Core Biology **Spring 2018**
Section 15 - MWF – 8:30 - 10:20
Section 17 - MWF – 12:30 - 2:20

Instructor

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Teaching Assistants

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Section 17 –

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Course Description

This course will cover the fundamental principles that govern living systems. We will explore life processes ranging from the molecular to cellular to organismal and the population levels. While studying these processes, we will pay attention to details that can be potentially altered to yield specific affects and beneficial processes and products. We will study these materials with the aim of answering the following questions: What does Biotechnology mean? How are the Biological systems used and manipulated to enhance human life? What are the repercussions, if any, of meddling with/altering the ways of Nature? We will also study biotechnology driven, directed evolution.
This course uses inquiry-driven interactive learning activities, readings from the popular and scientific press, and directed writing exercises to explore core concepts of Biology.

TENTATIVE SCHEDULE

Week One (03/26-03/30): Life and Cells

Reading: What is life? + Video: What is life?

Hour	Monday	Wednesday	Friday
1	*Intro:* What to expect? *Lecture:* What is life? Scientific Method	*Lecture:* Cells and Fluorescent Microscopy	*Lab:* Fluorescence Microscopy (Report due in class)

2	*Video*: Origins of life. *Lab*: Lab Basics I (Report due in class)	*Lab:* Lab Basics II (Report due in class)	*Discussion:* Week's reading and writing program

Week Two (04/02-04/06): Cells and Macromolecules

Reading: New Ways to squash Superbugs OR The Ultimate Social Network

Hour	Monday	Wednesday	Friday
1	*Lecture:* Prokaryotes: Good, bad and the ugly. Applications	*Lecture:* Molecules of life.	*Lab*: ABR Part II (Report due on 4/9)
2	*Lab:* Prokaryotes *in silico* (Report due in class)	*Lab:* ABR Part I (Report due on 4/9)	*Discussion:* Week's reading and writing program

Week Three (04/09-04/13): DNA & Genetic Variation

Reading: New Life for ancient DNA

Hour	Monday	Wednesday	Friday
1	*Lecture:* DNA & RNA	*Lecture:* DNA replication & PCR	*Lecture:* Genomes –SNPs, Haplotypes, Pharmacogenetics
2	*Lab:* ABR Part III (Report due in class)	*Lab:* Taste Receptor Sequence Part I. (Report due on 4/20)	*Discussion:* Week's reading and writing

Week Four (04/16-04/20): Gene Expression & Regulation

Reading: Alternative Genome

Hour	Monday	Wednesday	Friday
1	*Lecture*: Transcription & Translation	EXAM I	*Lab:* Taste Receptor Sequence Part III. (Report due in class. Includes parts I, II & III)
2	Lab: Taste Receptor Sequence Part II. (Report due on 4/20)	Tutorial on Canvas on DNA sequencing	*Discussion:* Week's reading and writing

Week Five (04/23-04/27): Gene expression

Reading: What makes us humans? OR Regulating Evolution

Hour	Monday	Wednesday	Friday
1	*Lecture:* Regulation of gene expression	*Lecture:* Mutations	*Lab:* RNAi Part II (Report due in class)
2	*Lab:* RNAi Part I (Report due on 4/27)	*Lab:* Protein Folding *In silico* (Report due in class)	*Discussion:* Week's reading and writing

Week Six (04/30-05/04): Regulation of cell division

Reading: Contagious Cancer

Hour	Monday	Wednesday	Friday
1	*Lecture*: Cell Cycle & Regulation of Cell Division	*Lecture*: Cancer & Cancer Vaccines	*Lab*: Metagenomics or iGem (Report due in class)
2	*Lab:* Cell Cycle and Cancer *In silico* (Report due in class)	*Lab*: Metagenomics or iGem	*Discussion:* Week's reading and writing

Week Seven (05/07-05/11): Metabolic interactions & energy exchange with the environment

Reading: Methane, Plants Climate change

Hour	Monday	Wednesday	Friday
1	*Lecture:* Metabolism and Energy	EXAM II	*Lab:* Fermentation
2	*In silico* research about alternative biofuels and global warming	*Video OR Research* On Fermentation	*Discussion:* Week's reading and writing

Week Eight (05/14-05/18): Inheritance & Mendelian Genetics

Reading: Forensics, DNA Fingerprinting, and CODIS

Hour	Monday	Wednesday	Friday
1	*Lecture:* Inheritance &Mendelian Genetics	*Lecture:* Forensics	*Lab:* Fingerprinting III (Report due in class)
2	*Lab:* Fingerprinting I	*Lab:* Fingerprinting II	*Discussion:* Week's reading and writing

Week Nine (05/21-05/25): Mechanisms of Evolution

Reading: The Making of the Fittest – Math of Evolution

Hour	Monday	Wednesday	Friday
1	Mechanisms of Evolution. Drift, Flow, Selection	*Lecture:* Genes and Development	*Lab:* Evo-Devo Exercise (Report due in class)
2	*Lab:* Mechanisms of Evolution I (Report due in class)	Lab: Mechanisms of Evolution II (Report due in class)	*Discussion:* Week's reading and writing

Week Ten (05/28-06/01):

Hour	Monday	Wednesday	Friday

1 & 2	Memorial Day	*EXAM III*	Reading Period

Reference Books and required Text

You could refer to any basic Biology text book from the library. Some of them include,
Biology – Concepts and Applications by Cecie Starr,
Biology by Campbell and Reece,
Biology – A Guide to the Natural World by David Krogh etc.

Additional reading materials will be posted on Canvas.

Grading

1. Discussion Participation - 10%
2. Reading and Writing - 15%
3. Exercises/Lab Reports - 30%
4. Exams (3) - 45%

Acknowledgements

Some of the Lab and Lecture materials for this course draw from the pooled resources of the other Core Biology Professors, namely Dr. Alison Hunter, Dr. Beatrice Fineschi and Dr. Megan McNulty.
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