Course Syllabus

Course Information

BIO/CHM 3361-001 Biochemistry I MWF 11:00-11:50am CN1.120
BIO 3161-001 Biochemistry I Workshop F 12:00-12:50pm CN1.120

Note: You must take this specific workshop section with this section of lecture, no exceptions will be made.

Professor Contact Information

Dr. Donovan C. Haines
Phone: 972-883-4542
Email: haines@utdallas.edu
Office: BE2.518

Office Hours: MW 2:00pm-3:00pm (Listen for possible changes announced in class.)

Course Pre-requisites, Co-requisites, and/or Other Restrictions

Pre-requisite: CHEM2323 Intro to Organic Chemistry I
and Pre-requisite: CHEM2325 Intro to Organic Chemistry II

Although many different aspects of organic chemistry come up in Biochemistry, the reactions covered at the very end of Organic II come up the most often. You need to know Organic Chemistry to understand complex issues like how enzymes catalyze specific reactions (aldolase for example) and how vitamins assist in specialized chemistry (how does pyridoxal phosphate stabilize anionic intermediates and lower activation energies in amino acid decarboxylation?).

Course Description

BIOL 3361 Biochemistry I (3 semester hours) Structures and chemical properties of amino acids; protein purification and characterization; protein structure and thermodynamics of polypeptide chain folding; catalytic mechanisms, kinetics and regulation of enzymes; energetics of biochemical reactions; generation and storage of metabolic energy associated with carbohydrates; oxidative phosphorylation and electron transport mechanisms; photosynthesis.

BIOL 3161 Biochemistry Workshop I (1 semester hour) Problem solving methodology in biochemistry; discussion of recent advances in areas related to the subject matter in BIOL/CHEM 3361.

Student Learning Objectives/Outcomes

Objectives: This undergraduate core course is the first of a two-course sequence which provides students with a working knowledge of the macromolecules and fundamental metabolic pathways of prokaryotes and eukaryotes, with emphasis on human systems. Biochemistry I is devoted to mastering 1) the structure and function of amino acids and proteins and 2) carbohydrate structure and metabolism, as a means of understanding biological processes in general and developing problem-solving skills in biochemistry. Overarching thermodynamic principles that drive life processes and the regulatory mechanisms that fine-tune them are stressed in order to provide the rationale and framework for students to master the necessary molecular structure and pathways. Relevance to human physiology, medicine, and genetics is used to stimulate students to begin the integration of biochemistry with other disciplines.

Outcomes: Students will be able to:

1. Explain the basic thermodynamics governing biochemical reactions and use this information to solve problems involving biochemical thermodynamics.
2. Recognize the molecular structures and describe the chemical properties of proteins, their amino acid residues, and carbohydrates; and solve related pH problems.
3. Explain enzyme catalysis and regulation, and apply enzyme kinetics in problem solving.
4. Describe the central catabolic and anabolic carbohydrate pathways.

Required Textbooks and Materials

Biochemistry, 3rd edition, by Garrett and Grisham (ISBN 0-534-49033-6), published by Brooks/Cole.

Suggested Course Materials

Jemiolo & Theg's 3rd edition Student Solutions Manual to accompany Biochemistry by Garrett and Grisham (ISBN 0-534-49035-2), Published by Brooks/Cole, will be used in the Workshops, BIO 3161. Many students also find it very useful for its summary information and worked out problems.

Assignments & Academic Calendar

	Date	Topic	Chapter		Workshop
Fri	8/18/2006	Intro	1		doesn't' meet
Mon	8/21/2006	Water/Buffers	2		
Wed	8/23/2006	Thermo	3		
Fri	8/25/2006	Thermo/Amino Acids	3 & 4		Buffers/Thermo calcs
Mon	8/28/2006	Amino Acids	4	PS#1 Due	
Wed	8/30/2006	Protein - primary	5		
Fri	9/1/2006	Protein - primary	5		Amino Acids
Mon	9/4/2006	NO CLASS - HOLIDAY			
Wed	9/6/2006	Protein - primary	5	PS#2 Due	
Fri	9/8/2006	EXAM 1			(Exam 1)
Mon	9/11/2006	Protein - 2,3,4	6		
Wed	9/13/2006	Protein - 2,3,4	6		
Fri	9/15/2006	Kinetics	13		Protein Structure
Mon	9/18/2006	Kinetics	13	PS#3 Due	
Wed	9/20/2006	Kinetics	13		
Fri	9/22/2006	Mechanism	14		Enzyme Kinetics
Mon	9/25/2006	Mechanism	14		
Wed	9/27/2006	Mechanism	14		
Fri	9/29/2006	Regulation	15		Enzyme Mechanism and Regulation
Mon	10/2/2006	Regulation	15	PS#4 Due	
Wed	10/4/2006	Regulation	15		
Fri	10/6/2006	EXAM 2			(Exam 2)
Mon	10/9/2006	Intro to Metabolism	17		
Wed	10/11/2006	Vitamins & Coenzymes	17		
Fri	10/13/2006	Vitamins & Coenzymes	17		Special Topic Lecture
Mon	10/16/2006	Carbohydrates	7		
Wed	10/18/2006	Carbohydrates	7		
Fri	10/20/2006	Glycolysis	18		Carb Workshop
Mon	10/23/2006	Glycolysis	18	PS#5 Due	
Wed	10/25/2006	Glycolysis	18		
Fri	10/27/2006	Exam 3			(Exam 3)
Mon	10/30/2006	TCA Cycle	19		
Wed	11/1/2006	TCA Cycle	19		
Fri	11/3/2006	TCA Cycle Regulation	19		Tracking carbons workshop
Mon	11/6/2006	Electron Transport Chain	20		
Wed	11/8/2006	Electron Transport Chain	20		
Fri	11/10/2006	Oxidative Phosphorylation	20		Special Topic Lecture
Mon	11/13/2006	Oxidative Phosphorylation	20	PS#6 Due	
Wed	11/15/2006	Gluconeogenesis	22		
Fri	11/17/2006	Exam 4	20		(Exam 4)
Mon	11/20/2006	Glycogen Metabolism	22		
Wed	11/22/2006	Glycogen Metabolism	22		
Fri	11/24/2006	NO CLASS - HOLIDAY			NO CLASS
Mon	11/27/2006	Metabolism Review	18-22		
Monday	12/4/2006	Comprehensive Final Exam	11:00am		

EXAMS – Exams are predominantly multiple choice. Exams are scheduled on Fridays and use both the lecture and workshop time with no break in between. Exams start at 11:00am and end at 12:45pm.

Exams utilize scantron #F-1712-PAR-L (a full sized pink form) which students must provide before exam one. Bringing five scantrons (one for each exam) prior to exam one will give you five bonus points on the exam. Do not fill in your name on the scantrons you bring. Due to students cheating by writing on the forms prior to exams, they must be shuffled and redistributed.

PROBLEM SETS – Problem sets are due at the start of lecture on the Monday shown in the schedule. You get to drop one problem set. Late problem sets will suffer a 20% per business day deduction in points. You are allowed (in fact encouraged) to discuss the problem sets with your classmates. The solution you write and turn in must be your own work, however.

FINAL EXAM – The final exam takes place during finals week and is comprehensive. Because our scheduled exam time is only a day and a half before grades are due, anyone missing the exam with a documented emergency will need to take an alternate final within 24 hours of the class final.

Grading Policy

You will receive the same grade in 3361 (lecture) and 3161 (workshop). The grade reported for both will be compiled as follows…

Numerical average

Problem sets (the lowest one will be dropped)	5 x 30 = 150 pts
Regular Exams	4 x 100 = 400 pts
Final Exam	150 pts
Total	700 pts

To get	You must get this percent of the total points				
A+	96.67%	676.7	to	700.0	A+
A	93.33%	653.3	to	676.6	A
A-	90.00%	630.0	to	653.2	A-
B+	86.67%	606.7	to	629.9	B+
B	83.33%	583.3	to	606.6	B
B-	80.00%	560.0	to	583.2	B-
C+	76.67%	536.7	to	559.9	C+
C	73.33%	513.3	to	536.6	C
C-	70.00%	490.0	to	513.2	C-
D+	66.67%	466.7	to	489.9	D+
D	63.33%	443.3	to	466.6	D
D-	60.00%	420.0	to	443.2	D-
F	0.00%	0.0	to	419.9	F

Points will be rounded to the nearest tenth of a point where necessary. Your grade is guaranteed to be at least as high as that shown in the table.

Course & Instructor Policies

It is my experience that the scantron machine, when used properly, does not make errors. For your protection, all scantrons are scanned to a PDF image archive before being returned to students. DO NOT ATTEMPT TO CHANGE YOUR FORM AFTER IT HAS BEEN GRADED. This is very easy to catch.

The exam questions are multiple choice and are carefully checked by the teaching faculty prior to the examination. Grading of computer bubble sheets are by automated scanner. Therefore, the exam will always be properly graded and scored. On rare occasion a question may appear where the answer is ambiguous (example, more than one correct answer or no answer is correct). If you have a strong argument that such a question has appeared, then you may write a written challenge to the question. Such a challenge must be submitted in writing (email is acceptable) to Dr. Haines within 48 hours of the return of your exam. The challenge must be based on your quoting sections of the faculty members lecture notes (on the web site) or the textbook (Garrett and Grisham). What the faculty member says in class on a subject, or in their class notes, will take priority over the textbook when considering a challenge. All challenges will be answered by the faculty in writing, and if the faculty member agrees grades will be modified appropriately. Do not waste your time or ours with challenges that are clearly without merit. This challenge system was created to give you fair grades and to catch the rare ambiguous questions.

Field Trip Policies
Off-campus Instruction and Course Activities

> *Off-campus, out-of-state, and foreign instruction and activities are subject to state law and University policies and procedures regarding travel and risk-related activities. Information regarding these rules and regulations may be found at the website address http://www.utdallas.edu/BusinessAffairs/Travel_Risk_Activities.htm. Additional information is available from the office of the school dean. Below is a description of any travel and/or risk-related activity associated with this course.*

There is no travel associated with this laboratory course.

Student Conduct & Discipline

> The University of Texas System and The University of Texas at Dallas have rules and regulations for the orderly and efficient conduct of their business. It is the responsibility of each student and each student organization to be knowledgeable about the rules and regulations which govern student conduct and activities. General information on student conduct and discipline is contained in the UTD publication, *A to Z Guide*, which is provided to all registered students each academic year.

The University of Texas at Dallas administers student discipline within the procedures of recognized and established due process. Procedures are defined and described in the *Rules and Regulations, Board of Regents, The University of Texas System, Part 1, Chapter VI, Section 3*, and in Title V, Rules on Student Services and Activities of the university's *Handbook of Operating Procedures*. Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations (SU 1.602, 972/883-6391).

A student at the university neither loses the rights nor escapes the responsibilities of citizenship. He or she is expected to obey federal, state, and local laws as well as the Regents' Rules, university regulations, and administrative rules. Students are subject to discipline for violating the standards of conduct whether such conduct takes place on or off campus, or whether civil or criminal penalties are also imposed for such conduct.

Academic Integrity

The faculty expects from its students a high level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student for that degree, it is imperative that a student demonstrate a high standard of individual honor in his or her scholastic work.

Scholastic dishonesty includes, but is not limited to, statements, acts or omissions related to applications for enrollment or the award of a degree, and/or the submission as one's own work or material that is not one's own. As a general rule, scholastic dishonesty involves one of the following acts: cheating, plagiarism, collusion and/or falsifying academic records. Students suspected of academic dishonesty are subject to disciplinary proceedings.

Plagiarism, especially from the web, from portions of papers for other classes, and from any other source is unacceptable and will be dealt with under the university's policy on plagiarism (see general catalog for details). This course will use the resources of turnitin.com, which searches the web for possible plagiarism and is over 90% effective.

Email Use

The University of Texas at Dallas recognizes the value and efficiency of communication between faculty/staff and students through electronic mail. At the same time, email raises some issues concerning security and the identity of each individual in an email exchange. The university encourages all official student email correspondence be sent only to a student's U.T. Dallas email address and that faculty and staff consider email from students official only if it originates from a UTD student account. This allows the university to maintain a high degree of confidence in the identity of all individual corresponding and the security of the transmitted information. UTD furnishes each student with a free email account that is to be used in all communication with university personnel. The

Department of Information Resources at U.T. Dallas provides a method for students to have their U.T. Dallas mail forwarded to other accounts.

Withdrawal from Class

The administration of this institution has set deadlines for withdrawal of any college-level courses. These dates and times are published in that semester's course catalog. Administration procedures must be followed. It is the student's responsibility to handle withdrawal requirements from any class. In other words, I cannot drop or withdraw any student. You must do the proper paperwork to ensure that you will not receive a final grade of "F" in a course if you choose not to attend the class once you are enrolled.

Student Grievance Procedures

Procedures for student grievances are found in Title V, Rules on Student Services and Activities, of the university's *Handbook of Operating Procedures*.

In attempting to resolve any student grievance regarding grades, evaluations, or other fulfillments of academic responsibility, it is the obligation of the student first to make a serious effort to resolve the matter with the instructor, supervisor, administrator, or committee with whom the grievance originates (hereafter called "the respondent"). Individual faculty members retain primary responsibility for assigning grades and evaluations. If the matter cannot be resolved at that level, the grievance must be submitted in writing to the respondent with a copy of the respondent's School Dean. If the matter is not resolved by the written response provided by the respondent, the student may submit a written appeal to the School Dean. If the grievance is not resolved by the School Dean's decision, the student may make a written appeal to the Dean of Graduate or Undergraduate Education, and the deal will appoint and convene an Academic Appeals Panel. The decision of the Academic Appeals Panel is final. The results of the academic appeals process will be distributed to all involved parties.

Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations.

Incomplete Grade Policy

As per university policy, incomplete grades will be granted only for work unavoidably missed at the semester's end and only if 70% of the course work has been completed. An incomplete grade must be resolved within eight (8) weeks from the first day of the subsequent long semester. If the required work to complete the course and to remove the incomplete grade is not submitted by the specified deadline, the incomplete grade is changed automatically to a grade of **F**.

Disability Services

The goal of Disability Services is to provide students with disabilities educational opportunities equal to those of their non-disabled peers. Disability Services is located in room 1.610 in the Student Union. Office hours are Monday and Thursday, 8:30 a.m. to 6:30 p.m.; Tuesday and Wednesday, 8:30 a.m. to 7:30 p.m.; and Friday, 8:30 a.m. to 5:30 p.m.

The contact information for the Office of Disability Services is:
The University of Texas at Dallas, SU 22
PO Box 830688
Richardson, Texas 75083-0688
(972) 883-2098 (voice or TTY)

Essentially, the law requires that colleges and universities make those reasonable adjustments necessary to eliminate discrimination on the basis of disability. For example, it may be necessary to remove classroom prohibitions against tape recorders or animals (in the case of dog guides) for students who are blind. Occasionally an assignment requirement may be substituted (for example, a research paper versus an oral presentation for a student who is hearing impaired). Classes enrolled students with mobility impairments may have to be rescheduled in accessible facilities. The college or university may need to provide special services such as registration, note-taking, or mobility assistance.

It is the student's responsibility to notify his or her professors of the need for such an accommodation. Disability Services provides students with letters to present to faculty members to verify that the student has a disability and needs accommodations. Individuals requiring special accommodation should contact the professor after class or during office hours.

Religious Holy Days

The University of Texas at Dallas will excuse a student from class or other required activities for the travel to and observance of a religious holy day for a religion whose places of worship are exempt from property tax under Section 11.20, Tax Code, Texas Code Annotated.

The student is encouraged to notify the instructor or activity sponsor as soon as possible regarding the absence, preferably in advance of the assignment. The student, so excused, will be allowed to take the exam or complete the assignment within a reasonable time after the absence: a period equal to the length of the absence, up to a maximum of one week. A student who notifies the instructor and completes any missed exam or assignment may not be penalized for the absence. A student who fails to complete the exam or assignment within the prescribed period may receive a failing grade for that exam or assignment.

If a student or an instructor disagrees about the nature of the absence [i.e., for the purpose of observing a religious holy day] or if there is similar disagreement about whether the student has been given a reasonable time to complete any missed assignments or examinations, either the student or the instructor may request a ruling from the chief executive officer of the institution, or his or her

designee. The chief executive officer or designee must take into account the legislative intent of TEC 51.911(b), and the student and instructor will abide by the decision of the chief executive officer or designee.

These descriptions and timelines are subject to change at the discretion of the Professor.