

**CHEM 388: Topics of Current Interest in Chemistry: Chemical Genomics
Spring 2008**

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Course Webpage: Hunter Blackboard

Time & Location:

Lecture	HN C111/HN 1312	Mon & Thu 9:45 – 11:00 AM
Office hour	HN 1312	Mon & Thu 11 AM – 12 PM
Midterm exam	HN C111	Thu Mar 20, 9:45 – 11:00 AM

Pre-requisites: CHEM 377 or BIOL 300 or permission of instructor

About this course:

- This is an advanced course designed for upper-level undergraduate and beginning graduate students interested in chemical and computational tools for genomics and proteomics research.
- The intention of this course is to introduce students to fundamental concepts that are employed in current genomics and proteomics research.
- **Molecular visualization (First half):** Students will refine their skills to visualize three dimensional structures of macromolecules (proteins, DNA, etc.) as well as small molecules (drugs, etc.). A series of computational exercises (MOE) will be used to help students learn how to visualize and analyze molecular structures.
- **Chemical and computational tools for genomics and proteomics (Second half):** Students will then be introduced to DNA microarray technology and chemical proteomics, which provide snapshots of transcriptome and proteome in cells.
- Lectures will be given mainly in the problem-solving format.
- Through literature analysis students will be exposed to current research activities at the interface of chemistry and biology.
- Students will be **required** to be fully prepared for each lecture/exercise (by completing homework assignments). Unprepared students will be asked to leave the class.
- Students will be **required** to actively participate in discussions during the class.

Textbook: Handouts and papers selected by the instructor.

Exams & Grading (total 400 pts):

Mid-term examination (100 pts), Class participation (100 pts)*, Final Presentation (100 pts)
Final Report (100 pts)

*Assessed based on your preparation and participation in the class (Being in the class does not automatically give you points).

Academic dishonesty: If any form of academic dishonesty is found, involved student(s) will be automatically given F with a note stating "Failed, due to academic dishonesty" on their transcripts. Student(s) will also be subjected to disciplinary actions according to the school guideline.

Policy on Incomplete Grade: Incomplete (IN) grade would be considered if a student maintained a passing grade (from the midterm exam and class-participation), but cannot complete the course because of unavoidable reasons, e.g., a medical and personal emergency. Documented proof will be required for the consideration of IN grade. However, it is noted that CHEM388 might not be offered in the near future.

"In compliance with the **American Disability Act of 1990 (ADA)** and with **Section 504 of the Rehabilitation Act of 1973**, Hunter College is committed to ensuring educational parity and accommodations for all students with documented disabilities and/or medical conditions. It is recommended that all students with documented disabilities (Emotional, Medical, Physical and/ or Learning) consult the Office of AccessABILITY located in Room E1124 to secure necessary academic

accommodations. For further information and assistance please call (212- 772- 4857)/TTY (212- 650-3230).”

Class & Exam Schedule:

Date	Topics	Rooms
Mon Jan 28	Introduction - Overview	HN C111
Thu Jan 31	Lecture 1: Structures of medically important compounds	HN C111
Mon Feb 4	Computational exercise 1: Molecular builder & analysis of structures (MOE)	HN C111 then HN 1312
Thu Feb 7	Lecture 2: Conformation	HN C111
Mon Feb 11	Computational exercise 2: Conformational search (MOE)	HN C111 then HN 1312
Thu Feb 14	Lecture 3: Spectroscopic tools to study molecular structure and conformation (2D NMR)	HN C111
Mon Feb 18	No class (Presidents' day – College closed)	
Thu Feb 21	2D NMR exercise 1: Problem 1	HN C111
Mon Feb 25	2D NMR exercise 2: Problem 2	HN C111
Thu Feb 28	Literature analysis 1: Endogenous ouabain	HN C111
Mon Mar 3	Lecture 4: Structures of macromolecules (DNA, RNA and proteins)	HN C111
Thu Mar 6	Computational exercise 3: Analysis of DNA and protein structures (MOE)	HN C111 then HN 1312
Mon Mar 10	Computational exercise 4: Protein-ligand interaction	HN C111 then HN 1312
Thu Mar 13	Literature analysis 2: Conformationally-locked ouabain	HN C111
Mon Mar 17	Literature analysis 3: Kinase inhibitors	HN C111
Thu Mar 20	Midterm exam	HN C111
Mon Mar 24	No class (No class scheduled)	-
Wed Mar 26	(Classes follow a Monday schedule) Lecture 5: DNA microarray – chemical principles	HN C111
Thu Mar 27	Lecture 6: DNA microarray – data analysis	HN C111
Mon Mar 31	Computational exercise 5: Microarray data processing	HN C111 then HN 1312
Thu Apr 3	Computational exercise 6: Cluster analysis	HN C111 then HN 1312
Mon Apr 7	Computational exercise 7: Functional annotation of microarray data (DAVID)	HN C111 then HN 1312
Thu Apr 10	Literature analysis 4: Genomic tools for the studies of small molecules	HN C111
Mon Apr 14	Literature analysis 5: Pharmacogenomics	HN C111
Thu Apr 17	Lecture 7: Chemical proteomics – Overview	HN C111
Mon Apr 21	No class – Spring recess	-
Thu Apr 24	No class – Spring recess	-
Mon Apr 28	Literature analysis 6: Chemical proteomics	HN C111
Thu May 1	Computational exercise 8: Analysis of proteomic profiles	HN C111 then HN 1312
Mon May 5	Final presentations 1 (3-4 students)	HN C111
Thu May 8	Final presentations 2 (3-4 students)	HN C111
Mon May 12	Final presentations 3 (3-4 students)	HN C111
Thu May 23	Final report due	