BE206 August 3:0

Biology for Engineers

Instructor

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Department: Centre for BioSystems Science and Engineering

Course Time: Tue., Thu., 3:30 - 5 PM

Lecture venue:

Detailed Course Page: http://www.be.iisc.ac.in/CourseTemplate/BE%20-%20206/index%20-%20206.html

Announcements

Brief description of the course

The course provides an introduction to fundamental concepts in Biology for PhD students with little to no knowledge of Biology past 10th or 12th standard school curriculum. The course will cover the following topics: evolution, biomolecules, fundamentals of biochemistry, protein structure and function, basic molecular biology, genetics, and an introduction to the cellular architecture. A combination of theoretical concepts and basic experimental methodologies in biology will be discussed. In addition, an introduction to plant and human physiology will also be provided, which includes lectures on classification of tissues, basic human anatomy, and an in-depth discussion on neurophysiology. The concepts covered here will aid in the skill development required to study diverse problems in bioengineering.

Prerequisites

None

Syllabus

Bio-molecules

Biochemistry

Molecular Biology

Genetics

Cell Biology

Tissue Architecture

Physiology

Course outcomes

Upon completion of the course, students will be able to:

1. Understand various chemical interactions between molecules in biological systems and the idea of pH

2. Describe the structure and function of various biological molecules

3. Explain basic concepts in enzyme kinetics, function and modes of inhibition

4. Compute association and dissociation constants during protein interactions

5. Discuss different aspects of molecular biology including DNA replication, transcription and RNA translation

6. Demonstrate an understanding of Mendelian laws of inheritance

7. Describe cellular architecture and utilize these concepts to design a synthetic organelle or cell mimic

8. Understand fundamental concepts in tissue architecture and physiology

9. Analyze basic biological laboratory experiments performed by others and critique literature

Grading policy

30% - assignments (usually a total of four in number)

30% - project (towards the middle of the semester)

40% - final examination

Assignments

Resources

There is no prescribed textbook for this course. Course material will include lecture notes (not provided, but

taken by students during the lecture), a few slide-handouts (provided), and classic papers in biology (link will be provided). In addition, the principle reference book is

Biology: concepts and connections (Third Edition), by Campbell, Mitchell and Reece