Introductory Organic Chemistry Lecture ~ CHM 124
Course Information & Syllabus ~ Spring Semester, 2021

Instructor

Cindy McGregor-Graham, PhD
Email: cbrittain@uri.edu, or via Brightspace
Office phone: 401-874-2028
Campus office: Beaupre 117A
Zoom Meeting Room: 203 419 8944
Office Hours: in Brightspace and/or Starfish

Teaching Assistant

Quentin Mylie
Email: via Brightspace
Zoom Meeting Room: 441 246 9151
Online Help Sessions: TBD, in Brightspace

Course Description and Goals

CHM 124 is a second-semester freshman organic chemistry course, taken after successful completion (C- or higher) of an introductory or general chemistry course (at URI: CHM103, CHM 101, or CHM 112).

The course is designed to not only advance students' scientific knowledge, but also increase their competency in the critical thinking skills identified as essential to success in their programs of study.

Topics include the elementary principles of organic chemistry, and the physical and chemical properties of the primary organic functional groups. The emphasis is primarily on aliphatic compounds, particularly those with physiological significance, including simple and complex carbohydrates, amino acids and proteins, and both dietary and membrane lipids.

Specific learning outcomes for each topic are provided within the Brightspace Content lessons and in the CHM 124 Skills Practice Book.

Required Learning Materials

- *CHM 124 site within the Brightspace platform:* Content Lessons, Skill Checks, Assignments, Discussions
- *Digital Platform:* "OWLv2: Chemistry for Today: General, Organic, and Biochemistry, Seager/Hansen, 9th Edition;" purchase from Cengage.com or Bookstore (6-month = $105, 24-month = $120). *Course Key* = E-FHXLR9JC698Y8

Students from recent CHM 103 sections should *still have* access to OWLv2 and the eReader textbook. Students from CHM 101/112 should purchase 6-month access to OWLV2 and the eReader from either Cengage.com or the URI Bookstore.

For students who prefer a hardcopy textbook to an online eReader – *ANY* recent edition of the Seager general / organic / biochemistry hardcopy textbook (published within the last decade) can be used.

- *CHM 124 Skills Practice Book:* Dr. Graham's Skills Summaries, One Page Lessons, and Practice Exam Questions; pdf files posted within the CHM 124 Brightspace site; printed, bound hardcopies available at URI Bookstore ($25)
- *Scientific calculator*: Logarithm and exponent functions may be needed for pH calculations

Zoom Class Meetings

Section 001: M W 3:00 – 4:15 PM Zoom Meeting ID: 203 419 8944

The most successful students in this course are those who consistently and diligently *prepare* for class, *participate* fully in each class meeting, and make a strong effort to *practice* the required skills – and thus become confident, competent and efficient at analyzing and solving organic chemistry problems.

Students should be familiar with and adhere to the *Community Standards of Behavior: University Policies and Regulations* in the *University Student Handbook.* Thus students should arrive on time to each class meeting, and remain engaged and attentive until class has concluded. Computers, tablets, and cell phones should be turned off and put away during class.

Classroom Protocol

The Brightspace Learning Management System (LMS) serves as the classroom for the fully-online CHM 124 course.

In an online learning environment, attendance is measured by each student's active presence in the LMS and OWL sites, and the submissions made to both sites. The importance of regular log-ins, active participation, and active utilization of the LMS Content lessons cannot be overstated, as these contribute to both students' learning quality and overall course grade.

Students should make a habit of checking their Class Progress in Brightspace, particularly their Content progress: the Topics (Content Lessons) visited, the number of visits to each page, and the total time invested in working that page.

Grading and Testing Policies

Each student's course grade will be determined from the results of the Brightspace LMS and OWLv2 online skill practice systems, four Exams, and the comprehensive Final Exam:

LMS Pre-Req Content lessons, Skill Checks, Assignments, Discussions	14%
OWLv2 (Online Web Learning) Homework	14%
Four Exams, administered via both OWL and Brightspace LMS (14% each)	56%
Comprehensive Final Exam, administered via Brightspace LMS	16%
	100%

The Final Exam score may replace the grade of any one of the four Exams that is missed or lower than the Final Exam score; thus the Final may count as much as 30% of a student's overall grade. This policy is designed to assist those students who miss an exam due to injury, illness, or family need. These students are able to focus on rest and recovery, or on meeting family needs, without the additional stress of arranging for a make-up exam.

Extended time testing accommodations can be provided for students with a documented disability. These students should contact the course instructor as early as possible with documentation from the Disability Services for Students Office (DSS), so these arrangements can be made.

No extra credit assignments will be given (other than those designated in OWLv2 and Brightspace), and students should expect that the standard grading scale will be applied:

90%+ = A- / A; 80-89% = B- / B / B+; 70-79% = C- / C / C+; 60-69% = D / D+; < 60% = F.

Grades in CHM 124 are *earned* by demonstrating proficiency in the required skills. These skills include critical thinking and problem solving: the ability to apply organic chemistry concepts to relevant scenarios, and predict physical and chemical properties from a study of a compound's molecular structure (*i.e., explain how Structure determines Function*).

Each student's grade will be determined by the quality of the student's performance on the course work items. The grade is not open to negotiation, and it is not dictated by what's needed to progress in the student's chosen program of study. Each student's grade must be earned by achieving proficiency in (and ideally, mastery of) the skills identified as essential to ongoing success in the student's degree program.

Course Work Items:

1. Brightspace LMS Skill Checks, Assignments, Discussion

The Brightspace Skill Checks will probe at your understanding of key skills, and push you to think more deeply and critically about fundamental concepts. Each consists of a pooled set of questions, meaning a fixed number of questions will be selected at random from a larger pool each time you open the Skill Check.

Each Skill Check can be taken up to three times. Correct answers and limited feedback will be provided for any answered questions. After reviewing the feedback, you can re-take the Skills Check two more times, to answer a different set of questions, and to maximize your learning.

Occasionally, Written Reflection assignments will be posted in Brightspace; each completed and submitted assignment will also contribute to your LMS % score.

The Brightspace Discussions provide a way for you to share and talk over your work with your classmates, with Dr. Graham, and with TA Quentin Mylie. Discussion posts that share worked solutions and/or discuss problem-solving strategies will also contribute to your LMS % score.

Each student's LMS % score is then the ratio: total LMS points earned (Skills Check points + Assignment points + Discussion contributions) / the number of required points possible (Skills Check points + Assignment points).

2. OWLv2 (Online Web Learning) System

The OWLv2 (Online Web Learning) System was designed to help students both learn and practice the skills needed for success in their chemistry course.

Three types of assignments contribute to the OWL portion of each student's grade: 1) mastery assignments (with pooled, algorithmic questions), 2) non-mastery multimedia activities (with tutorials and/or videos), and 3) end-of-chapter (EOC)

problems. The mastery assignments require that you answer a certain number of questions correctly out of a Group (usually two out of three). The questions are pulled at random from a larger pool of questions each time you Retry the Group.

You'll have one submission for each OWL assignment, but up to ten attempts to complete each question within the assignment before you submit the completed assignment for credit. This means you can cycle through a Group of questions – or choose to Save and Exit the assignment (and return to it later) – as many as ten times.

Your objective should *NOT* be to click through assignments until each question shows the green check of a correct response. It should be to carefully work your way through each assignment – trying to learn as much as you can. This means working the more challenging Mastery questions several times, to draw new questions from the pool and get additional skills practice. Please plan to take full advantage of OWL's ability to provide both skills practice opportunity and instant feedback on how you're progressing in building the needed skills.

So that you'll stay on track and on time with your skills practice, each OWL homework assignment will have a *due date* (corresponding to the timing of that topic in the course), and an *unavailable date* (corresponding with an exam or other course milestone). If you've started an assignment prior to its date, you can continue working on the assignment until the unavailable date; however a 10% late penalty will apply. Due dates of missed OWL assignments will not be extended.

Mastery and end-of-chapter OWL assignments are required; the non-mastery activities are extra credit. Each student's OWL % score is then the ratio: total points earned (required + extra credit) / the number of required points possible.

Be aware that there's a learning curve to using OWL's ChemDoodle structure-drawing software. A tutorial is provided, but you should start working the assignments immediately, so you'll have time to build proficiency, and to get help if needed. And realize you should always make a practice of drawing molecular structures on paper first, and then attempting to draw the structures in OWL.

3. Exams and Comprehensive Final Exam

The exams will have a variety of question types, including multiple-choice, short-answer, and structure drawing. The first four exams will be given in both online systems: OWL (for structure-drawing and nomenclature problems) and Brightspace (conceptual and other multiple choice questions). The Final Exam will have 100 multiple choice questions, and will be given entirely in Brightspace.

Exam questions will come directly from the content presented and discussed in the online systems. Exam questions are likely to be similar to the problems in the OWL online study system, the recommended problems in the Seager textbook, and the practice exam questions in the Skills Book pdf files.

Students should commit to working as many of these problems as possible as practice for the exams. The goal is to become confident, competent and efficient at analyzing and solving problems. The students who get the *MOST* practice solving problems tend to have the greatest success in science and math courses.

Additional Study Help Resources

Regardless of how well or how poorly you're doing in a given course, there are ways to improve your learning and studying. URI's Chemistry Department (Beaupre), and the Academic Enhancement Center (AEC, at Roosevelt Hall)) and Writing Center (Roosevelt Hall) offer several kinds of support to help students improve their learning and academic performance.

- ***Tutoring support from Dr. Graham and/or TA Quentin Mylie, at Zoom office hours or via Brightspace Discussion.***

Dr. Graham's office hour schedule will be available to you through Brightspace and Starfish. TA Quentin Mylie's Zoom help sessions will be listed in (and can be accessed through) Brightspace.

Unless you have a confidential question regarding your graded work in the course, please considering posting your inquiry to the Brightspace *Discussion,* so your classmates can also benefit from the answer(s) to your question.

When emailing instructors: use a concise, descriptive subject line; include your full name, chemistry course and section number, and make sure the question you asked or the information you convey in the message is clear and complete.

- ***CHM Tutoring, provided by Graduate Teaching Assistants at the Online Chemistry Help Office***

The Graduate Students who teach the various chemistry laboratory courses provide online tutoring via their WebEx CHM Help Office hours. A complete schedule of CHM TA WebEx office hours is available in the CHM 124 Brightspace site.

The TAs listed as teaching the CHM 126, 226, or 292 Organic Chemistry labs will be most familiar with the content of the CHM 124 lecture course.

- ***STEM Peer Tutoring, provided by the Academic Enhancement Center (AEC)***

STEM Tutoring helps students navigate 100- and 200-level math, chemistry, physics, biology, and other courses. The STEM Tutoring program will offer free online peer-tutoring in Spring 2021. Undergraduates in introductory STEM courses have a variety of small group times to choose from, and can select occasional or weekly appointments.

All tutoring appointments should be made through the TutorTrac system. The TutorTrac application is available through URI Microsoft 365 single sign-on and by visiting aec.uri.edu.

More detailed information and instructions can be found at uri.edu/aec/tutoring.

- ***Academic Coaching at the Academic Enhancement Center (AEC)***

The AEC's academic skills and strategies programs help students identify their individual planning and studying needs in this or any other course, and can teach you to implement new, more effective ways of studying, planning, managing time and work, and dealing with challenges like procrastination and motivation.

The AEC's three academic skills and strategies programs will be offered both online and in-person in Fall 2020. For more information on these programs or assistance with setting an appointment, visit https://web.uri.edu/aec/academic-skills/, or contact Dr. Hayes directly at davidhayes@uri.edu.

  - *UCS160: Success in Higher Education* is a one credit course, offered each semester to all undergraduates on learning how to learn and excel in college academics.
  - *Academic Consultation* sessions are 30-minute, one-to-one appointments that students can schedule online by visiting the AEC on Starfish and making an appointment with Dr. David Hayes, the AEC's academic skills development specialist.
  - *Study Your Way to Success* is a self-guided web portal connecting students to tips and strategies on studying and time management related topics.

Study Help Advice

Whether you're seeking help from Dr. Graham, a Teaching Assistant, or AEC Tutor, you'll want to come to your tutoring session *on time* and *fully prepared*, to make the discussion as productive and efficient as possible. This means that you should bring all relevant study/reference materials with you to the session.

These include:

- Your CHM 124 *Skills Practice Book*
- Your notebook of worked homework problems and lecture notes
- For help with the OWLv2 online homework – send an email message from *within* that particular assignment, then bring your laptop (or hand-written notes and/or a screen print that *clearly* indicate that assignment and question).
- And the most important item – your *written list* of specific questions and/or your goals for the help session.

Brightspace (LMS) Help

- Information Technology (IT) Services website: https://its.uri.edu/
- IT Service Desk (staffed most days 8 AM – 8 PM): 401-874-4357
- Student Key Information Technology (IT) Services website: https://its.uri.edu/student-key-services/
- IT Password Resources: https://its.uri.edu/passwords/
- IT Brightspace Resources: https://its.uri.edu/services/94530c3f5458461a0009654227972125b3e8f9abd6 /

Important Spring Semester Deadlines

- *Last day of e-Campus open add period:* Monday, February 1
- *Last day of e-Campus add with permission number:* Monday, February 8
- *Last day for students to drop courses via e-Campus with no transcript designation:* Tuesday, February 16
- *Last day for students to drop courses via e-Campus (with drop designated on transcript):* Tuesday, March 9
- *Mid-term progress reports posted in e-Campus:* Wednesday, March 17

Basic Needs Resources

Any students who face challenges securing their food, housing, or learning resources and believe this may affect their course performance are urged to contact Jacqui Tisdale (jtisdale@uri.edu) in the Dean of Students Office for support. If you're comfortable doing so, please also notify Dr. Graham, as this will enable her to provide any resources that she may possess.

COVID-19 Statement

The University is committed to delivering its educational mission while protecting the health and safety of our students, by minimizing the potential spread of COVID-19 within our community. While the university has worked this summer to create a healthy learning environment for all, it is up to all of us to ensure our campus stays that way.

As members of the URI community, students are required to comply with standards of conduct and take precautions to keep themselves and others safe. Students are required to comply with Rhode Island state laws, including the Rhode Island Executive Orders related to health and safety, ordinances, regulations, and guidance adopted by the University as it relates to public health crises, such as COVID-19.

Students should be familiar with and adhere to the *Community Standards of Behavior: University Policies and Regulations* in the *University Student Handbook.*

An addendum on policies and guidelines concerning students' obligations during this crisis has recently been integrated into the Student Handbook. These obligations include:

- Wearing of face masks by all community members when on a URI campus in the presence of others
- Maintaining physical distancing of at least six feet at all times
- Following state rules on the number of individuals allowed in a group gathering
- Completing a daily health self-assessment also available through the Rhody Connect app before coming to campus
- Submitting to COVID-19 testing as the University monitors the health of our community
- Following the University's quarantine and isolation requirements

If you exhibit symptoms, you must remove yourself from public spaces, and stay at home or in your room. You must also notify URI Health Services via phone at 401-874-2246. But you can continue working online to stay current in your studies – via the Brightspace Lessons, the *Skills Practice Book,* and the OWLv2 online homework system.

Academic Honesty

Academic dishonesty in any form is considered a serious offense, and disciplinary action will be taken immediately. The URI policy on academic honesty is detailed in the student handbook (available online), and it is summarized here:

Students are expected to be honest in all academic work. A student's name on ANY written work shall be regarded as assurance that the work is the result of the student's own thought and study. Work should be stated in the student's own words, and produced without assistance.

The following are examples of academic dishonesty:

- *Unauthorized possession or access to exams.*
- *Unauthorized communication during exams.*
- *Unauthorized use of another's work or preparing work for another student.*
- *Taking an exam for another student.*
- *Altering or attempting to alter grades.*
- *Unauthorized use of notes or electronic devices to gain an advantage during exams.*
- *Facilitating or aiding another's academic dishonesty.*

When there is an allegation of academic dishonesty, the instructor may:

- ***Fail the student for the assignment, or recommend that the student fail the course.***

CHM 124-001 Class and Exam Schedule ~ Spring 2021

Timing	*Monday*	*Wednesday*	*Work Items*
Week 1 1/25 – 1/29	***Advising Day***	Organic Compounds: Alkanes Unsaturated Hydrocarbons	Skill Checks, Written Reflections, OWL Assignments
Week 2 2/1 – 2/5	Organic Compounds: Alkanes Unsaturated Hydrocarbons	Organic Compounds: Alkanes Unsaturated Hydrocarbons	Skill Checks, Written Reflections, OWL Assignments
Week 3 2/8 – 2/12	Unsaturated Hydrocarbons	Unsaturated Hydrocarbons	**Exam 1** (Friday 2/12 – Sunday 2/14) Skill Checks, OWL Assignments
Week 4 2/15 – 2/19	Unsaturated Hydrocarbons	Alcohols, Phenols, and Ethers	Skill Checks, Written Reflections, OWL Assignments
Week 5 2/22 – 2/26	Alcohols, Phenols, and Ethers	Alcohols, Phenols, and Ethers	Skill Checks, OWL Assignments
Week 6 3/1 – 3/5	Aldehydes and Ketones	Aldehydes and Ketones	**Exam 2** (Friday 3/5 – Sunday 3/7) Skill Checks, OWL Assignments
Week 7 3/8 – 3/12	Aldehydes and Ketones	Carboxylic Acids and their Derivatives	Skill Checks, OWL Assignments
Week 8 3/15 – 3/19	Carboxylic Acids and their Derivatives	Carboxylic Acids and their Derivatives	Skill Checks, OWL Assignments
Week 9 3/22 – 3/26	Amines and Amides	Amines and Amides	**Exam 3** (Friday 3/26 – Sunday 3/28) Skill Checks, OWL Assignments
Week 10 3/29 – 4/1	Carbohydrates	Carbohydrates	Skill Checks, OWL Assignments
Week 11 4/5 – 4/9	Carbohydrates	Carbohydrates	Skill Checks, OWL Assignments
Week 12 4/12 – 4/16	Lipids	Lipids	**Exam 4** (Friday 4/16 – Sunday 4/18) Skill Checks, OWL Assignments
Week 13 4/19 – 4/23	Proteins	Proteins	Skill Checks, OWL Assignments
Week 14 4/26 – 4/30	***Last Day of Classes*** Proteins	***Reading Days***	Skill Checks, OWL Assignments
Week 15 4/26 – 4/30	***Final Exam Week***	***Final Exam Week***	**Final Exam** (Wednesday 5/5 – Saturday 5/8)

Skills you should be bringing with you from your CHM 103 or CHM 101 pre-req course:

- Describe the *two* ways atoms can achieve the stability of a noble gas electron configuration (gaining / losing electrons to become ions; sharing electrons / forming covalent bonds within molecules).
- Predict the charges on metal and nonmetal ions (for the Representative elements). Explain the concept of being atoms/ions being "*isoelectronic,*" and the relative sizes of isoelectronic atoms/ions.
- Given the name of an ionic compound, provide the chemical formula. Given the chemical formula of an ionic compound, provide the name.
- Given the chemical formula of a compound, identify it as *ionic* or *molecular (covalent)*.
- Predict the covalent bonding patterns (# bonds, # lone pairs) of the nonmetal atoms. Given the chemical formula of a molecular (covalent) compound, draw the Lewis structure. Explain the concept of "*isomers*" – *different* molecules that have the *same* chemical formula (for structural / constitutional isomers, the atoms are connected in a different order).
- Determine the *electron group* and *molecular geometries* of the central atoms in Lewis structures.
- Use electronegativity values to determine the *polarities* of covalent bonds in Lewis structures.
- Identify the inter-"*particle*" attractive forces that elements and/or compounds can use to interact with others of their own kind. Explain the relative strengths of these various inter-"*particle*" attractive forces (covalent bonds, metallic bonds, ionic bonds, hydrogen bonds, dipolar forces, IDDI/dispersion forces). Draw sketches to illustrate the "particles" interacting with one another (e.g., hydrogen bonding between molecules).
- Consider *ALL* of the factors that affect the physical state of a compound (mass, surface area, strength of inter-"*particle*" attractions), and then predict the states of matter and melting/boiling point behavior from chemical formulas and/or molecular structures.
- Identify the inter-"*particle*" attractive forces that elements and/or compounds can use to interact with *SOLVENT* molecules. Explain the "*like dissolves like*" rule for solubility, and predict the solubility of given solutes in specified solvents, based on an assessment of their chemical structure. Draw sketches to show solute "particles" and solvent molecules interacting with one another (e.g., hydrogen bonding, hydration of dissociated ions).
- Determine the oxidation *number* (oxidation *state*) of an atom in an element or compound. Identify the atoms that are being *oxidized and reduced* in a reaction (and the oxidizing and reducing *agents*). Recognize when an ion or an atom in a molecule is "*highly oxidized*" or "*highly reduced*."
- Write equilibrium constant expressions for reversible reactions: K = [products]/[reactants]. Interpret equilibrium constant values (K), in terms of the relative quantities of reactants and products at equilibrium. Use Le Chatelier's Principle to predict the effect of a change made to a system at equilibrium.
- Explain the Bronsted-Lowry and Arrhenius definitions of an acid and base. Write chemical reactions that illustrate an acid donating a proton to produce its conjugate base, and a base accepting the proton to produce its conjugate acid.
    - Specifically, write chemical reactions that illustrate an acid dissociating (ionizing) in water by donating a proton to a water molecule. And write chemical equations that illustrate a base ionizing in water by accepting a proton from a water molecule.
- Explain the terms "*strong*" and "*weak*" mean when applied to acids and bases.
    - Use equilibrium constants to compare the strength (proton-donating ability) of *weak* acids. These would be acid dissociation constants, K_a.
    - Use equilibrium constants to compare the strength (proton-accepting ability) of *weak* bases. These would be base ionization constants, K_b.
- Show/describe the self-ionization of water that occurs in every aqueous solution. Use the *Ion Product of Water* (K_w) to convert between hydroxide and hydronium ion concentrations in any aqueous solution.
- Explain the pH and pOH methods of expressing the hydronium and hydroxide ion concentrations. Use the expression derived from the *Ion Product of Water* (pH + pOH = 14) to convert between pH and pOH for any aqueous solution.
- Explain the composition and function of a *buffer*, a solution that changes pH only slightly when a small amount of strong acid or strong base is added. Use the K_a expression and value to predict the pH of a buffer made from a particular weak acid/conjugate base combination. *Most important:* pH = pK_a when [HA] = [A$^-$].

Check of Introductory/General Chemistry Pre-Requisite Skills from CHM 103/CHM 101

Consider the compounds *ethanol* and *sodium hydroxide*.

ethanol: $CH_3–CH_2–OH$ *sodium hydroxide:* NaOH

Ethanol is the alcohol in alcoholic beverages, and is produced by the fermentation of sugars by yeasts. It's also used as a solvent, an antiseptic, a fuel, and as the active fluid in modern thermometers. It is a volatile, flammable, colorless liquid, with a boiling point of 78.4 ^{o}C.

Sodium hydroxide, also known as lye, is a highly caustic metallic base and an alkali salt. Available in pellets, flakes, and granules, NaOH is a white solid with a melting point of 318 ^{o}C. You should recall that in water, NaOH is a *strong base.*

a) What type of "particles" (atoms, ions, or molecules) is each compound made of?

ethanol: _____ *sodium hydroxide:* _____

b) How are the particles in each compound interacting with one another? That is – what is the attractive force between the "particles" of ethanol? And what is attractive force between the "particles" of sodium hydroxide?

ethanol: _____ *sodium hydroxide:* _____

c) Which of these interactions is *stronger*, the attractive force between the ethanol "particles," or the attractive force between the sodium hydroxide "particles?"

_____

d) For your answer above, *explain WHY* this is the stronger attractive force. Is your answer *consistent* with the physical states of these two compounds?

e) *Illustrate your explanation* – draw a sketch that shows ethanol "particles" interacting with one another, and a sketch that shows the sodium hydroxide "particles" interacting with one another.

f) As noted above, ethanol is *volatile* (relatively low boiling point of 78.4 ^{o}C), and it is also *flammable*. Explain the difference between the *boiling* (volatility) and *burning* (flammability) of ethanol.

g) Write a balanced chemical equation for the combustion of ethanol. Draw Lewis structures of all reactant and products. What *type* of reaction is this, and how can you tell?

h) Ethanol is *miscible* with water, and sodium hydroxide can form a 50% w/w *saturated* solution with water. What does *miscible* mean? What does *saturated* mean?

i) Draw sketches of the ethanol and sodium hydroxide "particles" *interacting* with water molecules. Then state briefly (on the basis of their chemical structures) *WHY* you would expect both compounds to be water-soluble.

j) An aqueous solution of sodium hydroxide will conduct electricity, but an aqueous solution of ethanol cannot. Explain how your sketches above of ethanol and sodium hydroxide particles in water illustrate why aqueous sodium hydroxide is conductive, but aqueous ethanol is not.

k) As noted above, sodium hydroxide is a "*strong" base*. Explain what this means. Determine the pH of a 0.010 M solution of sodium hydroxide.