

# CHM1006HS LEC0101 2021: Biorganic Chemistry

[Jump to Today](#)

The purpose of the course is to provide a mechanistic understanding of biochemical reactions in terms of organic chemical knowledge. Thus, this course is intended for students with a strong background in organic chemistry, obtained in our third year courses, CHM347 (organic chemistry of biological compounds) and CHM348 (organic reaction mechanisms) as well as CHM379 or another biochemistry course. Building on this background, the subject matter includes illustrations of biochemical reactions and systems that are addressed in mechanistic terms. The topics are chosen to illustrate a wide range of mechanistic and structural questions and approaches to their solutions: general theories of reactions, heterocycles and their reactions, stress and strain, covalent intermediates and coenzymes, stereoelectronic control, enantiotopic distinctions and chiral environments, chiral methyl for stereochemical analysis, kinetic principles and survey of bisubstrate kinetics and inhibition, inhibitors, phosphates and nucleases. The course includes midterm and final examinations as well as critical essays on assigned topics that are done independently

**Background Pre-requisites:** CHM347H, CHM348H

**Required (choose at least one of the versions):**

Fersht, Structure and Mechanism in Protein Science:: [Kindle \(Links to an external site.\)](#) edition (Amazon.ca)

**Text**

Print

editions: <https://www.worldscientific.com/worldscibooks/10.1142/10574> ([Links to an external site.](#))

Downloadable edition for students: See module in Quercus site: [Text for Course](#)

**Lecturer**

[Ronald Kluger](#)[Links to an external site.](#), Rm: DB 444, Ph: 416-978-3582

**Last**

**Updated**

2020-15-12

**LECTURES AND READING:** Information is transmitted through lectures, reading from the text, and reading from additional material. Slides used in class lectures are available to minimize note-taking. The course is not limited to the content of the slides.

**OFFICE HOURS:** For virtual classes, contact via email for a Zoom meeting in advance to confirm.

**TURNITIN:** Written submissions are checked with TURNITIN. Normally, students will be required to submit their file to Turnitin.com for a review of textual similarity and detection

of possible plagiarism. In doing so, students will allow their reports to be included as source documents in the Turnitin.com reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of the Turnitin.com service are described on the Turnitin.com web site.

## Chemistry 1006HS - Bio-organic Chemistry - 2021

The topics and timing are subject to change. The chapter references (for information) are to Fersht, *Structure and Mechanism in Protein Science*, (See above)

Week	Tuesday	Thursday	Chapter # in Fersht
Jan-12	Reaction principles, heterocycles, pharmaceuticals		2
Jan-19	Electrostatics, ionization, stress and strain, proficiency, OMP decarboxylase		2, 11
Jan-26	Covalent catalysis: imines, acetoacetate decarboxylase, pyridoxal phosphate, orbital-controlled reaction specificity		2, 8F
Feb-2	Thiamin and its carbenes, Thiamin diphosphate enzymes and covalent intermediates, succinic dehydrogenase and stereochemistry		2
Feb-9	Citrate synthase and carbanions, synthesis and use of chiral methyl; NADH,		8, 16
Feb-16	Reading Week		
Feb-23	Carbanions in enzymic reactions		24
Mar-2	Cofactor mechanisms: biotin, bicarbonate, and ATP		
Mar-9	Decarboxylases and the formation of CO <sub>2</sub>		3

Mar-16	Ubiquitin mechanism	Mid-term exam 12 March	3
Mar-23	pH dependence, inhibition, affinity labels, suicide inhibitors		5, 9
Mar-30	Phosphate transfer, PIX, isotopically chiral phosphates		8
April-6	Ribonuclease, m-RNA, vaccines		16

Grading: Final Exam 50 %, Mid-Term Test 25 %, Assignments 25 %