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| <b>COURSE:</b>       | General Chemistry 1, CHEM140 T&N-T and CHEM141 T&N   |
| <b>CREDIT:</b>       | 4 Semester Hours (class). 1 Semester Hours (lab).  |
| <b>SEMESTER:</b>     | Fall 2022, Cycle 2   |
| <b>TIME:</b>         | Lecture CHEM140 Wednesday 8:00AM – 11:00AM CHEM140 N-T: Online<br>Lab CHEM141 T Wednesday 1:00 – 4:00 PM CHEM141 N: Online |
| <b>LOCATION:</b>     | CHEM140 T: Ed. 118-9 CHEM 140 N-T: Online<br>CHEM141 T: Ed.118-9 CHEM141 N: Online   |
| <b>INSTRUCTOR:</b>   | Chris Basel  |
| <b>CONTACT INFO:</b> | Office Phone: 816-425-6201<br>E-mail: <a href="mailto:chris.basel@calvary.edu">chris.basel@calvary.edu</a>                 |
| <b>OFFICE:</b>       | Ed. 224  |

It's an exciting time to study chemistry! New chemistry discoveries are made every day and our understanding of nature has increased incredibly. Chemistry has applications in numerous areas of science, medicine, engineer, and other fields. Some suggest that the Bible and chemistry are inconsistent. However, on the contrary, chemistry and the Bible are completely consistent and this should strengthen our faith as we discover more and more about the incredible, awesome nature of our Creator God!

## I. COURSE DESCRIPTION:

CHEM 140 T&N-T (4 hours) An introduction to chemistry for science majors. Qualitative and quantitative reactions and interactions of atoms and molecules will be covered. Specific topics include chemical reactions, gases, thermochemistry, quantum mechanics, periodicity, and bonding. Concurrent enrollment in CHEM141 is required. (Prerequisite: MA115 or equivalent with a C or higher. One year of high school chemistry or CHEM105 and CHEM106 or equivalent with a C or higher.) (\*Interdisciplinary Bible Course)

*This course is offered in two formats: in-person and online. Students registered for in-person attend the classes in person, online students attend the classes via the online classroom. For both in-person and online students, assignments and interaction outside of the class period are done in the learning management system.*

You must choose one of the following lab options:

CHEM141 T (1 hour) This course is one of two optional lab formats of CHEM140. If taken, it must be concurrent with CHEM140. (Fee: \$35)

CHEM141 N (1 hour) This course is one of two optional lab formats of CHEM140. This lab is completed remotely and required purchase of a lab kit. If taken, it must be concurrent with CHEM140. (Fee: Approximately \$225)

## II. COURSE OBJECTIVES:

### A. General competencies to be achieved. The student will:

- 1) Demonstrate an understanding of the fundamental concepts of general chemistry from a biblical worldview.
  - a. Program Objectives 1 through 5.
  - b. Assessments – chapter review questions and exams.

### B. Specific competencies to be achieved. The student will:

- 1) Demonstrate an understanding of the principles of general chemistry and use the principles to understand the applications of general chemistry.
  - a. Program Objectives 1, 3, 4, and 5.
  - b. Assessments – chapter review questions and exams.
- 2) Read literature covering the biblical worldview of general chemistry and demonstrate your understanding of these concepts by reporting on the literature clearly and concisely.
  - a. Program Objectives 2, 3, and 4.
  - b. Assessments – Biblical worldview essays.

## III. REQUIREMENTS: All students will be expected to:

- Participate frequently and make regular progress.
- Complete reading assignments, homework, biblical worldview essays, and exams on schedule.
- CHEM 141 - lab students only: Work safely and complete all labs and lab reports on schedule.

## IV. METHODS

- A. **LECTURES:** Lectures will consist of material from the book and additional material from a variety of sources. Students should take notes during lectures as the homework questions will be directly related to the lectures and not all the information can be obtained from the book.
- B. **READING:** The textbook provides a framework for the class. The text is not required as the information can be obtained from lectures or other online sources. However, most students will find the textbook very useful for studying (consider an eText). Not every topic in the textbook will be addressed. Emphasis will be placed on the most important concepts and practical applications. The instructor will tell you which sections of each chapter will be covered.
- C. **HOMEWORK QUESTIONS:** Homework questions will normally be completed using the Mastering Chemistry software in Canvas. It is imperative that you complete the homework problems to understand the material and to do well on tests. Most of the test questions will be taken directly from the homework, possibly with minor modifications.
- D. **BIBLICAL WORLDVIEW ESSAYS:** The purpose of this portion of the class is to develop your ability to analyze the complex issues associated with chemistry from the biblical worldview and to learn that you can defend your faith (1 Peter 3:15) using science. You will read articles or watch videos and then prepare essays that demonstrate your understanding of the topics. *For details about how to write the essays, see the Essay Guidelines in Canvas.*

*Plagiarism is defined as copying any part of a book or paper without identifying the author. This also includes taking another person's ideas and presenting them as your own.*

- E. **TESTS:** Most of the questions used for the regular tests will be taken from the homework, possibly with minor modifications. Test questions for the comprehensive portion of the final will be taken from the regular tests and will include new material covered since the last regular exam. Exams will be taken in the Mastering Chemistry software via Canvas.

All online students and on-campus students not taking tests during the class period must use the ProctorU test proctoring service. ***The Exam Policy in Canvas gives more details. Also see the ProctorU addendum at the end of this syllabus.***

- F. **MISSED OR LATE HOMEWORK OR ESSAYS:** Grades for late homework and creation apologetics essays will be reduced for each day that they are late. Assignments that are more than three days late will not be accepted and will receive no credit.

**G. LAB PREPARATION AND REPORTS**

**Students taking CHEM141 T:** Lab instructions must be read before completing each lab. Lab reports should be completed and turned in as instructed by the due date in Canvas. Grades on late lab reports will be decreased for each day they are late. Lab reports that are turned in more than three days late will not be accepted and will receive no credit.

**Students taking CHEM141 N:** Prepare lab reports as instructed in the Hands-On Labs software. Grades on late lab reports will be decreased for each day they are late. Lab reports that are turned in more than three days late will not be accepted and will receive no credit.

**H. LAB ATTENDANCE:**

**CHEM141 T** Lab attendance is required except for absences officially excused by the university, or for extenuating circumstances such as illness or death in the family. Labs missed for any reason must be made up at a later date, typically the next week. Missing more than two labs, even when excused by the university, may result in a lower grade. ***See the lab attendance policy in Canvas for details.***

**CHEM141 N** Lab is conducted remotely and attendance at a specific time is not required.

**I. LAB SAFETY**

**Students taking CHEM140 T:** Safety during lab activities must be observed at all times for your own safety, as well as the safety of others around you. Students performing lab experiments are responsible for planning and conducting experiments in accordance with the lab instructions and lab safety rules. Additional safety rules (when required) will be included in lab handouts. Safety will be discussed at the start of each lab, so if you are late, you may not be allowed to attend. Each student who participates in a lab exercise must clean up their lab area when finished before leaving. **All students must take a lab safety quiz covering the safety rules and sign a safety contract before working in the lab.**

**Students taking CHEM141 N:** Safety during lab activities must be observed at all times. Students performing lab experiments are responsible for planning and conducting experiments in accordance with the lab instructions and lab safety rules. Additional safety rules (when required) may be included with each lab. Each student who participates in a lab exercise must clean up their lab area when finished before leaving. **All students must take a lab safety quiz covering the safety rules and sign a safety contract before working completing any labs.**

**J. HOW TO GET HELP:**

- Feel free to contact me via email or phone (see email address and phone number above).
- Office hours: See the office hours posted on my office door. I will share these the first day of class too.
- Virtual office hours: Teams meetings can be set up with individuals upon request.

*The Clark Academic Center (learning@calvary.edu) is dedicated to providing free academic assistance for all CU students. Student tutors aid with all facets of the writing process, tutor in various subject areas, prepare students for exams and facilitate tests. Please take advantage of this service.*

*Students with disabilities have the responsibility of informing the Accommodations Support Coordinator (aso@calvary.edu) of any disabling condition that may require support.*

**V. GRADING - See grading scale in the university catalog.**

CHEM140

|                           |     |
|---------------------------|-----|
| Chapter Review Questions  | 20% |
| Regular Exams             | 65% |
| Biblical Worldview Essays | 15% |

CHEM141

|                                |      |
|--------------------------------|------|
| Lab Investigations and Reports | 100% |
|--------------------------------|------|

## VI. MATERIALS – Required

A) **The Bible:** The Bible is a required textbook in every course at Calvary University. To facilitate academic level study, students are required to use for assignments and research an English translation or version of the Bible based on formal equivalence (meaning that the translation is generally word-for-word from the original languages), including any of the following: New American Standard (NASB, English Standard Version (ESV), New King James (NKJV), or King James (KJV). Other translations and versions based on dynamic equivalence (paraphrases, and thought-for-thought translations like NLT and NIV) may be used as supplemental sources. Please ask the professor if you have questions about a particular translation or version.

B) **Textbook:**

Chemistry: A Molecular Approach, 5th Edition  
Author: Nivaldo J. Tro  
ISBN-13: 9780134989761  
Pearson, 2020

New hard copies cost approximately \$230. Used copies can be obtained for around \$50. You can buy the eText bundled with the Mastering software at a discount (about \$45) but be aware that you only have access for the semester. Previous editions of the text may be acceptable and will be less expensive.

C) **Mastering Chemistry Software (CHEM140):** It is **required** that you purchase access to the **Modified Mastering Chemistry** software. This is required to complete the homework and tests. The cost is approximately \$70. It will also allow access to many on-line helps that are useful for learning this material. **Purchase this through the class website on Canvas! Detailed instructions will be given there.** See the comments below about purchasing it with the eText, which is an option. If you do not purchase the software through the Canvas class website, it will be the wrong software!

D) **Lab Manual (only for students taking CHEM141 T):** On campus students must purchase the following lab manual. The cost is approximately \$100 for a new copy. Used copies or an eText can be obtained for far less. (Note – this manual is used for both CHEM141 T and CHEM146 T.)

Green Chemistry  
Laboratory Manual for General Chemistry  
Author: Sally Henrie, et al.  
ISBN-13: 978-1482230208  
CRC Press, 2015

E) **Lab kit (only for students taking CHEM141 N):** It is required that you purchase the lab kit prepared for this class to complete the lab experiments for CHEM141 N. The cost is approximately \$250. Detailed instructions will be given on the class website in Canvas.

**VIII. TENTATIVE CLASS SCHEDULE:**

Any changes to the schedule will be posted on Canvas.

| <b>TOPIC(S)</b>                                 | <b>CHAPTER(S)</b> |
|---|-------------------|
| Matter, Measurement and Problem Solving         | 1                 |
| Atoms and Elements                              | 2                 |
| Molecules and Compounds                         | 3                 |
| Chemical Reactions and Chemical Quantities      | 4                 |
| Introduction to Solutions and Aqueous Reactions | 5                 |
| Gases   | 6                 |
| Thermochemistry                                 | 7                 |
| The Quantum-Mechanical Model of the Atom        | 8                 |
| Periodic Properties of the Elements             | 9                 |
| Chemical Bonding 1: The Lewis Model             | 10                |
| Chemical Bonding 2: Molecular Shapes and VSEPRS | 11                |

### **ProctorU Addendum**

Calvary University uses ProctorU test proctoring service. ProctorU is a live online proctoring service that allows you to take your exam from the comfort of your home. ProctorU is available 24/7, however, **you will need to schedule your proctoring session at least 72 hours in advance to avoid any on-demand scheduling fees.** Creating a ProctorU account is simple. You can do so by going to <https://go.proctoru.com/students/users/new?institution=2045>.

Students must read all information and comply with all directions below to be successful for their proctored exam experience. Calvary University hopes that students will have a smooth experience, and to decrease student anxiety and increase success, please use this guide to help you plan for your test. Please note that, per ProctorU, there will be penalties for students who miss their testing window. Technical trouble will not be an excuse for missing the window. Therefore, pay attention to all details within this guide, and all links included.

**System Requirements:** Please see the information below supplied by ProctorU for system requirements. If your computer does not have these capabilities, please consider borrowing a computer as you will still be required to complete the exam using the live proctor system with ProctorU. Please note that you will not be able to take your exam(s) in the Calvary University Library due to the activity that will be picked up in a public place.

In order to use ProctorU, you will need a high-speed internet connection, a webcam (internal or external), a Windows or Apple Operating System, and a government issued photo ID. ProctorU recommends that you visit <https://test-it-out.proctoru.com/> prior to your proctoring session to test your equipment. They recommend you click on the button that says "connect to a live person" to fully test out your equipment. If using Firefox, please make sure that you are using the current version of your Firefox browser and have downloaded the ProctorU extension available at <https://www.proctoru.com/firefox>.

| Type       | Minimum             | Recommended                        | Calvary University Minimum |
|------------|---------------------|------------------------------------|----------------------------|
| Web Camera | 640×480 resolution  | 1280×720 resolution                | 1280×720 resolution        |
| PC Users   | Windows Vista       | Windows 10 (10 S is not supported) | same                       |
| Mac Users  | OS X 10.5 or higher | OS X 10.13 High                    | same                       |

|                         |                                    | Sierra                             |        |
|-------------------------|------------------------------------|------------------------------------|--------|
| Internet Download Speed | .768 Mbps                          | 1.5 Mbps                           | 3 Mbps |
| Internet Upload Speed   | .384 Mbps                          | 1 Mbps                             | 2 Mbps |
| RAM                     | 1024 MB                            | 2 GB                               | same   |
| Ports                   | 1935, 843, 80, 443, 61613, UDP/TCP | 1935, 843, 80, 443, 61613, UDP/TCP | same   |

- Desktop computer or laptop (not a tablet, Chromebook or cell phone).
- Webcam and microphone (built-in or external) – test your webcam at <https://test.webrtc.org/>
- Connection to network with sufficient internet speed: at least 3 Mbps download speed and 2 Mbps upload – test internet speed at [www.speedtest.net](http://www.speedtest.net)
- Operating systems: Windows Vista or newer, Mac OS X 10.5 – or newer
- Browser with pop-up blocker disabled: Google Chrome v39 or later, Mozilla Firefox v34 or later.

Additionally, please visit and review the test-taker resource center by going to <https://www.proctoru.com/proctoru-live-resource-center>. You should expect the startup process with the proctor to take about 10-15 minutes. However, this time will not affect your exam time. Please feel free to direct any questions to the student support team via the live chat within your account.

**\*\*\*\*If you have any questions or concerns, contact Proctor U's technical support team 24/7 via their live chat support at <https://www.proctoru.com/contact-us>**

Costs for ProctorU exams are listed below and are payable to ProctorU at the time of the test. These costs assume that a student will schedule their exam at least 72 hours in advance of the exam start time:

- 60 minutes or less - \$8
- 61 – 120 minutes - \$10
- 121 – 180 minutes - \$12

For those not scheduling an exam at least 72 hours in advance, late scheduling charges are added in addition to the above fee structure. There are two options for late scheduling:



- “Take It Soon” allows a test to be scheduled less than 72 hours but more than 24 hours before the desired start time. This option includes an additional fee of \$8.00. (Total cost for a 60 minute exam scheduled as “Take It Soon” would be \$16.)
- “Take It Now” allows a test to be taken on-demand with no appointment needed. This option includes an additional fee of \$12.00. (Total cost for a 60 minute exam scheduled as “Take It Now” would be \$20.)

These options are for the convenience of the examinee. Any charges applicable to the examinee must be paid with a credit or debit card. The test taker will be required to enter payment information on a secure page connected to a third-party card processor. The page is encrypted and secure and ProctorU does not see or store any credit card data.

Examinees will be required to re-enter payment information each time new charges are incurred.