Calumet College of Saint Joseph

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COURSE SYLLABUS, Fall 2017

Course: CHEM 320 Biochemistry Lecture

Instructor Information:		
Instructor Name	Tracy Stone	
Office Number:	Room 520	
Phone Number:	219-473-4357	
Email:	tstone@ccsj.edu	**"CHEM 320: *your reason for email*" must be in subject.**
Hours Available:	Tuesday & Thursday, 8:30a - 10:00a & 12:00p – 1:30p, Friday 9:00a – 2:00p by appt only	

Instructor Background:
Tracy Stone started her career in fitness in 1997 as a group exercise instructor and personal trainer. She has a B.S. in Exercise Science & Health Promotion from Miami University of Ohio and an M.S. in Kinesiology from the University of Illinois at Chicago (UIC). Mrs. Stone is a Certified Personal Trainer (CPT) and a Certified Strength and Conditioning Specialist (CSCS) through the National Strength and Conditioning Association (NSCA). She began her teaching career in 2003 as a graduate assistant at UIC. From there she went on to serve as the Lead Instructor for the National Personal Training Institute (NPTI) in Chicago for 12 years.

Course Information		
Course Time:	Lecture: Monday and Wednesday, 8:30a – 10:00a	Lab: Monday, 10:15a - 11:45a
Classroom:	334	
Prerequisites:	C in Math 104 or placed in a higher math course, C or better in CHEM 200, CHEM 200L, CHEM 205, CHEM 205L, CHEM 310, CHEM 310L, CHEM 311, CHEM311L, and concurrent enrollment in CHEM 320L.	
Required Books and Materials:	Appling's Biochemistry Concepts and Connections, Pearson Publishing ISBN: 0321839927 ISBN: 9780321839923	

Learning Competencies/Outcomes:
Students will:

- Describe chemical and thermodynamic properties that drive protein structure/function relationships
- Justify the use of buffers in studying biological systems
- Predict how alterations at the DNA level or primary structure could affect protein structure and function
- Compare and contrast protein and non-protein catalysts
- Compare the roles of enzymes, substrates, products, and cofactors in energetic pathways and photosynthesis
- Identify structures/functions of vital cofactors such as TPP, PLP, NADH, NADPH, etc.
- Describe the enzymatic metabolism (anabolism and catabolism) of macromolecules necessary for

cellular life

- Compare reversible and irreversible enzyme inhibition and predict the outcome on specific pathways
- Predict pathway inhibition in the presence of common regulatory molecules such as ATP, ADP, NADH, NAD^+, pyruvate, citrate, etc.
- Justify the evolution of enzymes and metabolic pathways using concrete examples
- Calculate energies and determine spontaneity of thermodynamic reactions
- Explain the second law of thermodynamics in terms of protein folding and interactions
- Analyze the role of enzymes and cellular regulation in human health and diseases
- Develop and defend hypotheses in a biochemical laboratory setting
- Explain the chemical principles behind biochemical tests such as ion exchange chromatography, electrophoresis, staining, and quantification of protein, quantification of DNA, expression systems, and competent cells.

This course meets the following Program Objectives:

- **Scientific Knowledge and Critical Thinking:**
  - Students will demonstrate substantial and up to date core knowledge of broad areas in basic biomedical, translational, or clinical research.
  - Students will demonstrate the ability to accurately and critically evaluate their own scientific work and the work of others.
- **Research Skills and Problem-Solving Ability:**
  - Students will demonstrate advanced understanding of a range of technical and conceptual approaches used in biomedical research.
  - Students can design, carry out, and interpret research projects that generate new knowledge that advances the biomedical sciences and human health.
- **Specific Expertise:**
  - Students can articulate the significance of their own work to their chosen research area in both historical and forward-looking contexts.
  - Students will demonstrate mastery of a range of technical and conceptual approaches used in their selected research area.
- **Communication:**
  - Students will demonstrate the oral, written and media communication skills required to be effective communicants, teachers and mentors of peers, future scientists and scientifically literate citizens
- **Ethics and Advocacy:**
  - Students will apply highest standards of ethics to their research (data management, research subjects, stewardship of research funds)
  - Students will improve their confidence and interactions with colleagues and the public.
  - Students will be able to advocate for the role of science in medicine and society
- **Career Preparation:**
  - Students can articulate an appropriate set of desired potential career paths, and are aware of the preparation and initiative required to pursue these paths

Course Description:
A 3-credit hour course implementing the structure and function of cellular constituents; enzymology; metabolism of carbohydrates, lipids, amino acids, nucleotides; molecular biology of biosynthesis of proteins and nucleic acids.

Learning Strategies:
Active learning, BlackBoard, group discussions, team projects, collaborative learning, laboratory exercises, demonstrations

Experiential Learning Opportunities:
Laboratory experience is essential for a fundamental understanding of the scientific method. This course has a required laboratory portion that provides students with experiential learning through experimental design, hypothesis development, data interpretation, and communication of results through laboratory reports.

Assessments:

Lecture Exams	4 total; Lowest score dropped	150 pts ea.
Homework/In-Class Activities	12 total; Lowest 2 scores dropped; Started in class weekly, may need to be completed independently.	Total pts vary. 1pt per question

Grading Scale:

100 – 92: A	81 – 80: B-	69 – 68: D+
91 – 90: A-	79 – 78 : C+	67 – 62: D
89 – 88: B+	77 – 72: C	61 – 60: D-
87 – 82: B	71 – 70 : C-	59 and below: F

Note:
Concerns about assignment or exam grading must be brought to the instructor's attention, in person, immediately after obtaining a copy of your exam or assignment during office hours. If you have further concerns about your overall performance in the course, you must **schedule an appointment with the instructor to discuss these in person**, during office hours, before the final exam grade has been recorded. It is your responsibility to keep track of the grades posted in your Blackboard account for this class. All grades are final once the final exam has been recorded. For grading disputes, in cases beyond simple arithmetic on the score sheet, the instructor reserves the right to re-grade the whole exam/report. Any issue not explicitly discussed here will be handled at the discretion of the instructor.

Course Schedule:

Class Date	Class Discussion/Activities	Assignments
Sept 4	**Labor Day Holiday**	
6	Introductions Class Overview Pre-Test	**Syllabus Quiz** **Homework 1 O-Chem Review**
11	Intro to Carbohydrates Monosaccharides	**Homework 2 Carbohydrates**
13	Disaccharides and Polysaccharides	
18	Fatty Acids, Waxes & Triacylglycerol's	*Homework 2 due* **Homework 3 Lipids**
20	Phospholipids, Steroids & Cell Membranes	
25	Amines	*Homework 3 due* **Homework 4 Amines & Amides**
27	Neurotransmitters & Amides	
Oct 2	**Exam 1** (Week 2-4)	*Homework 4 due*
4	Amino Acids & Formation of Peptides	**Homework 5 Amino Acids & Peptides**

9	Protein Structure I & II	*Homework 5 due* **Homework 6 Protein Structure**
11	Protein Structure III & IV	
16	Enzyme Classification & Activity	*Homework 6 due* **Homework 7 Enzymes & Vitamins**
18	Enzyme Regulation, Inhibition, Cofactors & Vitamins	
23	**Exam II** (Week 5-7)	*Homework 7 due*
25	Nucleic Acid Primary Structure & DNA Double Helix	**Homework 8 Nucleic Acids & DNA**
30	DNA Replication, RNA & Transcription	*Homework 8 due* **Homework 9 DNA, RNA, etc.**
Nov 1	Genetic Code, Protein Synthesis & Genetic Mutation	
6	Recombinant DNA & Viruses	*Homework 9 due* **Homework 10 DNA & Viruses**
8	**Exam III** (Week 8-10)	*Homework 10 due*
13	Metabolism & Energy Production	**Homework 11 Metabolism & Energy Production**
15	Metabolism & Energy Production (cont.) Metabolic Pathways for Carbohydrates	
20	Metabolic Pathways for Carbohydrates	*Homework 11 due* **Homework 12 Macro Metabolism**
22	Metabolic Pathways for Carbohydrates	
Nov 23-25	**Thanksgiving Recess**	
27	Metabolic Pathways for Lipids	
29	Metabolic Pathways for Lipids	

Dec 4	Metabolic Pathways for Amino Acids	
6	Metabolic Pathways for Amino Acids	*Homework 12 due*
11	**Exam IV** (Week 11-14) **during exam week**	
13		
I reserve the right to change this schedule to meet the needs of the class.		

Responsibilities

Attending Class

Attendance

Attendance is counted as being present from the **first 10 minutes** of class **until the end of lecture/lab.** Anyone missing after the first 10 minutes of class will be marked late. If you are still missing after the first 15 minutes of class, you will be marked absent unless a written excuse is provided within 24 hours of the occurrence. Similarly, anyone leaving early without a written excuse will be counted as absent.

General Absences

You are responsible for all material presented in class and all in-class announcements and assignments. If for whatever reason you have to miss class, please approach your fellow students for the notes you missed, and take advantage of the class materials that will be posted on Blackboard http://class.ccsj.edu

ALL planned and unplanned absences must be communicated to your instructor **via email (Subject: *Last name, First name*, "CHEM 320 Absent", *Date*)** with a brief explanation.

Intellectual growth and success in college is reinforced through interaction in the classroom. Students reach personal goals and course outcomes through regular and prompt attendance. **Therefore, three (3) unexcused absences will result in an administrative withdrawal from the course.** Furthermore, **excessive tardiness (every 2 late arrivals) will result in 1 absence.** The student may be subjected to a grade of F or FW per the policy stated under the Withdrawal from Classes section on this syllabus.

Absence due to college events

We do not want to penalize students for participating in college-sponsored events. When you miss class because of a college event, you must give notice of your absence **24 hours in advance** according to the communication guidelines above, and you are responsible for all missed work. Being absent doesn't excuse you from doing class work; you have **more** responsibilities to keep up and meet the objectives of this course.

Exams

- If you are late for an exam, you must arrive before the first person leaves the room, otherwise you will not be allowed to take the exam and you will receive a 0.
- Cell phones are expressly prohibited during exams, and must be placed on the whiteboard ledge and silenced during the exam.

	• Exam Rules:
	  ○ Items which students may not have near them during the exams include:
	  ▪ Coats, jackets, hats, or other items of outerwear
	  ▪ Backpacks, pencil cases, purses, or other bags
	  ▪ Cell phones or other electronic devices
	  ▪ Graphing calculators
	  ▪ Covers for non-graphing calculators
	If you are not sure whether an item is permitted, please ask the instructor before the exam. No talking during exams. Items you are not permitted to have during exams should be placed at the designated area prior to the exam. Neither the instructor nor the department is responsible for any loss or theft of personal items. The instructor retains the right to issue an exam grade of zero to any student found to be in violation of one or more exam rules.
	
	NO MAKE-UPS. Make-up exams will not be given except upon the discretion of the instructor. **Athletic competition** that interferes with exams will require **documentation** to be presented to the instructor **by the end of the first week of classes**. Extension requests for extenuating circumstances can be submitted via email to the instructor. In the event the instructor approves the extension, a make-up exam will be scheduled within 2 days of the original exam date.
	
	If you require special accommodations for taking exams, please submit to the instructor the appropriate documentation from the Office of Disability, within the first week of the course to address your needs.
	Graded exams will not be distributed during lecture time. In order to obtain a copy of your exam, please stop during the instructors' office hours. You are free to go over the exams with the instructor in detail. Please see the note in the "Grading Scale". Final exams will not be returned to the students. You are free to come by and look at your exam, but the exam will not leave the instructors office

Turning In Your Work	You cannot succeed in this class if you do not turn in all your work on the day it is due. **Missing Assignments** <u>In-Class Homework:</u> Completed homework must be turned in directly to the instructor in class on the due date. Students who miss class are responsible for completing all missed homework and must turn it in **before 3:30p** to the instructors office, or send it electronically (email or BB) **by 11:59p on the due date.**. **5 pts will be deducted** from all homework turned in after the end of class. **Homework will not be accepted after the due date.** Extension requests for extenuating circumstances can be submitted via email to the instructor. Decisions on make-up work are left to the discretion of the instructor.
CCSJ Student Honor Code	This course asks students to reaffirm the CCSJ Student Honor Code: I, as a student member of the Calumet College academic community, in accordance with the college's mission and in a spirit of mutual respect, pledge to: • Continuously embrace **honesty and curiosity** in the pursuit of my educational goals; • Avoid all behaviors that could impede or distract from the academic progress of myself or other members of my **community**; • Do my own work with **integrity** at all times, in accordance with syllabi, and without giving or receiving inappropriate aid; • Do my utmost to act with commitment, inside and outside of class, to the goals and **mission** of Calumet College of St. Joseph.

Using Electronic Devices	Electronic devices can only be used in class for course-related purposes. If you text or access the Internet for other purposes, you may be asked to leave, in which case you will be marked absent.
Participating in Class	You must be on time, stay for the whole class and speak up in a way that shows you have done the assigned reading. If you are not prepared for class discussion, you may be asked to leave, in which case you will be marked absent.
Doing Your Own Work	If you turn in work that is not your own, you are subject to judicial review, and these procedures can be found in the College Catalog and the Student Planner. The maximum penalty for any form of academic dishonesty is dismissal from the College. Using standard citation guidelines, such as MLA or APA format, to document sources avoids plagiarism. The Library has reference copies of each of these manuals, and there are brief checklists in your Student Handbook and Planner. **PLEASE NOTE:** All papers may be electronically checked for plagiarism.
Tracking Your Progress	Your midterm grade will be available on MyCCSJ between Weeks 6 and 8. Be sure to see how you're doing and follow up with your instructor. To discuss questions or concerns regarding your grade, please see the note in the grading scale above for instructions.
Sharing Your Class Experience	At the end of the term, you will have the opportunity to evaluate your classroom experience. These confidential surveys are ***essential*** to our ongoing efforts to ensure that you have a great experience that leaves you well prepared for your future. Your instructor will be using CCSJ's new Diagnostic Feedback Instrument, which will ask you to describe the progress you feel you have made on the following learning objectives for this course: • Gaining a basic understanding of the subject (e.g., factual knowledge, methods, principles, generalizations, theories) • Learning to *apply* course material (to improve thinking, problem solving, and decisions) • Learning appropriate methods for collecting, analyzing, and interpreting numerical information • Gaining a broader understanding and appreciation of intellectual activity • Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course Take the time to complete your course evaluations – we value your feedback!
Withdrawing from Class	After the last day established for class changes has passed (see the College calendar), you may withdraw from a course by following the policy outlined in the CCSJ Course Catalog.

Resources	
Student Success Center:	The Student Success Center provides faculty tutors at all levels to help you master specific subjects and develop effective learning skills. It is open to all students at no charge. You can contact the Student Success Center at 219 473-4287 or stop by the Library.
Disability Services:	Disability Services strives to meet the needs of all students by providing academic services in accordance with Americans with Disabilities Act (ADA) guidelines. If you believe that you need a "reasonable accommodation" because of a disability, contact the Disability Services Coordinator at 219-473-4349.
Student Assistance Program	Through a partnership with Methodist Hospital, Calumet College of St. Joseph provides a free Student Assistance Program (SAP) to current students. The SAP is a confidential counseling service provided to students for personal and school concerns which may be interfering with academic performance and/or quality of life. The SAP counselor is available on campus once a week and off-site at their Employee Assistance Program (EAP) office in Merrillville or Gary. For more information, contact the SAP Counselor, at 219-736-4067.

EMERGENCY PROCEDURES

MEDICAL EMERGENCY

EMERGENCY ACTION

1. Call 911 and report incident.
2. Do not move the patient unless safety dictates.
3. Have someone direct emergency personnel to patient.
4. If trained: Use pressure to stop bleeding.
5. Provide basic life support as needed.

FIRE

EMERGENCY ACTION

1. Pull alarm (located by EXIT doors).
2. Leave the building.
3. Call 911 from a safe distance, and give the following information:

- Location of the fire within the building.
- A description of the fire and how it started (if known)

BUILDING EVACUATION

1. All building evacuations will occur when an alarm sounds and/or upon notification by security/safety personnel. **DO NOT ACTIVATE ALARM IN THE EVENT OF A BOMB THREAT.**
2. If necessary or if directed to do so by a designated emergency official, activate the building alarm.
3. When the building evacuation alarm is activated during an emergency, leave by the nearest marked exit and alert others to do the same.
4. Assist the disabled in exiting the building! Remember that the elevators are reserved for persons who are disabled. **DO NOT USE THE ELEVATORS IN CASE OF FIRE. DO NOT PANIC.**
5. Once outside, proceed to a clear area that is at least 500 feet away from the building. Keep streets, fire lanes, hydrant areas and walkways clear for emergency vehicles and personnel. The assembly point is the sidewalk in front of the college on New York Avenue.
6. **DO NOT RETURN** to the evacuated building unless told to do so by College official or emergency responders.

IF YOU HAVE A DISABILITY AND ARE UNABLE TO EVACUATE:

Stay calm, and take steps to protect yourself. If there is a working telephone, call 911 and tell the emergency dispatcher where you are **or** where you will be moving. If you must move,

1. Move to an exterior enclosed stairwell.
2. Request persons exiting by way of the stairway to notify the Fire Department of your location.
3. As soon as practical, move onto the stairway and await emergency personnel.
4. Prepare for emergencies by learning the locations of exit corridors and enclosed stairwells. Inform professors, and/or classmates of best methods of assistance during an emergency.

HAZARDOUS MATERIAL SPILL/RELEASE

EMERGENCY ACTION

1. Call 911 and report incident.
2. Secure the area.
3. Assist the injured.
4. Evacuate if necessary.

TORNADO

EMERGENCY ACTION

1. Avoid automobiles and open areas.
2. Move to a basement or corridor.
3. Stay away from windows.
4. Do not call 911 unless you require emergency assistance.

SHELTER IN PLACE

EMERGENCY ACTION

1. Stay inside a building.
2. Seek inside shelter if outside.
3. Seal off openings to your room if possible.
4. Remain in place until you are told that it is safe to leave.

BOMB THREATS

EMERGENCY ACTION

1. Call 911 and report incident.
2. If a suspicious object is observed (e.g. a bag or package left unattended):

- Don't touch it!
- Evacuate the area.

TERRORISM AND ACTIVE SHOOTER SITUATIONS

EMERGENCY ACTION

1. Call 911 and report intruder.

RUN, HIDE OR FIGHT TIPS:

1. **Prepare** – frequent training drills to prepare the most effectively.
2. **Run and take others with you** – learn to stay in groups if possible.
3. **Leave the cellphone.**
4. **Can't run? Hide** – lock the door and lock or block the door to prevent the shooter from coming inside the room.
5. **Silence your cellphone** -- use landline phone line.
6. **Why the landline?** It allows emergency responders to know your physical location.
7. **Fight** – learn to "fight for your life" by utilizing everything you can use as a weapon.
8. **Forget about getting shot – fight**! You want to buy time to distract the shooter to allow time for emergency responders to arrive.
9. **Aim high** – attack the shooter in the upper half of the body: the face, hands, shoulder, and neck.
10. **Fight as a group** – the more people come together, the better the chance to take down the shooter.
11. **Whatever you do, do something** – "react immediately" is the better option to reduce traumatic incidents.