

## Syllabus

### BIEN 135 Biophysics and Biothermodynamics Senior Bioengineering Course Fall 2016

#### Required course for Bioengineering B.S. Degree

**Units:** 4 (3 hours lecture and 1 hour discussion)

**Description:** An introduction to the application of thermodynamic principles to understanding the behavior of biological systems. Discusses biophysical properties of biomacromolecules, such as proteins, polynucleotides, carbohydrates, and lipids, and methods of characterizing their properties and interactions.

**Prerequisites:** BIEN 101 (or BCH 100), MATH 010B, MATH 046, PHYS 040C, all with a grade of "D-" or better.

**Lectures:** Tuesdays & Thursdays 6:40-8:00 pm @ Bourns Hall (BRNHL) A125

**Discussion Session 021:** Wednesdays 4:10-5:00 pm @ MSE 003

**Discussion Session 022:** Thursdays 5:10-6:00 pm @ MSE 003

**Midterm Exam 1:** Thursday, October 20 during class time

**Midterm Exam 2:** Thursday, November 17 during class time

**Final Exam:** Saturday, December 3 @ 11:30 am – 2:30 pm

**Instructor:** Dimitrios Morikis, Professor of Bioengineering

**Office:** MSE 223 (Materials Science & Engineering building)

**BioMoDe Lab:** MSE 225

**Tel #:** 951-827-2696

**E-mail:** [dmorikis@ucr.edu](mailto:dmorikis@ucr.edu)

**Website:** [biomodel.engr.ucr.edu](http://biomodel.engr.ucr.edu)

**Office hours:** Wednesdays 2:00 – 4:00 pm, or by appointment.

I also encourage you to use the email for correspondence.

**Teaching Assistant:** Reed Harrison, Graduate Student in Bioengineering

**Office:** MSE 225

**Tel.:** 951-827-7107

**E-mail:** [rharr009@ucr.edu](mailto:rharr009@ucr.edu)

**Office hours:** Tuesday 3:00 pm – 4:00 pm; Thursday 2:30 am – 3:30 pm.

The UCR **iLearn** ([ilearn.ucr.edu](http://ilearn.ucr.edu)) environment will be used for class announcements and other postings, including grades. Each student should have access.

**Assignments**

- Homework will be assigned, but submission is not required. Homework solutions will be discussed during Discussion Sessions. Homework is essential for understanding the lecture material and for exam preparation.
- Quizzes (10%). Multiple-choice questions, administered using **Clickers**. Please make sure you have registered clickers and working batteries in your clickers. I recommend having a second set of batteries with you. 10% of false answers will be dropped. Only one makeup quiz per student will be allowed; all makeup quizzes will be taken during the last week of classes.
- Midterm exam - 1 (25%). Problem solving and quiz-like multiple-choice questions.
- Midterm term exam - 2 (25%). Problem solving and quiz-like multiple-choice questions.
- Final exam (40%). Problem solving, covering material from the whole class.
- Makeup exams will be allowed only for students with legitimate reasons for missing a scheduled exam. Makeup midterm exams will be administered during the last week of classes. Makeup final exam will be administered at a mutually agreed date.
- Extra credit will be given for class participation, or as assigned.

**Grading system:** Letter Grade or petition for Satisfactory/No Credit (S/NC).

**Grading scale:**

≥100%, A+	85-89.9%, B+	70-74.9%, C+	55-59.9, D+	<45, F
95-99.9%, A	80-84.9%, B	65-69.9%, C	50-54.9, D	
90-94.9, A-	75-79.9%, B-	60-64.9%, C-	45-49.9, D-	

In the absence of 100% or higher, the student who receives highest grade in the 95-100% range may receive an A+ per instructor's discretion. If needed, the above ranges may be adjusted per discretion of the instructor.

**Textbook**

*The Molecules of Life, Physical and Chemical Principles* (2012) by John Kuriyan, Boyana Konforti, and David Wemmer, Garland Science, Taylor & Francis group. ISBN: 9780815341888. Paperback.

**Computer Program**

UCSF Chimera: <https://www.cgl.ucsf.edu/chimera/>

**Topics (first 10 chapters of the textbook)**

1. From genes to RNA and proteins
2. Nucleic acid structure
3. Glycans and lipids
4. Protein structure
5. Evolutionary variation of proteins
6. Energy and intermolecular forces
7. Entropy
8. Linking energy and entropy: the Boltzmann distribution
9. Free energy
10. Chemical potential and the drive to equilibrium

**Academic integrity**

The UCR Academic Integrity Policy & Procedures are described at the website <http://conduct.ucr.edu/Pages/default.aspx>, and will be strictly followed. Academic integrity issues will be referred to the UCR Student Conduct and Academic Integrity Office.

**Emergencies and Environmental Health & Safety***Who to call:*

- In an Emergency: UC Police: 951-827-5222 (from cell) or 911 (from campus phones).
- Department Lab Safety Officer phone: 951-403-0932.
- Hazardous spills: EH&S: 951-827-5528 or 2-5528 from campus phones.
- Utility problems: Physical Plant: 951-827-4214 (days) or 951-827-4677 (evenings).
- If there is an emergency in the building such as a fire, pull one of the building fire alarm pulls.
- If the building alarm sounds go immediately to the building's emergency assembly area (EAA). EAA for Bourns Hall is outside the building, between Bourns, University Lecture Hall, and Surge buildings, and between Bourns and Campus Store buildings; EAA for MSE is outside the building, in front of the soccer field.

*If injured:*

- Inform your TA or Professor.
- If life-threatening, call 911 (from a campus phone) or 951-827-5222 (from cell).
- If non-emergency treatment is needed:
  - Undergraduate students: go to the Campus Health Center (daytime) or your plan's urgent care or emergency room (evenings).
  - Graduate students should contact Bioengineering Department 951-827-5025 for medical center information.