

Course Description:

An introductory investigation of biological fluids, buffers, amino acids, protein isolation and structure, lipids and membranes, enzymes, carbohydrates, glycolysis citric acid cycle, oxidative phosphorylation, electron transport chain, lipid metabolism, cholesterol synthesis and transport and nitrogen metabolism.

Course Objectives:

Acquire knowledge of the basic facts and principles of biochemistry.
Develop an appreciation and interest in biochemistry.

Exams:

Two 1-hour “midterm” exams and a 3-hour comprehensive final exam are scheduled. The midterms will be in February and March.

Attendance:

Regular attendance at all lectures is compulsory. **Make-up quizzes and exams will not, in general, be allowed.** In the event you must be absent, you must assume full responsibility for missed material.

Students are strongly cautioned not to miss quizzes and exams. Failure to notify the instructor in advance (if possible) and to provide a valid reason will result in a mark of zero being assigned.

Evaluation:

Assignments	10%
Midterm 1	25%
Midterm 2	25%
Final Exam	40%
Optional Assignment	10%

The optional assignment can be a paper or poster on a topic in biochemistry. If you choose to do the optional assignment, it will decrease the weighting of a midterm by 5%.

The final overall % grade will be converted to the College grading system using the following approximate ranges (applicable to this course only):

<u>Grade</u>	<u>Grade Point</u>	<u>% Range</u>
A+	4.0	95-100
A	4.0	89-94
A-	3.7	80-88
B+	3.3	76-79
B	3.0	73-75
B-	2.7	70-72
C+	2.3	65-69
C	2.0	60-64
C-	1.7	55-59
D+	1.3	51-54
D	1.0	50
F	0.0	<50

Students intending to transfer to universities should make themselves aware of the minimum passing grade acceptable for transfer.

- It is the student's responsibility to be familiar with the information contained in the Course Outline and to clarify any areas of concern with the instructor.
- Students should refer to the [Formal](#) and [Informal](#) Student Appeal Policies and Standard Practice should they have questions or concerns about the Course Outline that cannot be resolved with the instructor.
- Please be familiar with what constitutes [academic misconduct](#), as well as the consequences. Plagiarism involves submitting work in a course as if it were the student's own work. Plagiarism may involve the act of submitting work in which some or all of the phrasing, ideas, or line of reasoning are alleged to be the submitter's own but in fact were created by someone else.
- The [Final Examinations Policy](#) and [Practice](#) will be followed with respect to final exams. Please review these documents to ensure you understand the contents and implications of the policy.
- Attendance may take many forms. Lack of attendance may impact the students' ability to successfully complete the course.
- This course may be eligible for Prior Learning Assessment. Students should refer to the RDC College Calendar for a list of excluded courses.
- Classroom Learning Resources may be available to students in alternate formats.
- Students should be aware that Personal Counseling, Career, Learning and Disability Services are provided by RDC. Inquire about locations at Information Desk. It is the student's responsibility to discuss their specific learning needs with the appropriate service provider.

Important dates for the 2014 Fall Term at RDC

(see the previous pages of this course outline for other dates that are specific to this course)

03 Sep	First Day of Classes for Fall Term
05 Sep	Last Day to apply for Fall 2014
11 Sep	Last day to register or add/drop/ to have tuition refunded for Fall Term courses
01 Oct	First day to apply for Fall 2015
07 Oct	Emergency Response Day
13 Oct	Thanksgiving Day. College closed.
24 Oct	Mid-term feedback date
10 Nov	Final examination schedule posted
11 Nov	College closed in recognition of Remembrance Day
12 Nov	Classes Resume
03 Dec	Last day to withdraw from Fall Term courses and receive a WD on transcript
03 Dec	Last day of classes for Fall Term courses
08 Dec	First day of final examinations for Fall Term courses
13 Dec	Last day of final examinations for Fall Term courses
16 Dec	Deferred exams written
19 Dec	Last day for submission of final grades for Fall Term courses
22 Dec	Final grades available.
12 Jan	Last day to apply for supplemental exam for Fall Term course
17 Jan	Supplemental Exams for Fall Term course written

Changes to the course outline will be made with the consent of the course instructor and students. Changes will be reviewed by the Program Lead for consistency with College policies.

Program Lead:  _____

Date: _____

26 August 2014

LECTURE OUTLINE

- 1. Introduction to Biochemistry**
 - Biomolecules and biopolymers (Chapter 1, pages 2-17)
 - Intermolecular forces in biomolecules (Chapter 2, pages 32-39)
 - Buffers (Chapter 2, pages 40-50)

- 2. Protein Structure and Function**
 - Amino acids (Chapter 4, pages 75-91)
 - Peptide bonds and protein primary structure (Chapter 4, pages 91-95)
 - Secondary structure (Chapter 6, pages 140-152)
 - Tertiary structure (Chapter 6, pages 152-179)
 - Cooperativity and allosteric proteins, myoglobin and hemoglobin
 - Quaternary structure (Chapter 6, pages 179-185)
 - Protein purification and sequencing (Chapter 5, pages 102-122)

- 3. Enzymes**
 - Introduction to enzymes (Chapter 12, pages 403-407)
 - How do enzymes work
 - Catalytic mechanisms (Chapter 13, pages 442-468)
 - Substrate binding and stabilization of the transition state
 - Enzyme Kinetics and Inhibition of enzyme activity (Chapter 12, pages, 411-430)
 - Enzyme Regulation (Chapter 14, pages 477-489)
 - Coenzymes and vitamins

- 4. Introduction to Metabolism**
 - Energy and metabolism (Chapter 3, pages 53-71)
 - Metabolic pathways (Chapter 16, pages 537-557)
 - Thermodynamics and metabolism
 - ATP and coupled reactions
 - Oxidation and reduction

- 5. Glucose Metabolism**
 - Carbohydrates
 - Polysaccharides
 - Glycolysis (Chapter 17, pages 561-586)
 - Fates of pyruvate
 - Regulation of glycolysis
 - Glycogen degradation and synthesis (Chapter 21, pages 705-718)
 - Regulation of glycogen metabolism
 - Gluconeogenesis (Chapter 21, pages 694-705)

6. **Citric Acid Cycle** Chapter 18, pages 591-613
 - Conversion of pyruvate to acetyl-CoA
 - Reactions of the citric acid cycle
 - Regulation of the citric acid cycle
 - Catabolism, anabolism and anapleurotic reactions
 - Glyoxylate cycle (Chapter 18, pages 615-618)

7. **Oxidative Phosphorylation and the Electron Transport Chain** Chapter 19, pages 621-653
 - Oxidative phosphorylation
 - Electron transport chain

8. **Lipids and Biological Membranes** Chapter 8, pages 228-240; Chapter 10, pages 299-335
 - Structure of fatty acids and triacylglycerols
 - Structure of membrane lipids
 - Lipid bilayers, membrane fluidity, and the fluid mosaic model
 - Membrane proteins
 - Signal transduction

9. **Metabolism of Fats and Fatty Acids**
 - Oxidation of fatty acids (Chapter 22, pages 735-757)
 - Ketone bodies
 - Fatty acid synthesis (Chapter 9, pages 252-278, 282-288)

Optional

10. **Synthesis and Transport of Cholesterol**
 - Cholesterol synthesis
 - Lipoproteins and atherosclerosis

11. **Nucleotides and Nucleic Acids**
 - purines and pyrimidines
 - nucleosides and nucleotides
 - the structure of nucleic acids

12. **Nitrogen Metabolism**
 - Nitrogen fixation and assimilation
 - Synthesis of amino acids
 - Synthesis of non-essential amino acids
 - Catabolism of amino acids
 - Urea Cycle

13. Protein Synthesis