CHM562 **Natural Products** **Spring 2011**

Meets MWF @ 9 AM, II-307B

Instructor: Dr. Catherine Neto email: cneto@umassd.edu
Office: II-301A phone: x6928, or 508-910-6928
Research Lab: II-301 Office hours TBA

Pre-requisite: 1 year of Organic Chemistry & lab; biochemistry strongly recommended.

Course materials: Medicinal Natural Products—a Biosynthetic Approach by Paul M. Dewick, Wiley & Sons, 2nd or 3rd edition. Not available in the bookstore, but Amazon.com has several options:
http://www.amazon.com/s/ref=nb_sb_noss?url=search-alias%3Dstripbooks&field-keywords=Dewick%2C+Medicinal+Natural+Products&x=0&y=0
Some journal articles and other course materials will be distributed; others will be available in the library or through ILL. You will also have access to recent issues of Journal of Natural Products and the Journal of Agricultural and Food Chemistry through our laboratory subscription, use the computer in II-301 to search. 2001-2009 available in print in 301.

Course description:
Focus will be on the structure, occurrence, biosynthesis and pharmacological uses of compounds derived from nature, with emphasis on plants, (particularly medicinal plants) and functional foods. We'll also examine some of the health conditions that are improved by natural products. Along with selected material from the text, we'll discuss articles and reviews from the scientific literature. Journal articles will be used to examine methods used in natural products research to isolate & identify naturally occurring molecules and determine their potential biological and medicinal uses.

Course Assignments:

50% Two exams: a midterm and a final. Both will include a written portion in which you will review aspects of current scientific literature in natural products.

25% Course project: Write an original review article on a topic of your choice, incorporating various literature sources with emphasis on recent findings.

25% Class presentations: Each student will be expected to give two 15-minute presentations in class based on the scientific literature. Topics may be assigned or they may be of your choosing,

Tentative topics to be covered in the course:

Natural production of primary and secondary metabolites, basic mechanisms of biosynthesis and associated enzymes, vitamins & their physiological role, fatty acids, prostaglandins and polyketides, the shikimate pathway to aromatic molecules, antioxidants and other functional food factors, structure and bioactivity of terpenes and alkaloids, some basic pharmacology & nutritional aspects of natural products, bioassay methods and methods for isolation and structure determination, and the anti-cancer properties of natural products, marine and microbially-derived natural products.

CHM562 Spring 2011 Tentative topic coverage

Jan. 24th Introductory meeting

Jan. 26th- March 9th: Topics to be covered, in order of appearance:

Primary & secondary metabolites: building blocks, construction mechanisms, Enzymes, vitamins & cofactors (Ch. 2 Dewick).
Acetate pathway to fatty acids, polyketides, macrocyclics (Ch. 3 Dewick)
Shikimate pathway to aromatic compounds & phenolics (Ch. 4 Dewick)
Flavonoids and polyphenolics, antioxidant chemistry and biology (Literature)

Feb 21st: Holiday, no class

Feb 23rd to March 2nd: Student presentation #1: Topics to be chosen

March 11th: Exam #1

March 12-20th: Spring break

March 21st - May 9th: Mevalonate pathway to terpenes. Chemistry and biological activity of terpenes, triterpenes, steroids and carotenoids (Ch. 5).
Natural products, cancer and antimicrobial activity (literature).
Alkaloids (Ch. 6)
Marine and microbial natural products

April 25th to May 2nd: Student presentation #2: Present a research study from your review article topic

May 6th: Course Project Due (Review article)

Week of May 12-18th Exam #2: Date TBA