CHANDIGARH UNIVERSITY

Discover. Learn. Empower.

UNIVERSITY INSTITUTE OF SCIENCES

Academic Unit I

Bachelor of Engineering (Computer Science & Engineering)

Biology For Engineers 20SZ148

INTRODUCTION

By Shruti Sharma

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INTRODUCTION

Course Objective

- This subject is designed to impart fundamental knowledge on basic and emerging fields of biology like bioinformatics.
- It is designed to impart knowledge that how to apply basics of biology in engineering.

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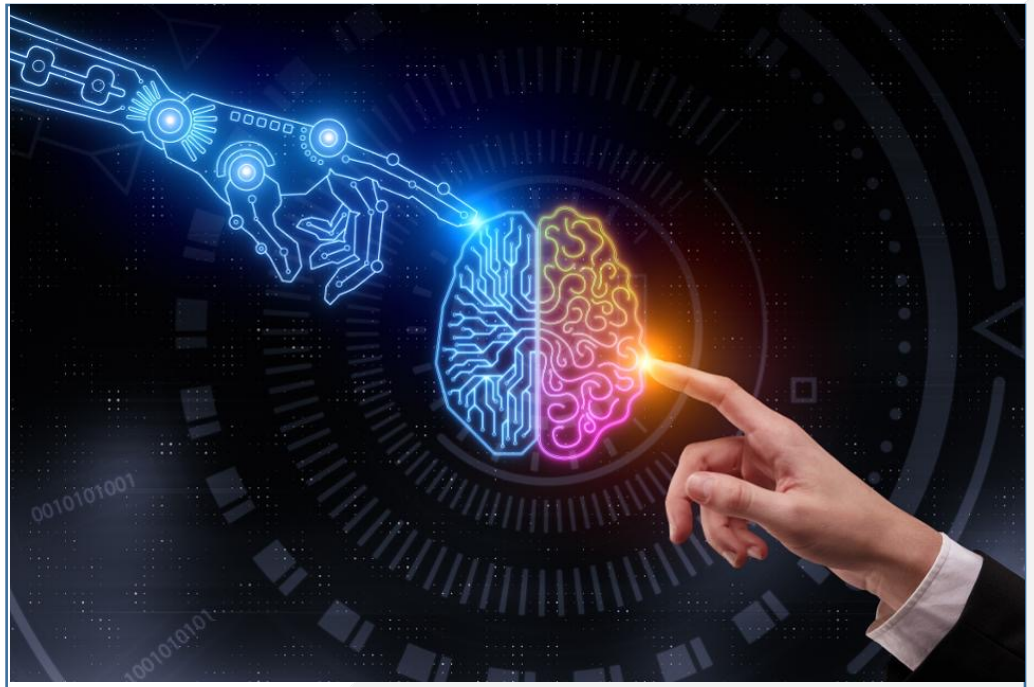
INTRODUCTION

Course Outcome

CO Number	Title	Level
CO1	To apply knowledge of cell biology to identify, formulate, and solve problems.	**Remember**
CO2	To excel in career as researcher in both traditional and emerging fields of science .	**Understand**
CO3	To apply knowledge of molecular biology, biosensors and immunology to excel in areas such as entrepreneurship, medicine, government, and education	Understand
CO4	To think critically and creatively, especially about the use knowledge about biology of cancer and new areas of biology to address local and global problems	Understand



Will be covered in this lecture

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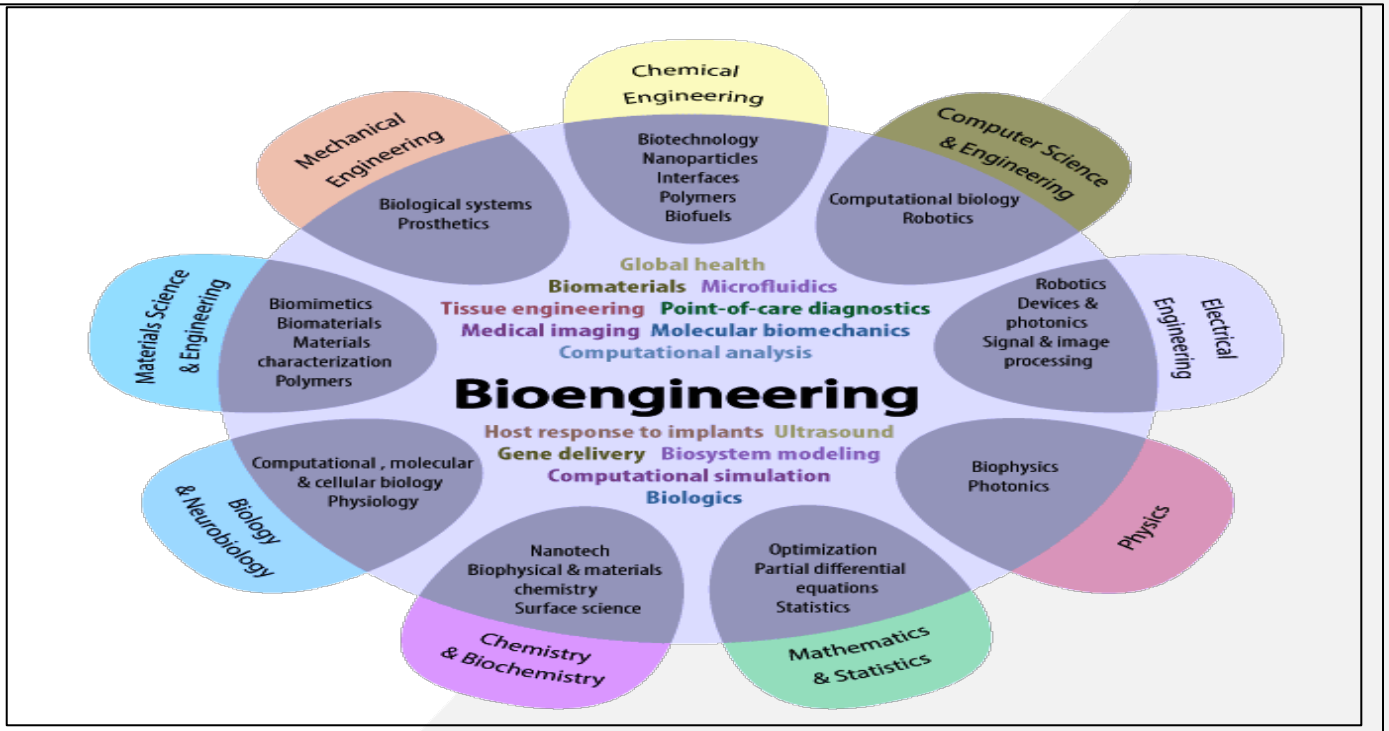
SYLLABUS

Unit 1 Two Chapters: (15 hours)

- **Chapter No.1**
- **Basic Cell Biology** 9 Hours
- Introduction: Living Organisms, Cells and Cell theory, Cell Structure and Function, Genetic information, protein synthesis, and protein structure.
- **Chapter No. 2**
- **Cell cycle & Tissue Engineering** 6 hours
- Cell growth, Cell Division, and differentiation. Ageing, apoptosis, stem
- Cell Biology and Tissue engineering

WHY DO WE NEED TO KNOW BIOLOGY

- To find solutions to challenges, that face mankind
- Biology is us, we are all biological creatures



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Polling Question

Why do we need to know biology

1. To find solutions to challenges, that face mankind
2. Biology is us, we are all biological creatures
3. Both 1 & 2
4. None of the above.

BIOLOGY FOR ENGINEERS

- Biological engineering, or bioengineering/bio-engineering, is the application of principles of biology and the tools of engineering to create usable, tangible, economically viable products.

- In general, biological engineers (or biomedical engineers) attempt to either mimic biological systems to create products or modify and control biological systems so that they can replace, augment, sustain, or predict chemical and mechanical processes.

BIOLOGY INSPIRED DESIGNS

Biology Inspired Designs
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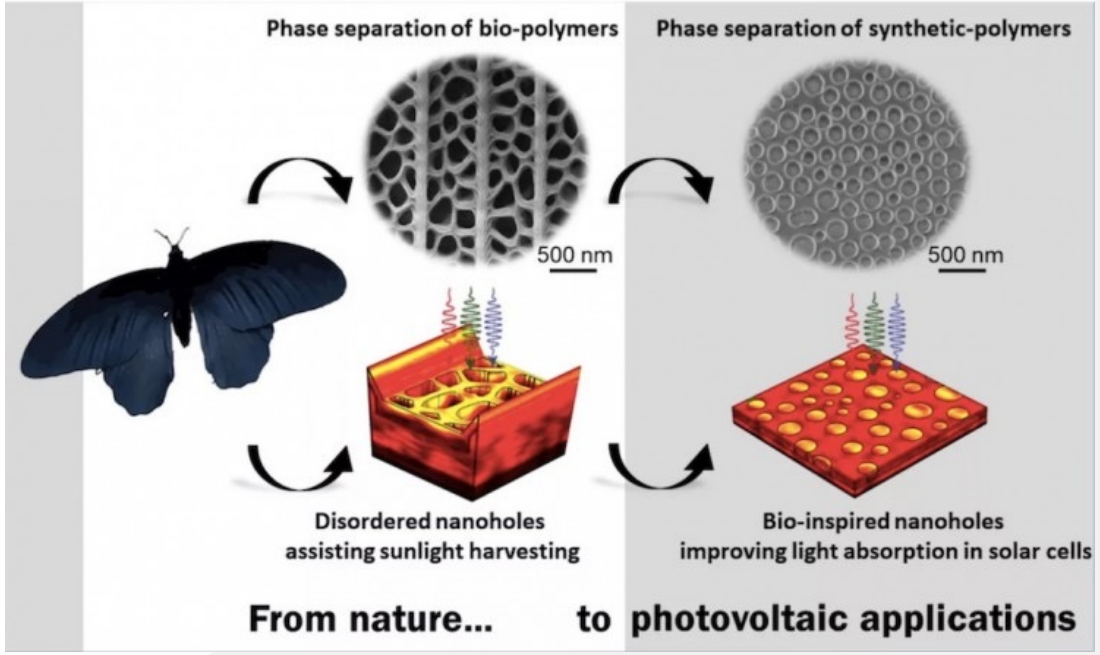
BIOLOGY INSPIRED DESIGNS

- The rose butterfly has tiny cells on its intricate and delicate wings that can collect light at any angle.
- The black wings of the rose butterfly have inspired a new type of solar cell that is two times more efficient at harvesting light



Biology Inspired Designs
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BIOLOGY INSPIRED DESIGNS

The toes of the gecko have inspired adhesive that is strong enough to allow a human to climb up a glass wall.

Biology Inspired Designs
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USE OF BIOLOGY IN ENGINEERING

- Mechanical Engineering: Biological system prosthetics.
- Computer science and engineering: Computational biology robotics.
- Electrical engineering: Robotics devices and photonics signals & image processing.
- Chemical engineering: Biotechnological nanoparticles interfaces polymers biofuels.

BIO-INSPIRED TECHNOLOGIES

- Aircraft wing design: inspired by birds and bats
- Bio robots: based on the physiology and methods of locomotion of animals
- Camera: inspired by human eye
- Pheromone Sensors: Ant-Inspired
- Construction and architecture: termite's

BIO-INSPIRED TECHNOLOGIES

- Suction nozzle of vacuum cleaner: inspired by proboscis of flies.

- Spider web silk is as strong as the Kevlar used in bulletproof vests. Engineers could in principle use such a material, if it could be reengineered to have a long enough life, for parachute lines, suspension bridge cables, artificial ligaments for medicine, and other purposes.

APPLICATIONS

- The study of biology for engineers will pave way for advance studies in the bioengineering.
- It will help in advance research area.
- It will help in understanding different biological processes.

CONCLUSION

- Biological engineering, or bioengineering/bio-engineering, is the application of principles of biology and the tools of engineering to create usable, tangible, economically viable products.
- We need biology to find solutions to challenges, that face mankind.
- Biology is used in different engineering branches

HOME WORK

Q.1. Why do we need to know biology?

Q2.Give some examples of biological Inspired Designs.

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THANK YOU

For queries
Email: shruti.e8736@cumail.in