

MWF @ 9:00, II-307B

Instructor: Dr. Catherine Neto

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Research Lab: II-301

Office hours TBA

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

Course materials:

A large 3-ring binder for keeping notes, articles and handouts.

No textbook is required. Some journal articles, book chapters and other course materials will be distributed; others will be available through the library, in the Neto lab, or online. Journal of Agricultural and Food Chemistry print issues (2001-2009) are available in II-301 or online through Dr. Neto's subscription.

Some resources will be posted for downloading on my UMD website faculty page:

<http://www.faculty.umassd.edu/catherine.neto/welcome.cfm?pg=6>

Course description:

This course will focus on the chemistry of food constituents, particularly plant-based phytochemicals (natural products) and the methods of analysis used to study food composition, molecular structure and biological effects. Emphasis will be on structure, function, occurrence, biosynthesis, biological activity, and nutritional roles of food constituents. Recent scientific literature in agricultural and food chemistry and related fields, nutrition, and current issues in food science will be discussed.

Course grades will be based on assignments and class participation.

Course Assignments:

- 40% Two exams: a midterm and a final. Both will include a written portion in which you will review aspects of current scientific literature on food chemistry.
- 25% Course project: write a mock review article on a topic of your choice, incorporating various literature sources with emphasis on recent findings.
- 25% Class presentations: Two 15-minute in-class oral presentations based on the scientific literature related to food chemistry. Topics may be assigned or they may be of your choosing,
- 10% In-class participation

Occasional events may be scheduled outside of class time, such as special seminars, guest lectures or a "field trip". I will do my best to give the class plenty of advance notice.

Please keep in mind that plagiarism or cheating in any form will not be tolerated. See the University policy on academic dishonesty at:

<http://www.umassd.edu/studenthandbook/academicregs/ethicalstandards.cfm>

All sources used should be properly cited in oral presentations and written assignments.

Tentative topics:

Basic food components - fats, protein, carbohydrates, vitamins and other phytonutrients
- biosynthetic pathways, building blocks & biological roles.

Fats & oils: structure & biosynthesis, unsaturation, omega-3 fatty acids, analysis methods, Vitamin E and antioxidants in preservation, health & nutrition effects.

Terpenes, phenylpropanoids and other volatiles, chemistry of spices, herbs, and beer, analysis of volatiles, flavor & odor; carotenoids and larger isoprenoids

Carbohydrates - chemistry and nutrition of simple and complex carbohydrates, fiber, lignan & lignins, cereals and grains.

Phytochemicals from fruits, vegetables & herbs (special topic: berries)

Flavonoids and other phenolic compounds: composition, analysis, health & nutritional benefits

Grapes & wine, French paradox, flavonoids and cardiovascular disease, soy and phytoestrogens,

Non-phenolic "functional food phytochemicals"

Botanicals and "nutraceuticals": Food or drug?

Food analysis methods

Extraction, sampling techniques, reproducibility issues

Chromatographic methods, LC and GC analyses

Spectroscopic analysis for structure identification and composition

Food safety - microbes, contamination, pesticides, etc. (Nielsen) - diseases related to food contamination, E. coli, mycotoxins, etc.

Issues in agriculture: chemistry of pest resistance, food quality

Additives and preservatives

Guest lectures TBA!