COURSE OUTLINE		
TERM: Fall 2022	**COURSE NO: CHEM 204**	
INSTRUCTOR:	**COURSE TITLE: STRUCTURE, ENERGETICS AND SPECTROSCOPY**	
OFFICE: LOCAL: **E-MAIL: @capilanou.ca**	**SECTION NO(S):**	**CREDITS: 3.0**
OFFICE HOURS:		
COURSE WEBSITE:		

Capilano University acknowledges with respect the Lil'wat, Musqueam, Squamish, Sechelt, and Tsleil-Waututh people on whose territories our campuses are located.

COURSE FORMAT

Three hours of class time plus an additional hour of supplemental activity delivered through on-line or other activities for a 15-week semester, which includes two weeks for final exams.

COURSE PREREQUISITES/COREQUISITES

CHEM 111 (C-); and MATH 116 or MATH 108 as a prerequisite or corequisite

CALENDAR DESCRIPTION

In this course, students will review and expand their understanding of chemical kinetics and thermodynamics with anemphasis on applications in the life sciences. Students will also be introduced to a variety of spectroscopic methods that are used for chemical structure determination.

COURSE NOTES

CHEM 204 is an approved Quantitative/Analytical course for baccalaureate degrees.
CHEM 204 is an approved Science course.
CHEM 204 is an approved Science and Technology course for Cap Core requirements.

REQUIRED TEXTS AND/OR RESOURCES

Textbook: none required

Additional resources will be provided via the course eLearn site.

COURSE STUDENT LEARNING OUTCOMES

On successful completion of this course, students will be able to do the following:

- Define key thermodynamic concepts such as energy, entropy and Gibbs free energy and relatethese concepts to equilibrium and spontaneous change.
- Calculate thermodynamic variables using the three laws of thermodynamics.
- Interpret and construct phase diagrams.

- Write rate laws and determine reaction order.
- Model enzyme kinetics using the Michaelis-Menten model
- Apply the basic principles of chemical thermodynamics and kinetics to biological problems.
- Interpret UV, IR and NMR data and determine the structures of simple organic molecules.

Students who complete this Science and Technology course will be able to do the following:

- Apply numerical and computational strategies to solve problems.
- Demonstrate how a problem, concept, or process can be modelled numerically, graphically, or algorithmically.
- Explain how scientific inquiry is based on investigation of evidence and evolves based on new findings.
- Participate in scientific inquiry and communicate the elements of the process, including making careful and systematic observations, developing and testing a hypothesis, analysing evidence, and interpreting results.

COURSE CONTENT

Topic	Week (Approx.)
Thermodynamics; Chemical Equilibrium; Solutions Work and heat, the first law of thermodynamics, enthalpy, heat capacities, temperature dependence of reaction enthalpies. Spontaneous and non-spontaneous processes, entropy changes, and the second and third laws of thermodynamics. Gibbs free energy. Phase equilibria and diagrams, colligative properties, chemical equilibrium and the effects of varying temperature and pressure. Electrochemical cells and their applications. Gaseous systems; solutions and heterogeneous equilibria.	1-4
Kinetics Determination of reaction order, rate laws, steady state approximation, examination of parallel, consecutive, opposing, free radical, chain and enzyme mechanisms. Temperature dependence of reaction rates.	5-7
Spectroscopy Atomic spectroscopy, quantum numbers, molecular rotations and vibrations. Electronic transitions, nuclear magnetic resonance (^{1}H and ^{13}CNMR), chemical shift and spin-spin coupling.	8-13
Final Exam Period	14-15

EVALUATION PROFILE

Final grades for the course will be computed based on the following schedule:

Term Work	60%
Performance Evaluation	10%
Final Examination	30%
TOTAL	**100%**

Term work may consist of tests, quizzes and/or assignments. No single component of term work will be worth more than 25%.

Specific dates and details regarding the Evaluation Component will be provided by the instructor.

Performance Evaluation

In the absence of exceptional circumstances, which are evaluated at the instructor's discretion, the performance evaluation component of the final grade will be pro-rated to the rest of the grade. For example, a 10% performance evaluation component would be determined by dividing the remaining mark out of 90 by 9. The most common circumstance justifying an increased performance evaluation mark is a student's improved performance in the final examination relative to the term work, which the instructor feels justifies an elevated letter grade.

GRADING PROFILE

A+ 90 - 100%	B+ 77 - 79%	C+ 67 - 69%	D 50 - 59%
A 85 - 89%	B 73 - 76%	C 63 - 66%	F 0 - 49%
A- 80 - 84%	B- 70 - 72%	C- 60 - 62%	

Students should refer to the University Calendar for the effect of the above grades on grade point average.

Incomplete Grades

Grades of Incomplete "I" are assigned only in exceptional circumstances when a student requests extra time to complete their coursework. Such agreements are made only at the request of the student, who is responsible to determine from the instructor the outstanding requirements of the course.

Late Assignments

Assignments are due at the beginning of the class on the due date listed. If you anticipate handing in an assignment late, please consult with your instructor beforehand.

Missed Exams/Quizzes/Labs etc.

Students must inform their instructor on the day of the exam or beforehand if they are unable to attend. Make-up exams, tests and/or labs or extensions on assignment due dates are given at the discretion of the instructor. They are generally given only in medical emergencies or severe personal crises, and to students who have been fully participating in the course until that time. Some missed labs or other activities may not be able to be accommodated. Please consult with your instructor.

Attendance
Students are expected to attend all classes and associated activities. If classes are missed, it is the student's responsibility to become aware of all information given out in the classes or tutorials, including times of examinations and assignment deadlines.

English Usage
Students are expected to use correct standard English in their written and oral assignments, exams, presentations, and discussions. Failure to do so may result in reduced grades in any part of the Evaluation Profile. Please refer to the guidelines provided in the Capilano Guide to Writing Assignments (available from the University Bookstore).

Electronic Devices
Students may use electronic devices during class; however, an instructor may ask for devices to be put away if they become a distraction to other students or interfere with classroom learning.

Online Communication
Outside of the classroom, instructors will (if necessary) communicate with students using either their official Capilano University email or eLearn; please check both regularly. Official communication between Capilano University and students is delivered to students' Capilano University email addresses only.

Students are reminded to engage in respectful behavior when participating in discussions.

UNIVERSITY OPERATIONAL DETAILS:

Tools for Success
Many services are available to support student success for Capilano University students. A central navigation point for all services can be found at: https://www.capilanou.ca/student-life/

Capilano University Security: download the CapU Mobile Safety App

Policy Statement (S2009-06)
Capilano University has policies on Academic Appeals (including appeal of final grade), Student Conduct, Academic Integrity, Academic Probation and other educational issues. These and other policies are available on the University website.

Academic Integrity (S2017-05)
Any instance of academic dishonesty or breach of the standards of academic integrity is serious and students will be held accountable for their actions, whether acting alone or in a group. See policy and procedures S2017-05 Academic Integrity for more information: https://www.capilanou.ca/about-capu/governance/policies/

Violations of academic integrity, including dishonesty in assignments, examinations, or other academic performances, are prohibited and will be handled in accordance with the Student Academic Integrity Procedures.

Academic dishonesty is any act that breaches one or more of the principles of academic integrity. Acts of academic dishonesty may include but are not limited to the following types:

Cheating: Using or providing unauthorized aids, assistance or materials while preparing or completing assessments, or when completing practical work (in clinical, practicum, or lab settings), including but not limited to the following:

- Copying or attempting to copy the work of another during an assessment;
- Communicating work to another student during an examination;
- Using unauthorized aids, notes, or electronic devices or means during an examination;
- Unauthorized possession of an assessment or answer key; and/or,
- Submitting of a substantially similar assessment by two or more students, except in the case where such submission is specifically authorized by the instructor.

Fraud: Creation or use of falsified documents.

Misuse or misrepresentation of sources: Presenting source material in such a way as to distort its original purpose or implication(s); misattributing words, ideas, etc. to someone other than the original source; misrepresenting or manipulating research findings or data; and/or suppressing aspects of findings or data in order to present conclusions in a light other than the research, taken as a whole, would support.

Plagiarism: Presenting or submitting, as one's own work, the research, words, ideas, artistic imagery, arguments, calculations, illustrations, or diagrams of another person or persons without explicit or accurate citation or credit.

Self-Plagiarism: Submitting one's own work for credit in more than one course without the permission of the instructors, or re-submitting work, in whole or in part, for which credit has already been granted without permission of the instructors.

Prohibited Conduct: The following are examples of other conduct specifically prohibited:

- Taking unauthorized possession of the work of another student (for example, intercepting and removing such work from a photocopier or printer, or collecting the graded work of another student from a stack of papers);
- Falsifying one's own and/or other students' attendance in a course;
- Impersonating or allowing the impersonation of an individual;
- Modifying a graded assessment then submitting it for re-grading; or,
- Assisting or attempting to assist another person to commit any breach of academic integrity.

Sexual Violence and Misconduct

All Members of the University Community have the right to work, teach and study in an environment that is free from all forms of sexual violence and misconduct. Policy B401 defines sexual assault as follows:

> Sexual assault is any form of sexual contact that occurs without ongoing and freely given consent, including the threat of sexual contact without consent. Sexual assault can be committed by a stranger, someone known to the survivor or an intimate partner.

Safety and security at the University are a priority and any form of sexual violence and misconduct will not be tolerated or condoned. The University expects all Students and Members of the University Community to abide by all laws and University policies, including B.401 Sexual Violence and Misconduct Policy and B.401.1 Sexual Violence and Misconduct Procedure (found on Policy page https://www.capilanou.ca/about-capu/governance/policies/)

Emergencies: Students are expected to familiarise themselves with the emergency policies where appropriate and the emergency procedures posted on the wall of the classroom.

DEPARTMENT OR PROGRAM OPERATIONAL DETAILS:

Professionalism

Students are expected to demonstrate a professional attitude and behaviour: reliability, respect for and cooperation with colleagues, willingness to work calmly and courteously, respect for equipment and systems, and constructive response to criticism.

Final Exam Period

Students should note the dates of final exam period and expect to write exams at any time during this period. Individual exam times will not normally be rescheduled because of holidays, work, or other commitments. While efforts are made to spread exams throughout the exam period, an individual's particular course combination may result in exams being scheduled close together or spread widely through the entire exam period.