



SEMESTER

Life and Natural Sciences Department School of Science, Technology, Engineering, and Mathematics

Program Name: Chemistry
Course Name: Chemistry for Biological Sciences – Laboratory
Course Number: CHM105 **Section:** BXX
Meeting Day(s) & Time(s):
Credits: 4 (combined lecture and lab)
Contact Hours: 3
Text: *Essential Laboratory Manual for General, Organic and Biological Chemistry, 2nd Edition*, Timberlake, Karen; Pearson Publishers, 2011.
Instructor Name:
Office Location:
Office Hours:
Owens CC Email:**
Phone:
Additional Contact:

CATALOG DESCRIPTION: This course covers basic concepts of inorganic, organic and biological chemistry for allied health students. Topics include measurements, atomic structure, periodic trends, bonding and nomenclature, chemical reactions and quantities, solutions acids and bases, physical and chemical properties of organic compounds especially related to functional groups and biomolecules of carbohydrates, lipids, proteins, nucleic acids and metabolism with their relation to health and medicine. Laboratory activities demonstrate the concepts, properties and relation of the compounds studied in lecture.

COREQUISITES: None

PREREQUISITES: MTH013 or MTH033 or MTH070 or MTH091 or equivalent

TEXTBOOKS and MATERIALS:

- *Essential Laboratory Manual for General, Organic and Biological Chemistry, 2nd Edition*, Timberlake, Karen; Pearson Publishers, 2011.
- *Chemistry – An Introduction to General, Organic and Biological Chemistry, 14th Edition*; Timberlake, Karen; Pearson/Prentice Hall Publishers, 2024.
- Scientific calculator

Your print book, e-book, or access code required for class can be accessed through the Owens Community College e-Campus Bookstore by accessing the online link, called “Find Books” on the course schedule for each course section.

GENERAL INFORMATION

Course Objectives

To provide the student with basic concepts of inorganic, organic and biological chemistry necessary for study of human physiology and allied health program

By completing this course, the student should be able to:

- Demonstrate a working knowledge of the metric system
- Give descriptions of the electronic structure of atoms
- Predict formulas of compounds, type of bonding and properties based on periodic relationships
- Balance chemical reactions and identify substance oxidized or reduced in redox reaction
- Calculate concentrations of solutions – equivalence, molarity and % by mass
- Describe important properties of acids, bases and buffers
- Illustrate the chain-forming ability of the carbon atom
- Explain the bonding in organic compounds
- Give the general structures of various classes of organic compounds
- Name basic organic compounds
- Relate structures of organic compounds to their physical and chemical properties
- Know preparation and reactions for all major classes of organic compounds
- Explain the use of energy to synthesize biomolecules
- Recognize the structure, properties and components of the biomolecules of carbohydrates, lipids, protein and nucleic acids in regard to their physiological functions

Laboratory Objectives

This laboratory is associated with the lecture of CHM105. The student should be able to:

- Demonstrate the knowledge of rules of safety in the laboratory
- Measure and calculate using metric system
- Use various types of laboratory equipment
- Perform basic laboratory techniques and procedures

- Predict formulas of compounds and bonding types based on physical and chemical properties
- Classify chemical reactions and apply chemical formulas in various equations
- Prepare solutions; different concentrations (% concentration, molarity, dilutions of solutions)
- Describe properties of acids and bases
- Recognize structures of organic compounds and compare physical and chemical properties
- Explore and evaluate the biomolecules of carbohydrates, lipids, proteins and nucleic acids and their relevance to the health issues

Laboratory Student Learning Outcomes:

***Please refer to lecture syllabus for all learning outcomes and competencies**

COURSE RULES

Attendance

Attendance is taken at each laboratory session. If you are more than 30 minutes late for a laboratory you will not be permitted to attend that session. During the first 30 minutes your instructor covers the basic information necessary to successfully complete the laboratory, mandatory safety issues, precautions, and location of needed materials. After the session has begun, for safety purposes, your instructor needs to be working with all students, not covering the information for those students who are late. Therefore, if you are more than 30 minutes late, you will not be permitted to attend the laboratory and will be counted absent. You are encouraged to obtain missed information from other students in the laboratory. You will not be permitted to submit laboratory assignments for sessions in which you have been counted absent.

To achieve success in this course, laboratory attendance is critically important. It is necessary to be present in order to get direct attention from the instructor on course material. Students cannot learn the laboratory material without this practical experience, and the practical experience will be a large portion of the laboratory exams. Student attendance in the laboratory is also vital for accreditation and registry exams for all the technologies.

- You must be registered for the laboratory section that you are attending. Non-registered persons are not permitted in the laboratory.
- There are no make-up laboratory sessions.
- You will not receive any points for any of the work from a missed laboratory session.

Safety

- **Eating, drinking and smoking are not permitted in the laboratory.**
- You must be registered for the laboratory section which you are attending. Non-registered persons are not permitted in the laboratory.
- Appropriate apparel is required in the laboratory at all times, including; cotton shirts, jeans, proper foot covering, proper shoes, etc.
- Loose clothing, shorts, sandals, open-toed shoes are not permitted.
- Full covering laboratory aprons are available as needed.
- More about apparel will be discussed at the first laboratory meeting.
- **Safety goggles MUST BE WORN while experiments are being conducted. The laboratory instructor will announce when goggles may be removed. The appropriate**

eyewear must be splash goggles, which are provided to each student. NO impact glasses are to be worn at any time.

Student Responsibilities

- Read the laboratory assignment and appropriate lecture material prior to each laboratory session. It is recommended that a laboratory notebook be kept to record observations, experimental results, and instructor notes.
- Be on time and use the full laboratory period.
- Turn in all work as assigned, ask questions, and participate in each activity.
- **CLEAN UP:** Be certain that your area of the laboratory table is properly cleaned after use. Wash and return all glassware and other instruments to the proper areas. Check the sink to be sure that it is clear of all glassware and trash.

GRADING

The laboratory grade will be based on assignments and quizzes.

11 Data Sheets (10 points each)	110 points
Quiz 1	45 points
Quiz 2	45 points
Quiz 3	50 points
Total	250 points

IMPORTANT: You must earn no less than 150 points (60%) out of the 250 total possible laboratory points to pass the entire course. If you do not earn at least 150 laboratory points, you will receive an (F) letter grade for the entire course.

There is NO provision for EXTRA CREDIT to be given beyond the designated points for each laboratory exam and activity.

Assignments – Reports and Question Sets

A Data Sheet will be assigned for each of the 11 experiments performed. See the attached weekly schedule. Each Data Sheet will be graded on a 10-point scale. It will be written based on the format guide found in the laboratory manual.

Assignments are due when indicated by the instructor. Late assignments will receive a 10% grade deduction for each day late. Any assignment over 1 week late will receive a zero (0%) grade. Laboratory assignments will not be accepted at the Life and Natural Sciences Department offices.

You will not be permitted to submit or to receive credit for a laboratory assignment in a session in which you have been counted absent.

Quizzes

Quiz questions will be comprised of material covered in the laboratory manual, experiments, and laboratory lectures. Quizzes will include the following types of questions: multiple-choice, practical application, fill-in the blank, calculations, and short essay.

- Quiz 1 will cover Activities 1-4.
- Quiz 2 will cover Activities 5-8
- Quiz 3 will cover Activities 9-12

Open book and open notes are not permitted for a quiz.

During exams, unauthorized use of a phone, tablet, e-watch or any other electronic device is prohibited. Use of these devices during an exam, could result in forfeiture of exam points.

Each quiz can only be taken once.

Contact your instructor immediately if you miss a scheduled quiz.

A student missing a quiz chooses one of the following options:

- Take a **DIFFERENTLY FORMATTED** makeup quiz on date assigned by instructor.
- Not take the quiz and receive 0 points.

A student missing Quiz 1 and/or Quiz 2 has one week from date of missed quiz to make up the quiz.

A student missing Quiz 3 has two days from date of the missed quiz to make up the quiz.

No assignments will be accepted at the Toledo Campus Life and Natural Sciences Department office

- There are NO make-up laboratory sessions.
- You cannot receive points for any work from a missed laboratory session.
- All work must be each student's own effort.
- No photocopied reproductions will be accepted.

Laboratory sections do not award letter grades, only point totals. The laboratory points earned are totaled and forwarded to your lecture instructor. The final grade for the course is determined from points earned in both lecture and laboratory. See your lecture syllabus for the course grading summary and letter grade scale.

ACTIVITIES

- Activity 1 Laboratory Safety Orientation (pg. ix-xx) **NO DATA SHEET**
- Activity 2 Measurement/Conversion Factors in Calculations (all **but** Significant Figures) (Sections C, D, E – Length, Volume, and Mass, D-15- D-18)
- Activity 3 Density and Specific Gravity (All Sections pg. 13-23)
- Activity 4 Atomic Structure and Electronic Arrangement (All Sections pg.25-39)
- Activity 5 Compounds and Their Formulas (All Sections A-E pg. D-19-D-34), **Quiz 1**
- Activity 6 Chemical Reactions and Equations (All Sections pg. 53-66)
- Activity 7 Solutions (All Sections A-C pg. 129-142)
- Activity 8 Acids and Bases (All Sections A-C pg. 169-184)
- Activity 9 Properties/Structures of Alkanes (All Sections A-F pg. D-35-D-50), **Quiz 2**
- Activity 10 Alcohols, Aldehydes, and Ketones (All Sections A-F pg. 185-200)
- Activity 11 Carboxylic Acids and Esters (All Sections A-C pg. 201-216)
- Activity 12 Carbohydrates (Sections A-D, G, H pg. 217-238)
- Activity 13 **Quiz 3**

Academic Support

Disability Services Resource Center: If you have a disability or acquire one, you may be entitled to receive reasonable accommodations intended to assure you an equal opportunity to participate in and benefit from the program. To receive more information or to register for accommodations, please contact the Disability Resource Center at 567-661-7007, email disability@owens.edu, visit <https://www.owens.edu/disability/>, or stop by College Hall 124.

Tutoring Services: Owens Community College offers academic tutoring and assistance in a variety of subjects including: accounting, computing, economics, mathematics, science, and writing. For more information go to: <https://www.owens.edu/successcenters/>.

Counseling Services: Counseling Services provides assistance to students experiencing personal, educational, interpersonal/relationship, family, social, or psychological difficulties. If you feel you may benefit from this service, please contact them at counselingservices@owens.edu. More information is at <https://www.owens.edu/counseling/>.

Campus and Community Connections: The Center for Campus and Community Connections (College Hall 151) is a walk-in office created to provide retention support through resource stability initiatives and community connections. Go here for more information: <https://www.owens.edu/connection/> or contact connections@owens.edu

Owens Library: The Owens Library offers two locations (Toledo and Findlay) as well as online resources. For more information visit <https://www.owens.edu/library/>.

Students can find more information on campus resources, student support, student life, and security at this [link](#).

General Information

Student Code of Conduct: All students are expected to follow Owens Community College's [Student Code of Conduct](#), which includes academic honesty, encompassing plagiarism. See the [Board Policy](#) for more information.

Anti-Discrimination and Harassment & Title IX/Sexual Misconduct: All students, faculty, and staff are expected to follow Owens Community College's [Anti-Discrimination and Harassment Policy](#) and the College's [Title IX Policy](#)/Sexual Misconduct Procedures and Guidelines. The College strictly prohibits and will not tolerate harassment, discrimination, intimidation, or hostile/offensive working or learning environments.

Religious Accommodations: A student seeking an accommodation for an absence permitted under Ohio's Testing Your Faith Act must provide the instructor with a written email notice with the specific dates for an absence, and must do so not later than fourteen (14) days after the first day of instruction. Alternative accommodations are not retroactive, and no academic penalty will be imposed for an absence under the policy*. The request for an alternative accommodation will be kept confidential. Students with questions about a religious accommodation under Ohio's Testing your Faith Act may contact the College's Office of Academic Affairs: provost@owens.edu. The policy may be found on the Owens website: [3358:11-2-63 Accommodation](#) for a Student Absence for the Observance of Religious Beliefs and Practices Policy

Document Collection: Throughout the semester, your instructors may ask for a variety of assignments including tests and/or quizzes for student learning of institutional general education competencies or program assessment. Please save all your class materials until the end of the semester.

Classroom Admittance: OCC classes shall only be attended by the officially registered OCC students or perspective students, instructor of record, guest lecturer, or substitute. Visitors are not permitted to be in the classroom and should not be invited to attend or participate in the class. See [FERPA](#) regulations for more information.

Use of AI Tools: This course requires you to complete various assignments that assess your understanding and application of the course content. You are expected to do your own work and cite any sources you use properly. You are not allowed to use any artificial intelligence (AI) tools, such as chatbots, text generators, paraphrasers, summarizers, or solvers, to complete any part of your assignments. Any attempt to use these tools will be considered academic misconduct and will be dealt with according to the university's academic integrity policy. Students are expected to complete all work independently and without the assistance of AI-generated content. If you have any questions about what constitutes acceptable use of AI tools, please consult with the instructor *before* submitting your work.

SEMESTER Master Laboratory Schedule

Laboratory Schedule

Laboratory Section DAY	Laboratory Section DAY	Laboratory Section DAY
Activity 1 - DATE	Activity 1 - DATE	Activity 1 - DATE
Activity 2- DATE	Activity 2- DATE	Activity 2- DATE
Activity 3- DATE	Activity 3- DATE	Activity 3- DATE
Activity 4- DATE	Activity 4- DATE	Activity 4- DATE
Activity 5- DATE	Activity 5- DATE	Activity 5- DATE
Activity 6- DATE	Activity 6- DATE	Activity 6- DATE
Activity 7- DATE	Activity 7- DATE	Activity 7- DATE
Activity 8- DATE	Activity 8- DATE	Activity 8- DATE
Activity 9- DATE	Activity 9- DATE	Activity 9- DATE
Activity 10- DATE	Activity 10- DATE	Activity 10- DATE
Activity 11- DATE	Activity 11- DATE	Activity 11- DATE
Activity 12- DATE	Activity 12- DATE	Activity 12- DATE
Activity 13- DATE	Activity 13- DATE	Activity 13- DATE