

LIFS5120 (by Prof Guang Zhu, Prof Mingjie Zhang and Dr Zhe Feng)

Key OBE Features

This is an elective course designed mainly for the final-year undergraduate students and junior graduate students. In this course, we introduce an array of major biophysical techniques that are currently being used in addressing major scientific questions in modern biology. We also aim to discuss how to employ these techniques to solve scientific questions. We feel that this course will give students not only the basic knowledge but also practical skills which will be very useful for junior graduate students and those undergraduate students who intend to pursue graduate studies after their graduation.

Intended Learning Outcomes:

1. to understand the principals of latest technological breakthroughs
2. to effectively use modern technologies to answer biological questions
3. to analyze and critique scientific papers
4. to develop essential skills in scientific communication.
5. to prepare students for conducting innovative research

Design of teaching and learning activities, assessment and assessment of criteria:

Teaching and learning activities: Basic concepts and practical applications of a selected array of major biophysical techniques will be the theme of the course.

The first half of the semester will be focusing on two major structural biology techniques, namely NMR spectroscopy and X-ray crystallography. Each student will be assigned a topic which is individually designed to solve a specific scientific question using one or a combination of multiple techniques. Students are expected to carry out independent research on the assignment. They will then present the paper to the class followed by an instructor-guided Q&A session/discussion.

In the second half of the semester, students will learn the basic principles of different modern biophysical techniques and latest development in biophysics. They will also learn how these biophysical techniques can be applied to solve biological problems ranging from molecular interactions to whole organism imaging. Students will be required to present a short study on one special biophysical topic.

Assessment: The performance in the two presentations/assignments will count 80% of the total marks. The remaining 20% will be given to students with active participation and regular attendance.

Assessment criteria:

1. For oral presentation: clear, logical, with sufficient background introduction, be able to provide your own analysis (e.g., what is good or bad about an experiment/a paper? Or what is unique about a particular protein?), be able to answer questions from instructors and fellow students.
2. For assignment: understand key concepts taught, as well as the principals and applications of commonly-used and modern techniques. Clear logics, quality of scientific writings, and critical analysis are important factors for the assessment.
3. attend all lessons and actively participate in discussion

The Hong Kong University of Science and Technology

**BISC5120 Advanced Topics in Biophysical Chemistry
(Co-list with NANO 5310)**

(2018/19 Fall Semester)

Date/Time: Friday, 9:00 – 10:50 am

Venue: Rm 4502

Instructors: Prof. Guang Zhu (x8705, Room 5519) (**Course Co-ordinator**)
Prof. Mingjie Zhang (x8709, Room 5532)
Dr. Zhe Feng (x8678, Room 6276)

Sep 7	Introduction to Biophysics & NMR Spectroscopy	Dr. Zhe Feng / Prof Mingjie Zhang
Sep 14	NMR Spectroscopy	Dr. Zhe Feng / Prof Mingjie Zhang
Sep 21	NMR Spectroscopy	Dr. Zhe Feng / Prof Mingjie Zhang
Sep 28	X-ray crystallography	Dr. Zhe Feng / Prof Mingjie Zhang
Oct 5	X-ray crystallography	Dr. Zhe Feng / Prof Mingjie Zhang
Oct 12	Student Presentation	Dr. Zhe Feng / Prof Mingjie Zhang
Oct 19	Mass Spectroscopy, FRET, SPR, ITC and DSC	Prof. Guang Zhu
Oct 26	Mass Spectroscopy, SPR, ITC, DSC and their Applications	Prof. Guang Zhu
Nov 2	NMR and its Applications	Prof. Guang Zhu
Nov 9	NMR and its Applications	Prof. Guang Zhu
Nov 16	NMR Spectroscopy	Prof. Guang Zhu
Nov 23	Student Presentation	Prof. Guang Zhu