

COLLEGE OF CHEMISTRY COURSE GUIDE (../INDEX.HTML)

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BIOE 150 - INTRODUCTION OF BIONANOSCIENCE AND BIONANOTECHNOLOGY (4 UNITS)

COURSE OVERVIEW

SUMMARY

(From the syllabus) BioE 150 presents “a background in recent development of bio-nanomaterials and bio-nanotechnology” and emphasizes the understanding of “the properties of biological basis building blocks, their assembly principles in nature, and their application to build functional materials and devices”.

The lectures before November are organized based on the central dogma and the ones after are all group project presentations. There were also three guest lectures.

Attendance, four homework, one group project, one individual proposal, one midterm and one final.

PREREQUISITES

BIOE 11 (bioe11.html) or BIO 1A (bio1a.html), and CHEM 1A (chem1a.html)

CHEM 4A (chem4a.html) can be substituted for CHEM 1A.

TOPICS COVERED

- Prof. Lee's Lectures
 - Introduction to Nanoscience & Nanotechnology

- Introduction to BioNanoscience & BioNanotechnology
- DNA-Based Nanoscience
- Peptide-Based Nanoscience
- Protein-Based Nanoscience
- Virus/Cell-Based Nanoscience
- Guest Lectures
 - DNA sequencing
 - Genetic Engineering & Protein-Based Polymers
 - Functional Biomaterials Development and Characterization – Scanning Probe Microscopy
- Group Presentations (Finding Nano I)
 - Spider silk
 - Cuttlefish
 - Lotus Leaf
 - Mantis Shrimp
 - Moth Eyes
 - Keratin
 - Butterfly Wing
 - Bone Matrix Regrowth
 - Mussel Protein
 - Water Strider
 - Gecko Feet

WORKLOAD

COURSEWORK

- Homework
 - ~ 4 in total
 - ~ 2 – 6 questions
 - Including but not limited to basics, concept application, design experiments, design molecules with specific properties, practice software such as Pymol, etc.
 - Similar to examples given in the lectures
- Group project (Finding Nano I)
 - Free to form groups of four

- Free to choose the topics listed
- 35-minute presentation with demonstration/models, Q & A and interactive quizzes for extra credits, etc.
- 4-page written report
- Individual Proposal (Finding Nano II)
 - Identify scientific and engineering challenges and propose solutions based on course materials
 - 2-page NSF-like proposal with two key figures
- One in-class quiz
- 8 AM lecture attendance (sign-in)
- One midterm with a cheatsheet
- One final with a cheatsheet

TIME COMMITMENT

3 hours of lecture and 1 hour of discussion per week. Discussion after the MT would be time for group project preparation time.

- Homework
- Group project
- Individual proposal

CHOOSING THE COURSE

WHEN TO TAKE

Fall only.

This course fulfills the Chem/ChemBio allied subject requirement, as well as the ChemE engineering elective requirement.

WHAT NEXT?

- BIOE 111 - Functional Biomaterials Development and Characterization
([bioe111.html](#))

ADDITIONAL COMMENTS AND TIPS

May encounter waitlist issue.

Prof. Seung-Wuk Lee is nice and fun. He really cares about individual students and wants to make the course a good experience.

Last edited: Fall 2018

Made by Angela Lee, c/o 2019



(<https://www.fsa.ca/dotpress.com/Cat65089.htm>) or
(http://www.kyley.edu/ugrad/current_students/peer-advising/)