**Cell and Microbiology: The Fun Basics! HIGH SCHOOL SYLLABUS**

MIT HSSP Summer 2013

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***Lectures:***

Day: Sundays (July 7 – August 18, 2013)

Section 2 (HSSP-MIT 7294) Room: 5-217 Times: 4:05pm-4:55pm

***Office Hours:***

-Sundays 9:00am-10:00am (MIT) -Mondays 3:00pm-6:00pm (Emmanuel)

\**Feel free to email the professor to arrange any office hours appointments.*

***Course Overview:***

This is an introduction to Cell Biology and Microbiology. This course includes a detailed examination of the structure and function of living systems at the cellular level. The lecture series will start off with Cell Biology, and then continues with Microbiology. The cell biology section pays particular attention to the relationship between the fine structure of the cell and cellular mechanisms, such as transport, movement, secretion, and reproduction. The microbiology aspect will primarily focus on bacteria and viruses. This section will utilize knowledge gained from previous cell biology lecture to advance onto topics of microbial diseases, pathogenic microorganisms, bacterial structure and physiology, as well as viral genetics. Students will receive first hand knowledge about the microscopic world around them. Class discussions and lab demos will enhances core concepts and vital details.

***Course Expectations:***

Students are expected to participate and ask questions when appropriate. Participation is key to a successful learning environment.

***Important Information and Course Breakdown***

-Class Participation (Ask questions!) 40%

-Mini Post-lecture quizzes (Simple 2 Questions) 10%

-Lab demo participation (Activities Sheet) 20%

-Reflection paper (End of Summer) 20%

-Mid-summer test (mini-Exam) 10%

\*This simply outlines the amount of class time that will devote to activities.

***Grades:*** Even though no formal grades will impact the student’s academic profile, constant progress reports may be asked for. Teacher will provide any feedback, comments, or answer questions when requested.

***Materials:***

\*Reading materials will be scanned and posted on the main portal. Students DO NOT have to buy books, but if they would like a copy the information below is the editions we will use.

-Essential Cell Biology 3rd Edition, Garland Science. Alberts Bruce, Dennis Bray, Karen Hopkins, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts.

-Biology 8th Edition, Pearson. Neil Campbell, Jane Reece, Lisa Urry, Michael Cain, Steven Wasserman, Peter Minorsky, Robert Jackson.

***Lectures and Homework***

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| ***Week Number*** | ***Lecture Topics*** |
| 1.  CELL BIO | Introduction to class! What is Cell Biology? What is Microbiology? Simple Chemistry, Cell Structures, Organelles, Prokaryotes vs. Eukaryotes, Bacteria, Viruses, Plants.  **\*\*Lab Demo! Yeast, are they alive?** |
| 2.  CELL BIO | Energy! Carbohydrates, Glucose regulation, Mitochondria, ATP Energy, Lipids, Membranes, Proteins, Protein Structures.  \*\***Lab Demo! 7 Day Moldy-Jell-O Experiment** |
| 3.  CELL BIO | Genetics! Mendelian genetics, Genes, Chromosomes, the Genetic code, DNA, RNA, Nucleus, Cell Division, Amino Acid, Peptide Chains.  **\*\*Lab Demo! Forensics Biology, Mystery Starch Criminal** |
| 4.  CELL BIO | Central Dogma! Transcription, Translation, Endoplasmic reticulum, Ribosomes, Golgi Apparatus, Proteins, and Protein Structures.  **\*\* Class discussion about “Sickle Cell Anemia and Malaria”** |
| 5.  MICRO  BIO | **\*Mid-Summer mini-Exam\*** Bacteria, Viruses, Bacteriophage, Bacterial replication, Viral replication, Bacterial structures, Viral structures, Bacterial Genetics, Viral Genetics. |
| 6.  MICRO  BIO | Bacterial infections, Viral infections, Fungi, Prions, Parasites, Antibiotics. **\*Lab Demo! Strawberry DNA extraction!**  **-Reading assignment for next class: either Bioterrorism or Nutrigenomics** |
| 7.  MICRO  BIO | **Bioterrorism or Nutrigenomics class discussion**  \*\*(End of summer Pizza Party!)\*\* |