HCS/FST 7830 Phytochemicals in Human Health: Crops to the Clinic

Semester: Autumn 2019 – 15 weeks. Course will be offered every other year.
Meeting times: Mondays, Wednesdays 10:20 – 11:40 am
Location: Room 120 Parker Food Science Building (Columbus) with video-link to 123 Williams (Wooster)
Credits: 3

Instructors:
Jessica Cooperstone Ph.D., Assistant Professor, Horticulture and Crop Science, Food Science and Technology, 348 Howlett Hall (Columbus), Phone: 614-292-2843, cooperstone.1@osu.edu

Joseph Scheerens Ph.D., Professor, Horticulture and Crop Science, 110 Williams Hall (Wooster), Phone 330-263-3826, Cell: 330-201-7751, scheerens.1@osu.edu

Office Hours: by appointment

Prerequisite requirements: Required: Biochemistry 4511, Biochemistry 5613 or equivalent or Approval of Instructor. To enroll, please send one of the instructors an email, and we can grant permission.

Text: No specific text book is required. However, recent research publications will be assigned throughout the course. Students are expected to read assignments and participate in class discussions.

Course description: This course will cover the function and control of phytochemicals in plants, the function of phytochemicals in human health, delivery of phytochemicals through foods in the diet, strategies when designing studies examining foods for health, and policy and sustainability considerations.

Learning objectives and learning outcomes:

Upon completion of this course, students will be able to:

1. Explain the function of secondary metabolites and phytochemicals in plants and horticultural methods to manipulate secondary metabolite and phytochemical levels in plants.
2. Describe the impact of phytochemicals from plants, food ingredients, and food products on human health.
3. Summarize factors to consider when designing studies involving 'crops to the clinic' research, including the delivery of foods and phytochemicals.
4. Appreciate the importance of interdisciplinary approaches to phytochemical investigation and the development of products that are translatable as health-beneficial foods or clinical dietary interventions.
5. Describe policy and sustainability considerations when developing plant-based foods with enhanced health benefits.
6. Assess the influence of media coverage (information/misinformation) on the increasing awareness of health benefits from a phytochemical-rich diet.

Course Outline (Two lectures per week; lectures are 80 minutes each) TENTATIVE AS OF 07/26/19

While this course involves various different lecturers, one of the main instructors (Cooperstone or Scheerens) will be present during all classes, providing continuity throughout the semester.

Mondays	Instructor	Topic	Wednesdays	Instructor	Topic
			8/21/19	Joe Scheerens	Intro to class, what are phytochemicals and why do we study them?
8/26/19	Joe Scheerens	Biosynthetic pathways of major phytochemicals	8/28/19	Joe Scheerens	Function of secondary products, oxidative stress
9/2/19	N/A	Labor day, no class	9/4/19	Jess Cooperstone	Nutrition based disease prevention
9/9/19	Jess Cooperstone	Phytochemical analysis	9/11/19	Susan Olivo-Marsten	Contribution of epidemiology to studying phytochemicals and health
9/16/19	Susan Olivo-Marsten	Contribution of epidemiology to studying phytochemicals and health	9/18/19	Earl Harrison	Animal/cell models in nutrition, bioavailability/bioaccessibility
9/23/19	David Francis	Genetic determinants of nutritional quality	9/25/29	Josh Blakeslee	Phytochemicals and abiotic stress
9/30/19	Chris Taylor	Nutrition intake assessment	10/2/19	OMSMS	No class
10/7/19	Matt Teegarden	Plant polyphenols and health	10/9/19	Clinton lab	Nutrition and cancer
10/14/19	Yael Vodovotz	Functional food delivery systems	10/16/19	Rachel Kopec	Fat soluble bioactives, vitamin A biofortification
10/21/19	Greg Bricker	Cruciferous vegetables and human health	10/23/19	Jill Clark	Nutrition policy
10/28/19	Matt Kleinhenz	Agronomic factors on phytochemical production	10/30/19	Jess Cooperstone	Journal club discussion (turmeric)
11/4/19	Jess Cooperstone	Tomato pigments and health	11/6/19	Tom Knobloch	Culinary berries and human health
11/11/19	N/A	Veterans day no class	11/13/19	Michael Dzakovich	Phytochemicals and biotic stress
11/18/19	Jess Cooperstone	Should we have reference intakes for phytochemicals?	11/20/19	Emily Hill	Behavior modifications to improve phytochemical consumption
11/25/19	Tom Mace	Phytochemical modulation of immune function	11/27/19	N/A	Thanksgiving no class
12/2/19	Media reports discussion		12/4/19	Poster presentations	

Final exam time (Dec 10, 10-11:45am): problem solving project presentation

Course assessment:

Student progress toward meeting the course learning objectives and learning outcomes will be evaluated by their performance as individuals or team members on three separate projects.

The Proposal Poster Project: This project is designed to address the first four learning objectives of the course, but will emphasize specifically the fourth objective. Pairs of students from different backgrounds will develop proposals for conducting scientific research involving phytochemicals, their production in plants, their incorporation into functional food products, their effects on human health and disease and/or their dietary or clinical use. Rather than writing a proposal per se, students will develop a "proposal" poster suitable to use in an oral presentation to the class during a "poster session" much like those commonly held at professional meetings. Abstracts for the proposal project (due Wednesday, **October 2, 2019**) and the course instructors will review poster content and provide feedback if submitted by Friday, **November 22, 2019**. Student teams will present their posters in open session on Wednesday, **December 4, 2019** to other class members and to a team of evaluators comprised of instructors, guest lecturers in 7830 or others with expertise in this field. The situation will be very similar to that which you may encounter presenting your work at a national meeting.

The Media Reports Diary Project: This project is designed to address objectives five and six. Since the general public has been introduced to the "wonders" of antioxidants, the media had been replete with advertisements about the health benefits of specific foods (e.g., POM Wonderful). Each student will keep an annotated diary of instances of when and where they encounter advertisements of health beneficial foods. In addition to logging such events, the student should follow-up by exploring what phytochemicals are actually contained in the food (e.g., what are the bioactive compounds in pomegranate juice) and then, find, read and write a one-page synopsis of a journal article addressing some aspect of the plant or the product. Three entries should be made in each journal. It would be beneficial if the research articles chosen were from diverse disciplines. The three articles synopses will be due on **October 9, 2019**, **October 30, 2019** and **November 13, 2019**. Media coverage of health beneficial foods will be discussed **December 2, 2019** by students based on information uncovered via preparation of diaries.

The Problem-solving Project: This project is designed to potentially address all course objectives and serve as a culminating opportunity to utilize what students have learned over the course of the semester. Many professional meetings have plenary sessions delivered by knowledgeable individuals or panels who present information about important and prevalent situations (e.g., food security) followed by breakout or brainstorming sessions where smaller groups address potential solutions to discrete aspects of the larger problem (e.g., "food deserts" in American cities, or "lack of food distribution infrastructure in developing nations) Presuming that Phytochemicals in Human Health: Crops to the Clinic constitutes our plenary session, groups of 5-6 students will be paired with an instructor (moderator), and given a problem to "brainstorm". In this exercise, the students will clearly define the problem by enumerating its root causes and then list possible ways to alleviate the situation with a plan of how to make it happen. Obviously each group will be given a distinct "problem", so basing performance evaluation on outcome of the exercise would be difficult. Instead, students will be evaluated based on their participation and on demonstration of their grasp of course subject matter.

Due Dates Summary:
Proposal project abstract: Wednesday, October 2, 2019
Proposal project poster text (optional): Friday, November 22, 2019

Proposal poster project presentation: Wednesday, December 4, 2019
3 Media diary entries due:

- Wednesday, October 9, 2019
- Wednesday, October 30, 2019
- Wednesday, November 13, 2019
- Discussion on Monday, December 2, 2019.

Problem solving project activity: Final exam time, December 10, 2019, 10-11:45am

Grading

Assignments		Available Points
The Proposal Poster Project		65
	Abstract Quality	5
	Text Rough Draft Quality	10
	Poster Quality (based partly on jury scores)	25
	Formal Presentation Quality (based partly on jury scores)	25
The Media Reports Diary Project		24
The Problem-solving Project		11
Total		100

Grading Scales: A (92.5-100), A- (90-92.4), B+ (87.5-89.9), B (82.5-87.4), B- (79.5-82.4), C+ (77.5-79.4), C (72.5-77.4), C- (69.5-72.4), D+ (67.5-69.4), D (60-67.4), E (Below 60).

Course policies:
Attendance policy: We expect you to attend class as it will be critical to your learning this material, though we will not take attendance. Any class material you miss will be your responsibility to learn. If there are extenuating circumstances that cause you to miss class, please let us know to make arrangements.

University policies:
Academic Misconduct: It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct at http://studentconduct.osu.edu/.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact us.

Disability Services: The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let one of the

instructors know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with one of the instructors as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

PLEASE TAKE CARE OF YOURSELF (Mental Health Statement):
As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing.

If you are or someone you know is suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life's Counseling and Consultation Service (CCS) by visiting ccs.osu.edu or calling 614-292-5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on-call counselor when CCS is closed at 614-292-5766.

If you are thinking of harming yourself or need a safe, non-judgmental place to talk, or if you are worried about someone else and need advice about what to do, 24 hour emergency help is also available through the Suicide Prevention Hotline (Columbus: 614-221-5445 / National: 800-273-8255); or text (4hope to 741741); or at suicidepreventionlifeline.org