

CHEM UA 828 | 4 units |
Session: 01/23/15 - 05/01/15 | Spring 2017
Section 0001

Structural DNA Nanotechnology

INSTRUCTOR: Nadrian C. Seeman, 1066 Waverly, ned.seeman@nyu.edu

TIME: 6:20 pm, Monday & Wednesday

PLACE: Waverly 367

PREREQUISITES: Consent of Instructor. Biochemistry & Physical Chemistry Strongly Recommended

DESCRIPTION--This is a course on a new field of research, which has been growing exponentially since the start of the twenty-first century. The field deals primarily with the control of molecular structure on the nanometer scale through programming it by means of DNA secondary structures. The course will consist of a series of lectures by the instructor and then a series of presentations by the students of recent papers in the field. A new textbook, *Structural DNA Nanotechnology*, by the instructor, will be used as appropriate.

GRADING--Students will be graded on the best of 2 midterm exams, on an oral presentation of a paper on an assigned topic from the recent literature, and on their contributions to the discussions of the presentations by other students. The relative weights are: Exams, 3; Presentation, 3; Discussion 2. Grading on the best exam, the presentation and the discussion.

Exam Dates chosen in consultation with the class within fixed windows. Presentation Dates at end of Semester, topics and associated dates chosen by lottery.

TEXT--*Structural DNA Nanotechnology*, by Nadrian C. Seeman, Cambridge Univ. Press.

LECTURE TOPICS--The following topics will be covered, in roughly the following order as time permits:

1. Introduction to Nucleic Acids and Structural DNA Nanotechnology.
2. Design of DNA Sequences.
3. Design of Motifs and Objects.
4. Experimental Methods.
5. DNA Topological and Geometrical Targets.
6. Robust DNA Motifs.
7. DNA Arrays and Lattices in 1D, 2D and 3D; Crystallography.
8. DNA Nanomechanical Devices.
9. DNA Origami and Bricks.
10. Combinations of DNA Lattices and Devices.
11. Self-Replicating Systems.
12. Programming with DNA.
13. Variations on the Theme of DNA; interactions with other chemistry.
14. Current and future applications of structural DNA nanotechnology.