The Hong Kong University of Science and Technology

Chemical Biology for Engineers

BIEN2610

PRE-REQUISITE (CHEM 1010 OR CHEM 1012) AND (LIFS 1901 OR (Level 3 or above in HKDSE 1x Biology))

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Office Hours: Room 5578, Tue 9:30AM - 10:20PM (By reservation)

Course Description

This course will introduce the basic knowledge and application of nucleic acid/protein/ligand engineering; the utilization of chemical & biological modification of biomolecules for biomedical purposes; the development of omic techniques. Along the way, this course will review the principle and limitation of several advance diagnostic and therapeutic techniques in health care.

Intended Learning Outcomes (ILOs)

By the end of this course, students should be able to:

1. Understand the fundamentals of nucleic acid & nucleic acid engineering

2. Understand the fundamentals of protein & protein engineering

3. Understand the roles of small biomolecules in biology

4. Know the basic principle of bioengineering techniques and their applications

Assessment and Grading

This course will be assessed using criterion-referencing and grades will not be assigned using a curve. Detailed rubrics for each assignment are provided below, outlining the criteria used for evaluation.

Assessments:

[List specific assessed tasks, exams, quizzes, their weightage, and due dates; perhaps, add a summary table as below, to precede the details for each assessment.]

Assessment Task	Contribution to Overall Course grade (%)	Due date
40 min exam (3; choose top 2 out of 3)	60%	Exam 1: Oct. 9 (Thu) Exam 2: Nov. 18 (Tue) Exam 3: TBA
Written assignment (2 pages)	10%	Nov. 27 (Thu)
In class exercise	15%	

Participation (in class quiz)	15%	
Bonus (1 point for 15 min appointment in office hour; Max 2 points)	0~2%	

* Assessment marks for individual assessed tasks will be released within two weeks of the due date.

Mapping of Course ILOs to Assessment Tasks

Assessed Task	Mapped ILOs	Explanation
exam	ILO1, ILO2, ILO3. ILO4	This task assesses students' ability to understand the taught concepts (ILO 1), evaluate their applications (ILO 2), analyze their role in bioengineering (ILO 3), and calculate reactions and provide solution (ILO 4).]
Written assignment	ILO3. ILO4	The task assess students' ability to evaluate the event and analyze the biological implications (ILO 3, ILO 4), demonstrating higher-order thinking skills of analysis and evaluation.
In class exercise	ILO3. ILO4	The task assess students' ability to perform mini wet lab experiment, analyze the results, and understand the biological implications (ILO 3, ILO 4).

Grading Rubrics

There is no specific grading rubrics.

Final Grade Descriptors:

Grades	Short Description	Elaboration on subject grading description
A	Excellent Performance	Demonstrates a comprehensive grasp of subject matter, expertise in problem-solving, and significant creativity in thinking.
B	Good Performance	Shows good knowledge and understanding of the main subject matter.
C	Satisfactory Performance	Possesses adequate knowledge of core subject matter.
D	Marginal Pass	Has threshold knowledge of core subject matter and the ability to make basic judgments.
F	Fail	Demonstrates insufficient understanding of the subject matter.

Course AI Policy

AI is allowed for gathering materials for written assignment.

Communication and Feedback

Assessment marks for exam will be communicated in class within two weeks of submission. Students who have further questions about the feedback including marks should consult the instructor within five working days after the feedback is received.

Late Submission and Resubmission Policy

Late submission and resubmission are not allowed.

Reference Reading Materials

Nucleic Acids in Chemistry and Biology*, by Blackburn et al.* (2006). PDF available online.

Principles of Biochemistry*, by Lehninger et al.* (2008). PDF available online.

Essentials_Chemical_Biology: *Structure and Dynamics of Biological Macromolecules, by Miller &Tanner.* (2007). PDF available online.

Academic Integrity

Students are expected to adhere to the university's academic integrity policy. Students are expected to uphold HKUST's Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance of academic misconduct. Please refer to Academic Integrity | HKUST – Academic Registry for the University's definition of plagiarism and ways to avoid cheating and plagiarism.