at the end of the semester and any remaining credits are removed. The cost varies depending upon page size and whether printing is done in black and white or color.

- a. There is a \$0.10 per page fee for standard 8.5" by 11" black and white documents.
- b. The reverse sides of duplex (double-sided) documents are free.
- c. There is a \$.50 per page fee for standard 8.5" by 11" color documents.
- d. There is a \$.20 per page fee for 8.5" by 14" (legal) or 11" by 17" (tabloid) black and white documents.
- e. There is a \$1.00 per page fee for 8.5" by 14" (legal) or 11" by 17" (tabloid) color documents.

Duplex charges (printing on both sides of a page) work in the following fashion: One page is \$0.10, two pages are \$0.10, three pages are \$0.20, and four pages are \$0.20, *etc.* The flipsides are free, but another sheet of paper is \$0.10. Please be aware that a document with any color at all (when printed to a color printer) will by default be printed in color. You are responsible for setting the print job to print black and white if you do not need color. For directions, please go to the IT Help tab in My SMCC.

How does it work?

The College's pay-for-print system monitors printing on all printers (including those in general access labs, library printers, the Academic Achievement Center, Noisy Lounge and technology labs). Students can check the number of pages they have printed by using the Printing Balance tool available on SMCC computers (located in the lower right corner of the screen, near the clock). Departments with work study students who need to print documents for the department should contact the HelpDesk at 741-5696 to have a special account set up.

Refunds

Print jobs are eligible for a refund in the event of mechanical or electronic error on the part of the printer, print server, or software used to submit the job. Jobs are not eligible for a refund in cases where the job was not set up correctly, was submitted multiple times, or the student is not satisfied with the result. To request a refund, please bring the offending print to the IT Department in the basement of the Ross Technology Center. Refunds will be granted in the form of a credit to the student's account.

Why is SMCC charging for printing?

The pay-for-print system is an effort to control escalating printing costs. Charging for printing helps offset the increasing cost of supplies and encourages students to conserve resources. To find ways to reduce your printing charges, please go to the IT Help tab on My SMCC. If you have questions about the pay-for-printing policy or your printing charges, please contact the HelpDesk at 741-5696 or send an email to helpdesk@smccme.edu.

Add-Drop Policy

Students who drop a course during the one-week “add/drop” period in the fall and spring semesters and the first three days of summer sessions receive a 100% refund of the tuition and associated fees for that course. Please note any course that meets for less than the traditional semester length, i.e., 15 weeks, has a pro-rated add/drop period. There is no refund for non-attendance.

Withdrawal Policy

A student may withdraw from a course only during the semester in which s/he is registered for that course. The withdrawal period is the second through twelfth week of the fall and spring semesters and the second through ninth week of twelve-week summer courses. This period is pro-rated for shorter-length courses. To withdraw from a course, a student must complete and submit the appropriate course withdrawal form, available at the Enrollment Service Center (no phone calls, please). The designation “W” will appear on the transcript after a student has officially withdrawn. A course withdrawal is an uncompleted course and may adversely affect financial aid eligibility. Failure to attend or ceasing to attend class does not constitute withdrawal from the course. There is no refund associated with a withdrawal.

Plagiarism Statement

Adherence to ethical academic standards is obligatory. Cheating is a serious offense, whether it consists of taking credit for work done by another person or doing work for which another person will receive credit. Taking and using the ideas or writings of another person without clearly and fully crediting the source is plagiarism and violates the academic code as well as the Student Code of Conduct. If it is suspected that a student in any course in which they enrolled has committed such a violation, the faculty member should refer the matter to the College’s Disciplinary Officer and appropriate action will be taken under the Student Code of Conduct. **Sanctions may include suspension from the course and a failing grade in the course.** Students have the right to appeal these actions to the Disciplinary Committee under the terms outlined in the Student Code of Conduct.

Chemistry Lab Class (CHEM 103) Information Spring 2022

I am pleased to say that your Science Interactive course has been created and is ready for you to get started. Students can enroll by creating their account or logging in through the unique enrollment link.

Cost of Lab Kit: **LP-2126-CK-03** has a cost of \$292.00 (we kept the cost lower than you would need to expend for the A&P I Textbook)....

The Text is FREE! (I will have it posted to Brightspace soon)

To sign in to the on-line/hands-on lab assignments/experiments follow these directions:

- 1) The link for students is: <https://myhol.holscience.com/enroll/bsdr-chxr-kptr-kkfd> This link will take a student directly to the SMCC CHEM 103 course and will then prompt them to create an account.
Students

To Order Your Lab PACK:

- 1) Students should follow these instructions after following the enrollment link-
<https://studenthelp.scienceinteractive.com/a/1132195-how-do-i-order-my-kit-through-hol-cloud>

LABS/ACTIVITIES

This is the list of labs you will be involved with this semester. The two PRE_REQUISITES must be completed before you can even attempt one of the lessons/labs. I suggest you get started on those as soon as possible. You will NOT NEED your lab kit to do the two pre-requisite assignments.

Pre-Requisites

[Getting Started](#) -3 hours

[Laboratory Safety](#) – 2 hours

Lessons and labs

[Laboratory Techniques and Measurements](#) – 4

[Separation of a Mixture of Solids](#) – 1 overnight drying period + 3 hours

[Anions, Cations, and Ionic Reactions](#) – 3.5 hours

[Oxidation-Reduction Activity Series](#) – 3 hours

[Observations of Chemical Changes](#) – 3.5 hours

[Identification of Gases](#) – 3.5 hours

[Equilibrium and Le Châtelier's Principle](#) – 4.5 hours

[Beer's Law](#) – 3 hours

[Colligative Properties and Osmotic Pressure](#) – 4 hrs

[Titration for Acetic Acid in Vinegar](#) – 3 hours

[Using Buffers](#) – 3 hours

[Caloric Content of Food](#) – 2.5 hours

[Chromatography of Food Dyes](#) – 3 hours

[Stoichiometry of a Precipitation Reaction](#) - 1 overnight drying period + 3 hours

Helpful Resources:

In case you or your students run into anything else during the semester, we've created several resources to help:

- **[Student Help Center](#)**: This help center is packed full of helpful articles, resources, and more to help your students with navigating Cloud, troubleshooting issues, and more. It's a great resource for both you and for them if questions come up.
- **[Instructor help center](#)**: This site has a library of instructions and help articles to walk you through using Cloud, helping your students, and more.
- **Customer Service (students)**: Please provide students who need further assistance with this help article: [How do I contact Customer Service?](#)
- **Customer Service (instructors)**: If you or other instructors need further assistance, I am available to help support you directly.