

LIFS3070 Biophysics and Physical Biochemistry

Course Outline - Spring 2018/19

Instructor

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Schedule

Lectures, Rm. 4504, Monday 1:30-2:50pm, Friday 9:00-10:20am

Course description

The course will provide students with basic principles and applications of modern biophysics and physical biochemistry, and instrumentation to facilitate students to be better prepared for the challenge in biological science.

Assessment Scheme

20% by Mid-term Exam I
20% by Mid-term Exam II
20% presentation
40% by Final Exam

Student Learning Resources

Lecture Notes

Recommended Reading :

Physical Biochemistry, Principle and Application (David Sheehan)
Biomedical Applications of Introductory Physics (Tuszynski, Dixon (2002))
Biophysical Chemistry for the life science (Thomas Engel, Gary Drobny)

Course Intended Learning Outcomes

On successful completion of this course, students are expected to be able to :

1. Understand the basic concepts of modern biophysics and physical biochemistry in layman terms or simple mathematical forms (calculus is not required).

2. Have sufficient knowledge on applications of biophysical principles and instrumentation in the life science.
3. Recognize and Acquire primary knowledge of modern biophysical instrumentation and experimental design.
4. Attain abilities or ideas for biological-problem solving with the knowledge taught in this course.

Course Schedule

Feb. 1	Introduction to Biophysics
Feb. 4	Newtonian principles
Feb. 8	Energy and Power
Feb. 11	Centrifugation and its biological application
Feb. 15	Fluids and Pressure
Feb. 18	Cohesion, Adhesion, and Surface Tension
Feb. 22	Capillary Action, Diffusion and Osmosis
Feb. 25	Radioisotopes and their application in biological science
Mar. 1	Mid-term I
Mar. 4	Isothermal titration calorimetry and its applications
Mar. 8	Differential scanning calorimetry and its applications
Mar. 11	Basic concepts of kinetics for biological application
Mar. 15	Basic concepts of thermodynamics for biological application
Mar. 18	Basic concepts of optics for biological application
Mar. 22	FRET and its biological application
Mar. 25	Electrophoresis and Electroporation
Mar. 29	Mid-term II
Apr. 1	Mass spectrometry
Apr. 8	Protein folding
Apr. 12	Introduction of bioinformatics and proteomics
Apr. 15	Introduction to biological NMR spectroscopy & X-ray diffraction
Apr. 26	Single molecular techniques
Apr. 29	Lab visit
May 3	Presentations
May 6	(review)