CHEM [redacted]8853, Spring, [redacted]

Bioconjugate and Bioorthogonal Chemistry

Syllabus

COURSE MEETING TIME/PLACE:

T,Th 3:05-4:25 pm, MoSE G021

COURSE DESCRIPTION:

The selective making of chemical bonds to biological molecules in complex mixtures enables a wide variety of applications in bio- and materials science, bioengineering, and diagnostic and therapeutic medicine. This course will discuss fundamental reactions to address proteins, nucleic acids, and lipids, design strategies for the use of such reactions, the incorporation of selectively reactive functional groups in living systems, and sample applications. In addition, techniques of molecular cloning, protein expression, and metabolic labeling that are required to take maximum advantage of selective chemical ligation processes will be discussed.

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TEXT:

Suggested: : "Bioconjugate Techniques" by Gregory T. Hermanson
2nd Edition: ISBN: 978-0-12-370501-3
3rd Edition: ISBN: 978-0-12-382239-0

Purchase the 3rd edition if you want a reference volume for your desk in future years. While the 3rd edition has color figures, it isn't much better in terms of content than the 2nd edition, which is less expensive. You will be able to get through the course without purchasing either book.

PREREQUISITES:

one semester biochemistry, one semester organic chemistry (CHEM 1315 or 2312)

T-SQUARE PAGE (COURSE WEBSITE):

To include lecture notes, class schedule, relevant course updates. Check often.

PIAZZA PAGE (for questions and answers)

- The primary way to ask questions and get answers outside of class will be through the web site Piazza (piazza.com). Piazza questions and answers are like Wikipedia: anyone can contribute to them. Collaboratively edited questions and answers are easier to read and comprehend than a long thread of comments, and there is a separate section for answers from the instructor. However, you are also free to contact me by e-mail.
- **Sign up** at this address: piazza.com/gatech/spring2014/chem48038853
- **Our class page** is at: piazza.com/gatech/spring2014/chem48038853/home

GRADING:

This class is being created for the first time this semester, and so no firm plans are set yet for homework or exams. If you are uncomfortable with this kind of uncertainty, I apologize and ask you to please talk with me. The class is intended for those who want to learn the subject matter to further their research. Regular attendance, participation, and effort on assignments will go a long way to getting you a good grade.

COURSE OUTLINE (subject to change with plenty of notice)

Week	Dates	Topic	Chapters
1-2	Jan 7, 9, 14, 16	Introduction: basic kinetics, water, biomolecular properties, analytical techniques, reaction types	1
3-4	Jan 21, 23, 28	Biomolecule substrates: proteins, nucleic acids, carbohydrates, lipids	2, 3
	Jan 30	no lecture	
5-7	Feb 4, 6, 11, 18	Reactions and reagents, useful noncovalent interactions	
	Feb 13	no lecture	
	Feb 20	Suddath Symposium, lecture uncertain	
8	Feb 25, 27	Installation of addressable tags	
9	Mar 4, 11	Operating *in vivo*	
	Mar 6	no lecture	
10	Mar 13, 25	Reversible reactions and cleavable connections	
	Mar 18, 20	Spring break, no lecture	
11-14	Mar 25, 27, Apr 1, 3, 8, 10, 15, 22, 24	Examples and case studies	
	Apr 17	no lecture	
	Apr 28-May 2	Final exam week	