

Course Code & No. - Section:	CHEM 471 - Sections 1
Course Title (Credits):	Independent Study Biochemistry
Term & Year:	Spring 2015
Course Ref. No. (CRN):	10008
Instructor:	Dr. Suzanne Gollery
Phone(s):	775-831-1314 ext7456 or 775-813-4215 (8 a.m. – 9 p.m.)
Email:	sgollery@sierranevada.edu
Office:	TCES, room 223
Office Hours:	M 10:00-11:15 a.m., W 2:30-3:45 p.m., R 1:00-2:15 p.m. or by appointment
Class Meeting Time:	Usually Mondays 11:30-12:45, but Wed's after exams
Location:	TCES 202 (chemistry lab)
Prerequisites:	BIOL 101 and CHEM 102
Corequisites:	CHEM 471 and CHEM 480 are co-requisites

Course Descriptions:

CHEM 471: Biochemistry (3) Prerequisites: BIOL 101, CHEM 102. Corequisite (Spring 2015): CHEM 480.

Study of the structure and function of biologically important molecules and their roles in life processes. Topics include the flow of gene expression, oxygen transport proteins, enzyme dynamics, membranes, energy metabolism, and muscle contraction.

Student Outcomes for CHEM 471: Upon completion of Biochemistry and Lab, students will

1. demonstrate sufficient understanding of the structure, function, and regulation of biological molecules (proteins, DNA, and RNA) to successfully answer related questions on pre-professional exams, such as the MCAT & GRE.
2. demonstrate sufficient understanding of the structure, function, and regulation of biological molecules (proteins, DNA, and RNA) to undertake related graduate courses.
3. demonstrate skill at critical analysis, logic, and problem solving involving facts and concepts of biochemistry, biology, and experimental data.

Methods of Assessing Student Outcomes: Student outcomes will be assessed using the following:

1. Homework sets will assess student comprehension of course topics and problem solving skills.
2. Three unit exams and one final exam will assess the ability of students to remember, apply, and synthesize key facts and concepts of course content.
3. Instructor observation during class will assess the depth and nuances of student understanding of course content.

Instructional Strategies

You will prepare for class by reading materials, working through online tutorials and quizzes provided by the text publisher, and answering questions at the end of each text chapter. Meeting time will be spent on clarifying questions about the reading or homework and mini lectures to help explain particularly dense concepts. The students enrolled in the class are expected to work together outside of class to help each other understand the material prior to meeting with the instructor.

Required Texts and Materials

1. Nelson DL, Cox MM. Lehninger Principles of Biochemistry, 6th ed. New York (NY): WH Freeman. ISBN-13: 978-1-4292-3414-6
2. A loose-leaf binder or spiral notebook with pockets to keep notes and returned work
3. Access to a computer (one that meets the published SNC Computer Requirements) and internet

Attendance

We will meet weekly, on Mondays except for exam weeks, to discuss your progress, questions, and have mini lectures on particularly difficult material. You are responsible for meeting with other students in the class on Wednesdays when we do not meet to work as a team on learning the material.

Course policies:**1) Food and drinks:**

Food and beverages, even drinking water, are FORBIDDEN by state and federal safety regulations in TCES 202, the chemistry lab. You must leave food and beverages outside of the lab room.

2) Due dates and late work:

Due dates for homework and other assignments are indicated on the schedule of classes. Because this is an independent study, late work will be accepted, but you run the risk of getting behind and having difficulty finishing the class if work is often late.

3) E-mailed work:

All work may be submitted by e-mail or in hard copy. The instructor will reply to verify that e-mailed work was received. It is the student's responsibility to follow up if the instructor does not reply about e-mailed work.

4) Modifications to the CHEM 471 course syllabus:

This syllabus and schedule is intended to provide students with a clear and accurate outline of course content, student outcomes, class topics, assignments and due dates, and exam dates. Students should keep and refer to the syllabus regularly. The instructor reserves the right to make announced changes to the syllabus and class schedule at her discretion if it is in the best interest of the students to do so. Major changes, such as changes to exam dates or coverage and permanent changes to the schedule, will be e-mailed.

Prim Library Resources

Using the library's resources effectively (not just Internet resources) contributes to developing each of SNC's core themes by exposing students to high quality academic resources, diverse opinions, new ideas, and a future that includes building on a liberal arts education. It also establishes good habits that will serve students well in their professions. In this course, you will be expected to utilize the library's resources (either on-site or remotely) as you complete your assignments.

Prim Library Resources for CHEM 471: Biochemistry and Lab include, but are not limited to:

1. **Books** (can be checked out): In general, books related to biology have Library of Congress Classification numbers ranging from QH through RC. Books about biotechnology have LCC numbers beginning with TP. However, you will find books related to our course with other LCC numbers, so search the Prim Library Catalog using key words related to the topic that you are researching.
2. **Electronic databases** (for peer-reviewed research articles, reviews, newspaper and magazine articles): Electronic databases most likely to include articles on biology topics are EBSCO: Academic Search Premier, Environment Complete, General Science Collection, GreenFILE, Health Source, Newspaper Source, and TOPICsearch; BioOne; and GREENR. If you want to access electronic databases when you are off campus, use your first initial and your last name as the username and your 9 digit student ID number as the password.
3. **Hardcopy periodicals**: Prim Library has current subscriptions for Science, New Scientist, Science News, and National Geographic Magazine. Any of these are likely to have articles about biology topics written for educated people who are not necessarily scientists. Full-text articles from many more periodicals are available through the electronic databases.
4. **Lib Guides**: <http://Libguides.sierranevada.edu> These web pages contain instructions about how to use resources available at Prim Library, how to evaluate the appropriateness of information from the Internet for a research paper, how to cite sources, and other topics related to finding and using information.

The SNC Email System

The SNC email system is the official communication vehicle among students, faculty members and administrative staff and is designed to protect the confidentiality of student information as required by the Family Educational Rights and Privacy Act of 1974 Act (FERPA). Students should check their college email accounts daily during the school year.

Students have a right to forward their SNC e-mail to another e-mail account (for example, @hotmail or @gmail). However, confidentiality of student information protected by FERPA cannot be guaranteed for SNC e-mail forwarded to an outside vendor. Having email redirected does not absolve a student from the responsibilities associated with official communication sent to his or her SNC email account.

ADA Accommodations In accordance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, students with a documented disability are eligible for support services and accommodations. If a student wishes to request an accommodation, please contact the Director of Academic Support Services, Henry Conover, at (775) 831-1314 x7534, hconover@sierranevada.edu, office in Prim Library: PL-304.

The Sierra Nevada College Mission Statement:

Sierra Nevada College graduates will be educated to be scholars of and contributors to a sustainable world. Sierra Nevada College combines the liberal arts and professional preparedness through an interdisciplinary curriculum that emphasizes entrepreneurial thinking and environmental, social, economic and educational sustainability.

The Core Themes: Four core themes from the SNC mission are woven through all courses and the life of the community at SNC.

Liberal Arts

Professional Preparedness

Entrepreneurial Thinking

Sustainability

Sanctions for Cheating and/or Plagiarism**The Honor Code**

The faculty of SNC believes students must be held to high standards of integrity in all aspects of college life in order to promote the educational mission of the College and to encourage respect for the rights of others. Each student brings to the SNC community unique skills, talents, values and experiences which, when expressed within the community, contribute to the quality of the educational environment and the growth and development of the individual. Students share with members of the faculty, administration and staff the responsibility for creating and maintaining an environment conducive to learning and personal development, where actions are guided by mutual respect, integrity, responsibility and trust. The faculty and students alike must make diligent efforts to ensure high standards are upheld by their colleagues and peers as well as themselves. Therefore faculty and students accept responsibility for maintaining these standards at Sierra Nevada College and are obligated to comply with its regulations and procedures, which they are expected to read and understand.

Consequences of Violating the Student Honor Code

SNC students and faculty share the responsibility for maintaining an environment of academic honesty. Thus, all are responsible for knowing and abiding by the SNC Faculty/Student Honor Code published in the current SNC Catalog. Faculty are responsible for presenting the Honor Code and the consequences of violating it to students at the start of their classes AND for reporting all incidences of academic dishonesty to the Provost. Students are responsible for knowing

what constitutes CHEATING, PLAGIARISM and FABRICATION and for refraining from these and other forms of academic dishonesty. Violations of the Honor Code become part of a student's academic record.

1st Offense: Student receives a zero for assignment/exam and counseling with faculty on the honor code, consequences for violating the honor code, and the value of academic honesty in learning.

2nd Offense: Student fails course and receives counseling with faculty on the honor code, consequences for violating the honor code, and the value of academic honesty in learning.

3rd Offense: Student is expelled.

Grading Policy

Since CHEM 471 and CHEM 480 are being taught by separate instructors, the course grades will be separate. The CHEM 471 grading curve is based on a 600-point scale. Sierra Nevada College awards half grades (e.g., A- or B+), so a student with a point total within 1.5% of the cutoff for the letter grade will earn the appropriate half grade.

Grading Curve

A	90 – 100%	540 – 600 points
B	80 – 89.9 %	480 – 539 points
C	70 – 79.9%	420 – 479 points
D	60 – 69.9%	360 – 419 points
F	<60%	<360 points

Students may earn points in the following ways:

Homework – 12 at 25 points each	300 points
Exams – 3 at 60 points each	180 points
Final exam – 120 points	<u>120 points</u>
	600 points

Assignment details:

Weekly homework questions:

Short description of the assignment: Students will write and submit answers to questions from the assigned chapters each week. All questions are assigned if the entire chapter is assigned. When the entire chapter is not assigned, assigned question numbers will be included on the syllabus.

Learning goals for the assignment: Scientific studies on how people learn have shown repeatedly that we learn and remember more when we are active learners. This means that you will remember and be able to apply more facts and concepts about biochemistry for a much longer time if you learn them by reading and writing about them, communicate about them with other people, and apply them to solve problems in different contexts, than if you passively listen to an instructor lecture. The homework questions give you a chance to learn actively by reading a short section, trying to solve problems related to the reading, and then discussing the reading content and problems with other people. When you meet with Suzanne, time will be used addressing your questions and for mini-lectures about particularly dense topics. **Work together to discuss chapter section summaries with the goal that everyone understands them and to solve the homework problems.**

How to do the assignment: Homework questions are found at the ends of chapters from which reading is assigned in the Nelson and Cox text. You may write answers by hand or on computers and turn in hardcopy answers or e-mail homework files. Due dates are given in the schedule of classes. I recommend reading chapters one section at a time. At the end, review the section summary and immediately try to solve problems that seem to be related to content from that section. This way you will only have to remember a manageable amount of new information when you first try a problem. If you can't solve a problem, move on to the next section, because some problems will require that you understand concepts from multiple sections. Only after you have tried to solve the homework problems by yourself, work on them with other students in the class.

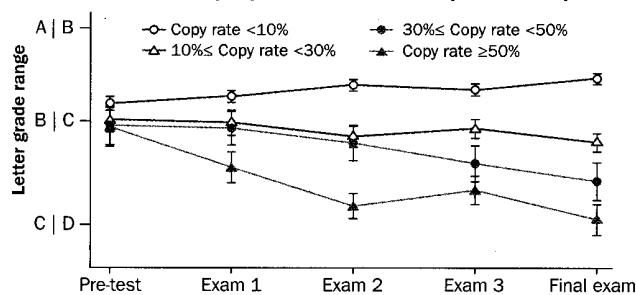
Individual work: You must write answers to questions and all individual assignments in your own words. Students with answers that are identical to or paraphrased from other students work, the text, Wikipedia, or other published or internet sources will receive no credit for the assignment and consequences for violating the academic honesty policy will apply. Cheaters never learn!

Scoring and feedback from the assignment: Homework questions will be scored for correctness. You will have ample opportunity to check answers and ask for help before homework due dates. I will give you both oral and written feedback on questions. You should keep their evolving question answers in your binders.

Science Stats | CHEATERS NEVER LEARN

A study of MIT students found that those who copied others' homework more frequently did worse on exams over the course of a semester.

Exam scores per percent of homework problems copied



SOURCE: D. PALAZZO ET AL./PHYSICAL REVIEW SPECIAL TOPICS - PHYSICS EDUCATION RESEARCH 2010

4 | SCIENCE NEWS | May 8, 2010

Exams: Three exams will cover material introduced since the last exam, although course content builds, so you will be asked to apply concepts and information learned previously when these are related to exam chapter content. Exams include multiple choice questions, since this format is used on standardized exams, such as the GRE and MCAT. Other questions may include short answer, essay, or true-false formats. Exam questions will ask you to apply concepts and facts, much like the homework. You will have hard copy exams.

Final Exam: You will take a comprehensive final exam with a format similar to the four exams at the end of the semester. The Biochemistry final exam is scheduled for Friday, May 8, 2015, 3:00 – 6:00 p.m. If there is not a CHEM 480 (Biochemistry Lab) final exam, the class may choose to hold the CHEM 471 final on Tuesday, May 12, 3:00 – 6:00 p.m..

Midterm grades: I will calculate midterm grades using all work due through March 11, 2015. There will not be a midterm exam, per se.

Class schedule for Independent Study Biochemistry begins on the next page.

Week and Dates	Reading assignment	Topic	Homework due (usually Mondays)
Week 1 Jan 20-23	Chapter 1	<i>Martin Luther King Holiday</i> Biochemistry foundations	
Week 2 Jan 26-30	Chapter 2	Recap chemical & physical foundations Water, acids & bases pH and pKa, buffers, intermolecular interactions in water	Chapter 1 by Wednesday (all)
Week 3 Feb 2-6	Chapter 3 Start Chapter 4, sections 4.1 & 4.2	Amino acids & protein primary structure Protein secondary structure & protein folding motifs	Chapter 2 (all)
Week 4 Feb 9-13	Ch 4, sections 4.3 & 4.4 Ch 5, section 5.1	Protein tertiary & quaternary structure, protein folding, denaturing proteins O ₂ -binding proteins – allosteric proteins	Chapter 3 (all)
Week 5 Feb 17-20	Ch 5, sections 5.2 & 5.3	<i>President's Day Holiday</i> Immunoglobulins and molecular motor proteins Friday exam I review??	Chapter 4 (all)
Week 6 Feb 23-27	Ch 6, sections 6.1, 6.2, & 6.3	Monday Exam 1: Chapters 1 – 5 How enzymes work (meet with Suzanne) <i>Junior English Proficiency Exam</i>	Chapter 5 (all)
Week 7 March 2-6	Ch 6, sections 6.4 & 6.5	Enzyme examples Enzyme regulation	
Week 8 March 9-13	Ch 13, sections 13.1, 13.2, 13.3, 13.4 Ch 19, sections 19.1 – 19.5	Bioenergetics and how ATP hydrolysis is linked to energy-requiring processes Reduction potential, redox reactions, & oxidative phosphorylation	Chapter 6 (all)
<i>March 16 – 20</i>		<i>Spring break</i>	
Week 9 March 23-27	Chapter 11 Ch 12, sections 12.1 – 12.4 and 12.6 – 12.8	Membrane transport proteins Signal transduction	Chapter 13 (all) & 19 (1 – 25)
Week 10 March 30-Apr 3	Ch 14, sections 14.1 & 14.4 Ch 15, sections 15.1 & 15.3	<i>Advising begins for fall 2015 courses</i> Glycolysis and gluconeogenesis Coordinate regulation of glycolysis and gluconeogenesis (see note below schedule) Friday Exam 2 review session??	Chapters 11 (all) & 12 (1 – 18)

(RE week 10 content: If you also want to learn about glycogen synthesis, use, and regulation by the hormones insulin and glucagon, add sections 15.4 & 15.5 and Ch 15 problems 8 – 10, 11 C&D, 12 – 16)

Week and Dates	Reading assignment	Topic	Homework due
Week 11 April 6-10	Ch 8, sections 8.1 & 8.2	Monday Exam 2: Chapters 6, 13, 11, and sections 19.1- 19.5, 12.1-12.4, 12.6-12.8, 14.1, 14.4, 15.1, & 15.3 Nucleotide and nucleic acid structures (meet with Suzanne)	Ch 14 (1 – 5, 10, 14, 16, 21 – 23, 29) and Ch 15 (3 – 6, 11 cases A and B)
Week 12 April 13-17	Ch 8, sections 8.3 & 8.4 Chapter 9	<i>Registration for spring 2015 begins</i> Nucleotide & nucleic acid functions DNA information technologies	
Week 13 April 20-24	Ch 25, sections 25.1, 25.2 & 25.3	DNA replication and repair DNA recombination	Chapters 8 (all) & 9 (all)
Week 14 April 27-May 1	Ch 26, sections 26.1 & 26.2 Section 26.3	Transcription & RNA processing Reverse transcription Friday Exam 3 review session??	Chapter 25 (all)
Week 15 May 1 and 2 May 3 and 4 Friday, May 5 or Tues, May 12	<i>Reading days</i>	Monday Exam 3: Chapters 8, 9, 25, 26 <i>Final exam review on _____?</i> Final exam 3:00 – 6:00 p.m.	Chapter 26 (all)