**“Enzymes, the Amazing Catalysts” - HSSP Fall 2010**

**Syllabus**

**Description**: This course will introduce the basic concepts about enzymes: their functions,

kinetics, and mechanism.

**Text:** Weekly handouts will be distributed at the beginning of the class, and might be

uploaded in the website.

**Prerequisite:** Basic understanding of biology and chemistry, some familiarity with single-

variable calculus is helpful.

**Problem sets:** The problems will be in each weekly handout. Students are encouraged to do the

problems, but not required. The purpose of these problems is to help students review the material and challenge themselves through some difficult questions.

**Topics to be covered** (subject to change)

* What enzymes are, and why they are fascinating.
* General review: basic kinetics, chemical equilibrium, thermodynamics, protein and amino acid chemistry.
* Active sites and cofactors
* Functions and regulations in living systems: involvement in metabolic pathways, feedback controls, and allosteric model
* How specific conformation and arrangement of the enzymes significantly facilitate their functions: molecular motor & multi-enzyme complex
* Enzyme kinetics: steady-state principles, Michaelis-Menten kinetics for reversible and irreversible reactions, inhibition models, etc.
* Catalytic mechanism of enzymes: preferential transition-state binding, chemical stabilization, and orientation/proximity
* Drug development principles toward target enzyme, and pharmaceutical/industrial application

**Grading:** There is going to be “**Fatally Stressful Exam**” by the end of HSSP program !!!

~Just Kidding =P. There is no grading system or any exam in this course. What we are looking for is that everyone enjoys the class and the materials.