



Virginia State University

DEPARTMENT OF BIOLOGY

Microbial Biochemistry (BIOL 542)
Spring, 2003
Syllabus and Course Schedule

INSTRUCTOR: Dr. Ali Mohamed OFFICE: 201
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TEXTBOOK: Lehninger Principles of Biochemistry by D. Nelson and M. Cox, 3rd edition

SEMESTER: Spring, 2004

CLASS SCHEDULE: Wednesday 5:00-7:50 PM ROOM: 110 Lockett Hall
Course Credit: 3 semester hours

Prerequisites: Successful completion of undergraduate courses in biology, cell physiology, chemistry specifically organic chemistry (a physical chemistry course would help), and enrollment in an advanced degree program.

Materials: Writing instruments and paper, textbooks, and Calculator, Announcement and lecture notes will be posted on the VSU's Blackboard. Please visit the site and bring lecture notes with you to the class. Have a one folder to keep you class materials and assignments.

Office Hours: See Attached table for office hours

University Mission:

To promote and sustain academic programs that integrate instruction, research, and extension of public service in a design most responsible to the needs and endeavors of individuals and groups within its scope of influence. The University is dedicated to providing for its students and education which challenges their intellect and prepares them to become knowledgeable, perceptive and equipped for personal fulfillment sensitive to the needs and aspirations of others, and committed to assuring productive roles in an ever-changing global society.

Department of Biology Mission:

The mission of the Department of Life Sciences is to provide the professional assistance needed to develop insight into biological research and preparation for medical or graduate study.

COURSE DESCRIPTION AND OBJECTIVES:

Course Objectives: The primary objective of BIOL 542 is to provide graduate and advanced students with a basic understanding of biochemistry, molecular, and cellular biology. Heavy emphasis is given to Biochemistry. Special emphasis will be given to the biochemical processes and where they occur within the cell. Topics are listed in the attached course schedule. The students will:

1. Gain knowledge of chemistry and physiology of the biological system.
2. Understand the biochemical characteristics of various organelles and types of cells.
3. Understanding the principles involved in membrane transports, permeation, cell communication and signaling.
4. Gain needed knowledge about DNA synthesis and metabolism.

Course Activities:

Students will be requested to conduct e-search to collect most recent information in biochemistry and related areas. ***Information on such activities will be provided to students at the appropriate time.***

Be advised this is a difficult course from the standpoint of breath of material to be covered and the relentless pace through the semester. DO NOT GET BEHIND! I will strive to develop your ability to integrate basic information and develop your problem solving skills. This will be reflected in the types of exam questions that will be given. Exams will be designed to make you think, not memorize and regurgitate basic facts. Therefore, exam questions may be of mixed composition ranging from problem solving, fill-in the blank, matching, multiple-choice, to essay questions. This course is designed to provide a basic background for students wishing to ultimately carry out research as a part of their degree program(s) here at VSU. I will be to consult with students who need extra help on an ad hoc basis. If you get into a grade problem, please come see me before it gets irreparable.

CRITICAL THINKING:

Data show that college graduates and the general population are increasingly ignorant of science and are ill equipped to make intelligent decisions about issues such as biological systems and their interaction with environments. The lack of training in critical thinking is a major reason for this paucity of problem-solving skills, (critical thinking is broadly defined as the use of any cognitive skills higher than recall, or more narrowly as the process of evaluating a body of evidence, separating assumptions from observations, and reaching some conclusion based on the evidence.) Therefore, a major goal of this course is to improve students' learning and understanding of biology by implementing student critical thinking in the classroom. This will be accomplished by:

- Teaching science as science is done-namely, as a process of learning with emphasis on observation and hands-on, discovery-based activities that lead to formulating and testing hypotheses;
- Starting lessons with explanations of why the topic is interesting and important and using everyday language coupled with scientific terminology;

- Presenting information as a constant state of flux rather than dogmatic "facts"; and,
- Testing for and rewarding critical thinking rather than memorization.

Honor Code:

Each student is expected to adhere to the policies of the honor code as established by the University. All academic assignments, quizzes and tests are to be the result of individual effort. Any student found guilty of cheating will receive a failing grade (F) for the assignment or activity in question.

Classroom Conduct:

The classroom environments will be maintained in a manner that facilitates effective teaching and learning. The classroom environments should be such that it prepares students for behavior that is expected in the professional and corporate environments for which they are preparing to live and work.

Disruptive and disrespectful behavior on the part of any student will not be tolerated by the instructor. The instructor will always be in charge and has the right to determine appropriate standards of behavior in the classroom as long as the requirement does not infringe upon the individual's rights. To cover extract information which will not be provided in handouts or provided on through e-mail or internet, students must be prepared to take lecture notes during the class.

STUDENT STUDY AIDS:

Audio-visual aids are available on specific topics. These will be available to you after class on the web site provided by the instructor (during conference hours).

ANALYSIS AND EVALUATION OF THE COURSE:

1. Pro and post testing
2. Itemized analysis of the tests.
3. Revision/modification of problematic test questions
4. Implementation of the SST Advisement/Intervention strategies

GRADE EVALUATION:

Students will be evaluated according to the following plan:

Class attendance and participation are essential to learning. In addition to test scores, class attendance and participation will be used for evaluation in this class. Each student is expected to participate in the classroom discussion. To ensure such

1. Participation, student must read the information prior attending the class.
2. Attendance (25pts.): Attendance is required of all students to obtain a passing

- grade in the course.
3. 4 Hourly Examinations (100 Pts. Each, for a total of 400 Pts).
 4. 2 concept papers (50 Pts. Each, for a total of 100). The guidelines for these concept papers will be provided by the faculty at appropriate time.

Testing: As indicated on the schedule, there will be 4 examinations of equal weight. The final exam date and time will be decided on by the university as it will fall during the final exam week. The last exam is NOT COMPREHENSIVE.

Students will sit at least one seat apart and directly behind each other. All book bags, notebooks, purses, etc., will be left at the sides or preferably the back and front of the room. Only pencils (pens) and simple calculators will be permitted at your seat. No fancy calculators with memory or extra sheets of paper will be permitted at your desk. Expect random checks of all students leaving the test room during the exam. All exams will be turned in before leaving the room. Exams will be copied at random to avoid misunderstandings. THE HONOR CODE WILL BE STRICTLY FOLLOWED. If you see any infraction, please report it immediately to the faculty member(s) in charge.

Examination Policy:

In order to evaluate each student fairly, it is imperative that all students take all examinations (tests and final-exam.) at specified times. Therefore, no exam will be given at earlier or later times. No make-up exam(s) will be given unless justifiable excuse with written document is given. Excuses are limited to extreme emergencies such as being sick or hospitalized (with proofs from physician and/or hospital. (Note: not just excuse sheet from the Dormitory Counselor). Make-up exams will definitely be a "new" exam. which may be oral, written, or a combination of oral and written depending on faculty preference. In the event of a mis-grade, preference will be given to the correct answer. Arrangement for make-up examination needs to be made within one week of the scheduled exam. The final examination, the best three out of the four hourly test scores, and the other assignments will be used for computing the final grade. Finally, an F score will be assigned to any student who cheats during any of the examinations.

This semester, I will be entertaining re-grading questions for only one week after exam has been returned to the students. Thus, you must take care of this immediately or forfeit the opportunity in the future.

Grading: Ideally, an average of 87 or 75 will ensure a grade of "A" or "B", respectively, in the course. To ensure a satisfactory grade for your efforts, strive to be above the 87 or minimum of 75. The final grade will be determined at the end of the course based on the performance of whole semester.

GOOD LUCK TO YOU! I hope that this semester will be a rewarding experience for all and the course will adequately prepare you for more advanced classes in your specific curriculum.

Knowledge, Skill and Ability for For Microbial Biochemistry

Knowledge:

1. Student will describe the Biochemical process in biological systems.
2. Student will understand basis for different scientific methods used in biochemistry and molecular biology.
3. Student states the differences between inductive and deductive reasoning and their applications in different biochemical processes
4. Student will identify different biochemical Pathways.
5. Student will link the biochemical processes with different biochemical events in animals, plants and other organisms.
6. Student will recognize the chemical and cellular basis of Life.
7. Student will know the processes by which molecules move through the biological membranes.
8. Student will understand and know the processes by which energy transformation takes place in living organisms.
9. Student will understand the basis of chronic diseases.
10. Student will know recent information in biochemistry recent development in stem cell, cloning, and biotechnology.

SKILLS:

1. Student will demonstrate the use of their knowledge in biochemistry in different aspect of biological sciences.
2. Student will differentiate between different biochemical processes and selected the appropriate process and its application.
3. Student will identify different kinds of biological molecules.
5. Student will identify the behavior of biological molecules in associated organelles.
6. Student will express differences; different types of biological systems and flow of energy.
7. Student will locate scientific information by using the library as a resource center.
8. Student will demonstrate writing ability in science.
10. Student will express results qualitatively as well as quantitatively.

ABILITIES:

1. Student will be able to reject misconceptions in biochemical processes.
2. Student will be able to understand scientific materials in biochemistry and be able comprehend the biochemical information.
3. Student will know the importance of biology as science to be used in public policy for all organisms.
4. Student will be able to make sensible decisions and voting based on biological facts.
5. Student will be able to carry out better scientific communicate in biochemistry and its applications.

Virginia State University
School of Engineering, Science and Technology
Department of Biology

Microbial Biochemistry
Spring, 20024 Course Schedule

TEXT: Lehninger Principles of Biochemistry by D. Nelson and M. Cox, 3rd edition
WEBSITE: <http://blackboard.vsu.edu>

DATE	LECTURE TOPIC	Chapter Covered
Jan. 12-16	Foundations of Biochemistry/Cells Biomolecules	Chp. 1,2 Chp. 3, pp. 53-73
Jan. 19 MON.	Martin Luther King Jr. Day- University Closed	No Monday Labs
Jan. 20-23 Tues.- Fri.	Thermodynamics/Energetics	Chp. 1, pp. 5-12 Chp. 14, pp. 485-501
Jan. 26-30	Water/Acids and Bases Buffering	Chp. 4, pp. 82-98 Chp. 4, pp. 98-110 Chp. 5, pp. 123-126
Feb. 2-6	Amino Acids/Peptides/Proteins Physical Methods for Protein Purification II & Analysis	Chp. 5, pp. 113-120,137-141 Chp. 5, pp. 146-149
Feb. 9-13	EXAM I (Jan 12- Feb 6, a total of 4 lectures) Physical Methods for Protein Purification I & Analysis Chemical Determination of Structure, Amino Acid Analysis	Chp. 5, pp. 121,130-137
Feb. 16-20	Protein Sequence Determination Primary and Secondary Structure of Proteins Tertiary Structure/Structure Determination Term Paper Assignment [Dateline)	Chp. 5, pp. 141-154
Feb. 23-27	Protein Folding/ Structure Prediction Quaternary Structure/Allosteric Regulation	Chp. 5, pp. 141-154 Chp. 6, pp. 159-172 Chp. 6, pp. 173-191
Mar. 1-5	Antibody Structure/Utilization Enzymes Rates of Enzyme Reactions Enzyme Kinetics, Graphical Analysis	Chp. 6, pp. 191-199 Chp. 7, pp. 203-221 Chp. 7, pp. 221-233 Chp. 8
Mar. 8-12	Spring Break – No Classes	No Labs
Mar. 15-19	EXAM II (Feb 18- MAR 4, a total of 4 lectures) Enzyme Kinetics, Inhibitors Coenzymes, Review [include ATP. NAD, FAD, CoA] " Carbohydrates and Glycobiology I.	Chp. 8 Chp. 10, pp. 354-358 Chp. 9
Mar. 22-26	Lipid Structure Membrane Composition Transport I, Transport II/Biosignaling Oxidation of Fatty Acids Biosynthesis and Regulation	Chp. 11 Chp. 12, 13 Chp. 17
Mar. 29-Apr. 2	Principles of Bioenergetics Glycolysis, Citric Acid Cycle Gluconeogenesis Carbohydrate Biosynthesis	Part III, pp. 485-489 Chp. 14, pp. 490-526 Chp. 15, pp. 527-597

Apr. 5-9	EXAM III (Mar 25-Apr 8, a total of 21 lectures) Regulation of Carbohydrate Metabolism Electron Transport/Oxidative Phosphorylation Nucleotides and	Chp. 19, pp. 659-690 Chp. 19, pp. 659-690 Chp. 10, pp. 325- 343
Apr. 12-16	Nucleic Acid Structure Biosynthesis of Nucleotides Nucleotide Metabolism Arachidonate Metabolism Cholesterol Metabolism	Chp. 22, pp. 848-856 Chp. 22, pp. 856-865 Chp. 21 Chp. 23
Apr. 19-23	Phospholipid and Glycolipid Metabolism Energy Metabolism; Integration and Organ Specialization	Chp 23
Apr. 26 Mon.	Last Day of Classes Continue Chapter 26	
Apr. 27 Tues.	Reading Day	
Apr. 29-May 3	Final Exam Week	

Dr. Mohamed, Ali
Class Schedule and Office Hours
 Semester: Spring Year: 2004

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
8:00		BIOL. SCI. GEBI-116-06 8:00-9:20 RM 204		BIOL. SCI. GEBI-116-06 8:00-9:20 RM 204		
9:00			Office Hours 9:00 - 12:00		Office Hours 9:00 - 12:00	
10:00						
11:00						
12:00	BIOL. SCI. GEBI-116-03 12:00-12:50 RM 204		BIOL. SCI. GEBI-116-03 12:00-12:50 RM 204		BIOL. SCI. GEBI-116-03 12:00-12:50 RM 204	Cytology BIOL-520-01 12:00-2:50 (RM 208)
1:00	Office Hours 1:00 - 4:00		Investigations and Research BIOL-446-05 1:00-1:50 (RM 112)		Investigations and Research BIOL-446-05 1:00-1:50 (RM 112)	
2:00			Office Hours 2:00 - 4:00		Office Hours 2:00 - 4:00	
3:00					by Appointment	
4:00						
5:00			MICROBIAL BIOCHEMISTRY BIOL-542-01 5:00- 7:50 RM 110			
6:00- 7:50						