BIOCHEMISTRY 403 Course Outline

(January-April, 2012)

LECTURE TOPICS:	Number of Lectures	INSTRUCTOR

PART I. General Concepts of Enzymology

1. Kinetic Analysis of Enzymatic Catalysis — 14 — F. Van Petegem

(a) Introduction to enzymes and classification
(b) Review of simple chemical kinetics: transition state theory
(c) Protein-ligand binding (3 lectures)
(d) Steady state kinetics of enzymes
(e) Enzyme inhibition
(f) Methods to measure enzyme kinetics
(g) Allosteric enzymes: models and case study of ATCase
(h) Temperature adaptation of enzyme (2 lectures)
(i) Case study : voltage-dependent enzymes

2. Principles of Catalysis — 14 — N. Strynadka

(a) Why are enzymes required? How enzyme structure promotes catalysis
(b) General acid-base catalysis, intramolecular catalysis, entropy, electrostatic catalysis, metal ion catalysis
(c) Covalent catalysis: nucleophilic and electrophilic catalysis, factors which determine nucleophilicity and leaving group ability

PART II. Mechanistic Studies of Model Enzyme Systems

3. Structure-based Analyses of Enzyme Systems — N. Strynadka

(a) Structural, mechanistic and drug design strategies in enzymes involved in antibiotic resistance
(b) HIV Protease: Structure, mechanism and drug design strategies

4. Polysaccharide Synthesizing and Degrading Enzymes — 8 — S. Withers

(a) Mechanisms of glycosidases and transglycosylases
(b) Design and application of glycosidase inhibitors
(c) Glycogen phosphorylase structure, function, kinetics, and control of activity

---

Course Instructors, Offices, and Contact Information

Dr. Filip Van Petegem: 2.356 Life Sciences Centre, 827- 4267, filipvanpetegem@gmail.com

Dr. Natalie Strynadka: 4.362 Life Sciences Centre, 822-0789, natalie@byron.biochem.ubc.ca

Dr. Stephen Withers: A333 Chemistry, 822-3402, withers@chem.ubc.c