NAU NORTHERN ARIZONA UNIVERSITY

**Course Title: CHM 360 Fundamental Biochemistry**
**Term: Fall 2022**
**Instructor: TBA**
**Course Credit: 3**
**Mode of Instruction: Online**

## Course Description:

This course will explore the principles of biochemistry emphasizing biologically important compounds and their functions and metabolism in living cells. Subsequently, the fundamental metabolic pathways will be explored. Students will gain experiential learning through laboratory practicals, problem-solving exercises, group-based learning, and research-based projects. Upon the completion, they will be also aware of how deductive processes are applied in biological research for the advancement to new insight.

## Course Prerequisites:

BIO 181 Unity of Life I: The Cell

CHM 230 - Fundamental Organic Chemistry

## Learning Outcomes:

By the end of the course, the student should be able to:

A. Understand the principles of biomolecular structure, metabolism, molecular interactions, and molecular processes;

B. Analyze critically and evaluate the concept of science and efficiently learn the knowledge derived from that;

C. Work with others demonstrating leadership and collaborative skills;

D. Use current biochemical and molecular techniques to plan and carry out experiments.

**Course Material:**

Richard I. GumportFrank H. Deis, Nancy Counts Gerber, Roger E. Koeppe, ***Biochemistry: Student Companion***, 5th Edition, Freeman, 2002.

**Evaluation:**

- 4 Labs [40%]
- Mid-term Exam [25%]
- Final Exam [35%]

**Description of the Evaluation tasks:**

Assignment/ Essay/ ... : During the term, students will be required to finish several evaluation tasks within due date. All the tasks are linked with specific course topics/outcomes and will adequately assess students' competence and learning outcomes. Students are encouraged to meet with instructor about these tasks at any point.

Mid-term/ Final Exams/ Quiz/... : There may be periodic quizzes given at the beginning of lecture sessions; the feedback from these quizzes will monitor the progress of the learners and help to set learning priorities. There will be mid-term exam/ final exam for the course. They are the basic criteria for the evaluation of students' learning outcomes and final grade.

**Grading Policy:**

Students are supposed to finish each online lecture. Prior to each class, students should finish the required readings. During the class time, students are encouraged to make use of all relevant online course resources and communicate with the instructor. Students' grades are accumulated based on the cumulative evaluations.

Students' letter grade will be assigned according to the following scale:

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|---|---|---|
| A+ 90-100 | A 85-89 | A- 80-84 |
| B+ 77-79 | B 73-76 | B- 70-72 |
| C+ 67-69 | C 63-66 | C- 60-62 |
| D+ 57-59 | D 53-56 | D- 50-52 |
| F < 50 | | |

**Academic Integrity:**

Students must strictly adhere to the university's academic integrity rule; and all essays, exams and any other form of academic assignments must adhere to these rules. Any form of plagiarism, cheating, or misappropriation of materials will be considered a violation of academic integrity and will be punishable by the university.

**Withdrawal from the Course(s):**

Students will be able to apply for a transfer or withdrawal within 3 days of the starting date of the course. If a withdrawal is applied for within 3 working days, the tuition fee will be fully refunded. After 3 days, the tuition fee will not be refunded. If a withdrawal is applied for in the first two weeks, it will be recorded as W (Withdraw) on the course transcript. After this initial two-week period, the class will be recorded as F (Fail).

**Tentative Schedule:**

**Week 1**

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|---|---|
| 1 | Course Introduction: Biochemical Evolution |
| 2 | Protein Structure and Function |
| 3 | DNA, RNA, and the Flow of Genetic Information |
| 4 | Exploring Genes |
| 5 | Lipids and Cell Membranes<br>**Lab 1: DNA and RNA** |

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| **Week 2** | |
| 6 | Lipids and Cell Membranes (Cont.) |
| 7 | Membrane Channels and Pumps |
| 8 | Metabolism: Basic Concepts and Design |
| 9 | The Citric Acid Cycle |
| 10 | Glycogen Metabolism<br>**Lab 2: Cell Membranes** |
| **Week 3** | |
| 11 | Fatty Acid Metabolism |
| 12 | Protein Turnover and Amino Acid Catabolism |
| 13 | **Mid-term Exam** |
| 14 | Nucleotide Biosynthesis |
| 15 | Membrane Lipids and Steroids<br>**Lab 3: Nucleotide Biosynthesis** |
| **Week 4** | |
| 16 | DNA Replication, Recombination, and Repair |
| 17 | RNA Synthesis and Splicing |
| 18 | Protein Synthesis |
| 19 | The Integration of Metabolism |
| 20 | The Control of Gene Expression<br>**Lab 4: Protein Synthesis** |
| **Week 5** | |
| 21 | Response to Environmental Changes<br>Sensory Systems |
| 22 | The Immune System |
| 23 | Properties of Living Systems |
| 24 | Molecular motors |
| 25 | **Final Exam** |