LIFS3070 Biophysics and Physical Biochemistry

Course Outline- Spring 2016

1. Instructor (s)

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2. Teaching Assistant (s)

Names: Capel Lee

Contact Details: Phone: 2358 8713

3. Lectures:

Date/Time: Tuesday and Thursday (10:30-11:50)

Venue: Rm 1104

4. Course Description

Credit Points: 3

Pre-requisite: NIL

Exclusion: NIL

Brief Information/synopsis:

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.

5. Intended Learning Outcomes

After taking this course, students should be able to:

No.	ILOs
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.

6. Assessment Scheme

Examination duration: 3 hrs

Percentage of coursework, examination, etc.:

Assessment	Assessing Course ILOs
20% by mid-term Exam I	1 – 4
20% by mid-term Exam II	1 – 4
10% Lab visits & participation	1 – 4
50% by final exam	1 – 4

7. Student Learning Resources:

Lecture Notes

Recommended Reading:

Text(s):

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)

8. Teaching and Learning Activities -

Scheduled activities: 5 hrs laboratory visit and tutorial

Teaching Approach: The major part of this course is delivered through lectures. Students are anticipated to read lecture notes and encouraged to ask questions during and after the lectures to facilitate the understanding of concepts and applications of biophysical principles. Before the end of the course students are required to carry out a group project and present posters on biophysical topics related to our daily life and research in biological science. Meanwhile, students are required to take part in a Lab visit to have direct experiences with modern biophysical instrumentation. Through abovementioned learning processes, students are expected to acquire basic knowledge of biophysics and physical biochemistry and to develop problem solving abilities to cope with the challenges in life.

9. Course Schedule

Feb. 2	Introduction to Biophysics
Feb. 7	Newtonian principles
Feb. 9	Energy and Power
Feb. 14	Centrifugation and its biological application
Feb. 16	Fluids and Pressure
Feb. 21	Cohesion, Adhesion, and Surface Tension
Feb. 23	Capillary Action, Diffusion and Osmosis
Feb. 28	Radioisotopes and their application in biological science
Mar. 2	Mid-term I
Mar. 7	Isothermal titration calorimetry and its applications
Mar. 9	Differential scanning calorimetry and its applications
Mar. 14	Basic concepts of kinetics for biological application
Mar. 16	Basic concepts of thermodynamics for biological application
Mar. 21	Basic concepts of optics for biological application
Mar. 23	FRET and its biological application
Mar. 28	Electrophoresis and Electroporation
Mar. 30	Mid-term II
Apr. 6	Mass spectrometry
Apr. 11	Lab visit
Apr. 20	Lab visit
Apr. 25	Introduction of bioinformatics and proteomics
Apr. 27	Single molecular techniques
May 2	Introduction to biological NMR spectroscopy
May 4	X-ray diffraction