Course Description: This course is intended to establish an integrated physical and biochemical foundation for undergraduates majoring in chemistry, biology, and for students pursuing careers in medical, pharmaceutical, forensic and environmental fields. It covers the modern tools and insights of physical chemistry by interconnecting fundamental concepts with key biological phenomena.

Course Objectives, Learning Goals and Expected Outcomes:

1. Develop an understanding of physical chemistry, structural chemical biology, and thermodynamics.
2. Familiarize with modern experimental methods used to study thermodynamic and kinetic mechanisms.
3. Understand the modern tools used to monitor the secondary, tertiary and quaternary structures of biomolecules.
4. Apply principles of thermodynamics to bio/chemical phenomena and related measuring tools and techniques.
5. Understand kinetic principle and related equations that describe enzymatic catalysis and critically interpret the results of the related experiments.

Grading Scale: This course will be graded on the basis of the three units of the course. Three exams and five home works will be given. Each exam and homework will be worth 100 and 20 points respectively. Thus total score from three exams and five homeworks (carefully chosen from the problems at the end of the each chapter of the textbook or formulated by the instructor to help understanding the course materials) will be 400.

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<th>Grade</th>
<th>Range</th>
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<tbody>
<tr>
<td>A</td>
<td>360-400</td>
<td>B</td>
<td>320-335</td>
<td>C</td>
<td>280-295</td>
<td>D</td>
<td>240-255</td>
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<tr>
<td>A-</td>
<td>348-359</td>
<td>B-</td>
<td>308-319</td>
<td>C-</td>
<td>268-279</td>
<td>F</td>
<td>&lt;240</td>
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<tr>
<td>B+</td>
<td>336-347</td>
<td>C+</td>
<td>296-307</td>
<td>D+</td>
<td>256-267</td>
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- If students cannot make any of the exam dates with a good reason, earlier date
can be arranged with a permission of the instructor.

- Late homework cannot be accepted and there will not be any makeup for the homework.
- Daily attendance will be checked and 75% attendance is required in order to pass the course.
- Homework will be graded and be returned to students within a week. Help on homework material will be provided by the instructor during the office hours.

In addition to lectures, there will be a discussion session on Wednesdays from 5 – 7 pm (Fulmer 438)

**Topic Coverage:**

**Block I**
- Chapter 2 The First Law: Energy is conserved.
- Chapter 3: The Second Law: The Entropy of the Universe Increases
- Chapter 4: Free Energy and Chemical Equilibria
  - **Exam I**, Friday, Sep 21, Chapters 2, 3, 4, 100 pointes

**Block II**
- Chapter 5: The Statistical Foundations of Biophysical Chemistry
- Chapter 6: Physical Equilibria
- Chapter 8: Motions of Biological Molecules
  - **Exam II**, Friday, Oct 19, Chapters 5, 6, 8, 100 pointes

**Block III**
- Chapter 11: Molecular Structures and Interactions: Theory
- Chapter 12: Molecular Structures and Interactions: Biomolecules
- Chapter 13: Optical Spectroscopy
- Chapter 14: Magnetic Resonance
- Chapter 15: Macromolecular Structure and X-ray Diffraction
  - **Exam III**, Mon, Dec 3, Chapters 11, 12, 13, 14, 15 100 pointes

**Student learning outcomes:** The fundamental goal of this course is to reinforce an understanding and application of physical principles that govern biochemical processes through classroom lectures, homework assignments (possibly with classroom quizzes), and exams for each module.

<table>
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<tr>
<th>Student Learning Outcomes</th>
<th>Activity</th>
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<tr>
<td>1. Develop an understanding of physical principles that govern biochemical processes.</td>
<td>Lectures are designed to provide a strong foundation of physical principles.</td>
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<tr>
<td>2. Use critical thinking and scientific ideas</td>
<td>Homework assignments, (possible)</td>
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</table>
skills to analyze and solve biochemical problems. quizzes, and exams for each module.

3. Effectively communicate biochemical problems and solutions. Weekly two-hour discussion sessions in which students will participate in discussions of principles and solving problems to reinforce the principles.

4. Recognition and application of physical principles in biochemical research. Encourage students involved in biochemistry research to apply concepts learned.

Students with Disabilities:
Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center.

Academic integrity:
Academic integrity will be strongly enforced in this course. Any student caught cheating on any assignment will be given an F grade for the course and will be reported to the Office Student Standards and Accountability. Cheating is defined in the Standards for Student Conduct WAC 504-26-010 (3). It is strongly suggested that you read and understand these definitions: http://conduct.wsu.edu/default.asp?PageID=338

Safety Statement:
The following websites detail the WSU Safety policy and plan. The content of these sites will be discussed on the first day of the term

- http://safetyplan.wsu.edu
- http://alert.wsu.edu
- http://oem.wsu.edu