CHM 527 BIOCHEMISTRY LABORATORY, FALL 2010

Instructor: Dr. Stephen J. Juris
Classroom: Dow 249, Thursday, 1 PM-4:50 PM
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Office Hours: Mondays and Wednesdays 10 AM-12 PM; or by appointment

BLACKBOARD ACCESS: http://blackboard.cmich.edu. Log in with your CMU Global ID and password. Direct Blackboard questions to the CMU Help Desk (http://www.it.cmich.edu/helpdesk/helpdesk_home.asp or call 989-774-3662). Grades and other important class announcements will be posted here.

COURSE DESCRIPTION: The theory and practice of techniques used in basic biochemistry and molecular biology research. This course is intended to prepare students for research and development careers in biochemistry or for research in academia (e.g. lab technician, graduate school, or CHM 491 projects). Furthermore, it will demonstrate the practical aspects of lecture topics pertinent to biochemistry.

PREREQUISITES: CHM 211 and CHM 349. Prerequisite or co-requisite: CHM 425 or CHM 521.

REQUIRED TEXT: Text: Ninfa, Ballou and Benore, 2nd ed., 2010, Fundamental Laboratory Approaches for Biochemistry and Biotechnology.

OTHER REQUIRED MATERIAL: Laboratory notebook, black Sharpie, black ballpoint ink pen, calculator.

MAJOR COURSE GOALS: The overall goal of this course is to develop skills essential in biochemistry and molecular biology research.

- Achieve basic laboratory skills in biochemistry and develop familiarity with commonly used protein techniques such as protein purification, quantitation, and enzymatic assays, hybridizations, PCR, plasmid isolations, and restriction digests
- Achieve basic skills in molecular biology research including use of PCR, plasmid isolation, and restriction digests
- Develop work attitudes essential for successful careers in research

COURSE OBJECTIVES

By the end of this course, the student will be able to:

- Use a spectrophotometer to analyze different chemical species, including reactants and products in enzymatic reactions
- Effectively quantify proteins by a variety of methods
- Purify proteins using several techniques and analyze proteins for purity
- Carry out enzymatic reactions to determine enzyme yield during purification and analyze kinetics of enzymatic activity
- Isolate nucleic acids
- PCR amplify DNA
- Run and interpret acrylamide and agarose electrophoresis gels
- Maintain a laboratory research notebook

LABORATORY: Laboratory skills and theory behind experiments in biochemistry are the emphasis of this course. Everyone must read the lab exercises and prepare a pre-lab **prior to class** so you will be able to complete the exercise in the allotted time.

Access to the lab is restricted to students registered in one of the courses assigned to Dow 249 this semester; do not bring your friends or family into the lab. Always wash your hands prior to lab and wash your hands before leaving the lab.

WORK OUTSIDE THE CLASS: Expectations are that students will spend a **minimum of 2 hours studying for each hour of class time (approximately 8-10 hours each week)**. This includes reading required material, preparing for lab, completing homework, and working on assignments. In addition, there may be some lab work to be continued or completed outside of normally scheduled class time.

ATTENDANCE: Attendance is mandatory. Due to the nature of the labs, there can be no make-ups of missed labs. If you cannot attend lab, please contact me. **You are responsible** for notifying me as soon as possible about illness, trouble, or conflict. **You are responsible** for any make-up assignments, if possible, and for an excused absence. There will be no make-up assignments for unexcused absences. Any lab that is missed without notification of the lab instructor will be considered unexcused. If you have a serious problem that you don't want to discuss with your instructor, please contact the Office of Student Life, 774-3016. **If you miss two lab sessions (unexcused), you will not pass the course**.

EVALUATION will be based on the following:

(1) Lab Assignments **300 points** **60%**

In order to demonstrate competence in laboratory experiments you have carried out, you should be able to answer questions regarding techniques or experimental results. This competence will be assessed based on assignments covering questions at the end of experimental chapters. **A good notebook is vital for describing your experimental design and recording your experimental results in order to carry out these assignments!** You will not necessarily be graded on whether your experiment worked the way you expected, but rather whether you can correctly interpret results that you collected. Each assignment will be worth 35 points and will be graded for content, completeness and writing/grammar. Calculations that allow you to determine the answer to the question is just as important as the answer – partial credit is easy to give if you've made a calculation mistake if you show your work.

(2) Quizzes **165 points** **33%**

Being prepared for laboratory exercises prior to beginning those exercises helps in the safe and timely completion of experiments. In order to test for the preparedness of students, there will be a quiz at the beginning of class. **This quiz will be given out at the start of class and will be collected 10 minutes after the start of class, regardless of when each student began.** Thus, it is imperative that you be on time for class in order to maximize your time to take the quiz. Each quiz will be worth 15 points and students will be able to drop their lowest 2 quizzes. Your pre-lab exercise will serve you well if you are well prepared, as you will be able to use these on your quiz. No books will be allowed during the quiz!

(3) Subjective work attitude assessment **35 points** **7%**

Employers are looking for individuals with specific skills and attitudes. Potential employers will ask for comments specifically on traits from the list below. Those skills and attitudes that will be included in the assessment in CHM 527 are indicated in **bold**.

Trait	Is the candidate:
Intellectual ability	**Able to evaluate situation, solve problems, trouble shoot**
Knowledge	Generally well-educated with an understanding of the area of emphasis
Technical Skills	**Knowledgeable, coordinated, dexterous**
Computer Skills	Able to use word processing and spreadsheets
Interpersonal Skills	**Cooperative and tactful in relationships with supervisors, instructors, peers; a strong team player**
Leadership	Appropriately assertive, responsible, sensitive
Motivation	**Willing to show initiative, commitment, a drive to succeed**
Industry	**Self-starting, requiring little supervision, self-confident**
Personality	Patient, humorous, warm, cheerful, positive, pleasant, courteous, enthusiastic
Character	Honest, trustworthy, dependable, responsible, reliable, respectful, ethical, mature
Oral communication	Articulate, clear, grammatically correct, an attentive/responsive listener
Written communication	**Prepared, organized, grammatically correct, fluent**
Time management skills	**Prioritize, organize, multi-task**
Quality of work	**Produce a product that is accurate, neat, thorough, organized**
Adaptability	**Adapt to new situations, changes in routine, workload, assignments**
Attendance	**Frequently absent, late, or leaving early**
Perseverance	See a task through to completion
Personal appearance	Neat, clean, dress appropriately
Maturity	Stable, self-aware, receptive of criticism, self-disciplined, maintains control, poised
Knowledge of chosen profession	Opportunities, challenges, responsibilities, issues, ethics

(4) Graduate Student Assignment – Using the Internet for Biochemical Research 50 points
Graduate students are required to have an extra assignment for the CHM 527 in order to receive graduate credit. The graduate student assignment will be focused on Chapter 15 of the textbook and can be done outside of normal laboratory class time. Graduate students will be expected to answer questions 1, 3, and 5 from Section 15.6 (it can be turned in however you choose – lab report, poster, but the questions must be answered in the assignment). Utilize the resources provided in the textbook for conducting the assignment. If you have questions, please feel free to contact me. Start early, although an understanding of enzyme activity as we encounter it in the semester may help. This assignment will be due **December 2nd.**

COURSE GRADES will be determined by % of total points achieved out of 500, based on:

A 93-100%	A- 90-92%	B+ 87-89%	B 83-86%	B- 80-82%	C+ 77-79%
C 73-76%	C- 70-72%	D+ 67-69%	D 63-66%	D- 60-62%	E Below 60%

Depending on class performance and average, these cutoffs may be adjusted.

LATE POLICY: In the working world meeting deadlines is critically important. Missing deadlines may result in termination of your employment. Good time management skills will be essential no matter what your career turns out to be. It is important to develop these skills while you are in school so that assignments are finished on schedule. Due dates will be provided for each assignment; assignments will

be due **at the beginning of class**. There will be a 10% reduction in the final grade for the assignment for each day an assignment is late.

MISCELLANEOUS: Students with extended absences due to illness or other excused reason should contact me about making up required coursework. Make-up assignments will be given only under extreme personal circumstances (illness, death in the family), extramural athletic participation, required field trips in other courses, or employment obligations, and must be approved in advance. A note from the appropriate authority must be provided. A grade of Incomplete will be given only to students who are passing the course, and, for some reason of emergency, fail to complete the course requirements. The last day to withdraw from class with an automatic W is 5 PM, Friday, October 29.

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES: CMU provides students with disabilities reasonable accommodation to participate in educational programs, activities or services. Students with disabilities requiring accommodation to participate in class activities or meet course requirements should register with the office of Student Disabilities Services (250 Foust Hall, Telephone #989-774-3018, TDD #2568), and then contact me as soon as possible.

POLICY ON ACADEMIC INTEGRITY: In May 2001, the Central Michigan University Academic Senate approved the *Policy on Academic Integrity*, which applies to all university students. Copies are available in the Academic Senate Office in room 108 of Bovee University Center and on the CMU website at http://academicsenate.cmich.edu/noncurric.htm. All academic work is expected to be in compliance with this policy.

CLASSROOM CIVILITY: Each CMU student is encouraged to help create an environment during class that promotes learning, dignity, and mutual respect for everyone. Students who speak at inappropriate times, sleep in class, display inattention, take frequent breaks, interrupt the class by coming to class late, engage in loud or distracting behaviors, use cell phones or pagers in class, use inappropriate language, are verbally abusive, display defiance or disrespect to others, or behave aggressively towards others could be asked to leave the class and subjected to disciplinary action under the *Code of Student Rights, Responsibilities and Disciplinary Procedures*.