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Hunan University
BIL 201: Chemical Biology

Professor: To be announced
Total contact hours: 54 hours
Credit: 4

Course Description

This course familiarizes the students with in-depth explanations of biochemical concepts and offers a unified presentation of life and its variation through evolution. Along with an emphasis on the reflections of enormous advances in molecular and protein structure, the course incorporates both classical and current research to illustrate the historical source of much of our biochemical knowledge.

Required Material

Textbook: Biochemistry
Author: Donald Voet, Judith G. Voet
Edition: 4th Edition
Publisher: Wiley
Publication Date: Dec. 14, 2010
ISBN: 0470570954

Grading

- 8 Lab experiments 40%
- 4 Quizzes 20%
- Final Exam 40%

A+ 96-100	A 90-95	A- 85-89
B+ 82-84	B 78-81	B- 75-77
C+ 71-74	C 66-70	C- 62-65
D 60-61	F < 60	

Course Schedule

The course has 24 class sessions in total. All sessions are 2 hours and 15 minutes in length.
Note: the course outline and required readings are subject to change.

Class 1:
Part I - Introduction and Background
Life
Aqueous Solutions
Thermodynamic Principles

Class 2:
Part II - Biomolecules
Amino Acids
Nucleic Acids, Gene Expression, and Recombinant DNA Technology

Class 3:
Techniques of Protein and Nucleic Acid Purification
Covalent Structures of Proteins and Nucleic Acids

Class 4:
Three-Dimensional Structures of Proteins
Protein Folding, Dynamics, and Structural Evolution

Class 5:
Hemoglobin: Protein Function in Microcosm
Sugars and Polysaccharides
Lipids and Membranes

Class 6:
Part III - Mechanism of Enzyme Action
13. Introduction to Enzymes
14. Rates of Enzymatic Reactions
15. Enzymatic Catalysis

Class 7:
Part IV - Metabolism
Introduction to Metabolism
Glycolysis
Glycogen Metabolism

Class 8:
Signal Transduction
Transport Through Membranes

Class 9:
Citric Acid Cycle

Class 10:
Electron Transport and Oxidative Phosphorylation

Class 11:
Other Pathways of Carbohydrate Metabolism

Class 12:
Photosynthesis

Class 13:
Lipid Metabolism
Amino Acid Metabolism

Class 14:
Energy Metabolism: Integration and Organ Specialization

Class 15:
Nucleotide Metabolism

Class 16:
Part V - Expression and Transmission of Genetic Information

Class 17:
Nucleic Acid Structures

Class 18:
DNA Replication, Repair, and Recombination

Class 19:
Transcription

Class 20:
Translation

Class 21:
Viruses: Paradigms for Cellular Function

Class 22:
Eukaryotic Gene Expression

Class 23:
Molecular Physiology
Preparation for the final exam

Class 24:
Final Exam

Laboratory Schedule

Laboratory Room: To be determined
Hour: 18: 00 – 20:00

Labs and corresponding quizzes (or participation) count 60% towards the course grading. Experiments are a very important part of this course. All the labs must be completed in order to pass the course.
1. There will be 2 hours for each experiment and there will be 8 experiments and 4 quizzes in total.
2. Students should carry out the experiments by oneself under the instruction of the professor.
3. The experiment should be performed singly (except that sometimes cooperated experiment is needed).
4. Students should write the lab report singly.
5. Students should submit each lab report before the next lab period. Late reports will not be accepted.

In order to do a good job in the experiments, it is essential that students come well prepared. Reading the experiment for the first time in lab will put you and your partner at a disadvantage and make it very difficult to complete the experiment on time.
If you have any technical questions on the pre-lab, data section or post-lab assignments, you are encouraged to ask the professor.

Experiments and Discussions
Pre-lab: Introduction of relevant laboratory safety, policy and general lab expectations
Experiment 1: Amino acids and nucleic acids
Experiment 2: Gene expression and recombinant DNA technology
Quiz 1: Report of detailed analysis and comparison of acids and genetics

Experiment 3: Techniques and structures of proteins: protein function, lipids and membranes
Experiment 4: Enzyme action, enzymatic reactions and catalysis
Quiz 2: Report of analysis and comparison of proteins and enzyme properties

Experiment 5: Glycogen metabolism
Experiment 6: Citric acid cycle
Quiz 3: Report of metabolism and citric acid functions and development

Experiment 7: Cellular function
Experiment 8: Eukaryotic gene
Quiz 4: Report of cell development and molecular genetics

Attending Policy

Regular and prompt attendance is required. Under ordinary circumstances, you may miss two times without penalty. Each absence over this number will lower your course grade by a third of a letter and missing more than five classes may lead to a failing grade in the course. Arriving late and/or leaving before the end of the class period are equivalent to absences.

Policy on "Late Withdrawals"

In accordance with university policy, appeals for late withdrawal will be approved ONLY in case of medical emergency and similar crises.

Academic Honesty

Hunan University expects all students to do their own work. Instructors will fail assignments that show evidence of plagiarism or other forms of cheating, and will also report the student's name to the University administration. A student reported to the University for cheating is placed on disciplinary probation; a student reported twice is suspended or expelled.

General Expectations:

Students are expected to:

— Attend all classes and be responsible for all materials covered in class and otherwise assigned;

— Complete the day's required reading and assignments before class;

— Review the previous day's notes before class and make notes about questions you have about the previous class or the day's reading;

— Participate in class discussions and complete required written work on time;

— Refrain from texting, phoning or engaging in computer activities unrelated to class during the class period;

— While class participation is welcome, even required, you are expected to refrain from private conversations during the class period.

Special Needs or Assistance

Please contact the Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material. Our goal is to help you learn, not to penalize you for issues which mask your learning.