Term Information

Effective Term
Autumn 2014

General Information

Course Bulletin Listing/Subject Area
Human Nutrition

Fiscal Unit/Academic Org
Human Development & Family Sci - D1251

College/Academic Group
Education & Human Ecology

Level/Career
Graduate

Course Number/Catalog
7830

Course Title
Phytochemicals in Human Health: Crops to the Clinic

Transcript Abbreviation
phyto hum health

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.

Semester Credit Hours/Units
Fixed: 3

Offering Information

Length Of Course
14 Week

Flexibly Scheduled Course
Never

Does any section of this course have a distance education component?
Yes

Is any section of the course offered
Greater or equal to 50% at a distance
Less than 50% at a distance

Grading Basis
Letter Grade

Repeatable
No

Course Components
Lecture

Grade Roster Component
Lecture

Credit Available by Exam
No

Admission Condition Course
No

Off Campus
Never

Campus of Offering
Columbus, Wooster

Prerequisites and Exclusions

Prerequisites/Corequisites
Biochemistry 4511 (511), Biochemistry 5613 (613) or equivalent or Approval of Instructor

Exclusions
FST 7810

Cross-Listings

Cross-Listings
FDSCTE 7830, HCS 7830, IBGP 7830, PUBHEPI 7830

Subject/CIP Code

Subject/CIP Code
01.1001

Subsidy Level
Doctoral Course

Intended Rank
Masters, Doctoral
**Requirement/Elective Designation**

The course is an elective (for this or other units) or is a service course for other units.

**Course Details**

**Course goals or learning objectives/outcomes**

- Explain the function of secondary metabolites and phytochemicals in plants and horticultural methods to manipulate secondary metabolite and phytochemical levels in plants.
- Describe the impact of phytochemicals from plants, food ingredients, and food products on human health.
- Summarize factors to consider when designing studies involving ‘crops to the clinic’ research, including the delivery of foods and phytochemicals.
- Describe policy and sustainability considerations when developing plant-based foods with enhanced health benefits.

**Content Topic List**

- Clinical trial design and execution for functional food research. Interface between fruits, vegetables, and nutritional genomics. Food and nutrition policy: health claims, novel ingredients, nutrition advertising for plant-based foods.
- Examples and case studies of crop-based functional food research.

**Attachments**

- HCS 7830Phytochemicals 4-3-2014 Revised.docx: Syllabus

**(Syllabus. Owner: Bomser, Joshua A)**

**Comments**

- Bomser uploading new syllabus (by Zircher, Andrew Paul on 04/03/2014 03:17 PM)

**Workflow Information**

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Phytochemicals in Human Health: Crops to the Clinic
Cross-listed in FDSCTE 7830, HCS 7830, HUMNNTR 7830, IBGP 7830, PUBHEPI 7830

Semester: Autumn 2014 – 14 weeks. Course will be offered every other year.
Meeting times: 3 hours/week (two 80-minute meetings/week)
Location: Parker Food Science and Technology Building, with video-link to Wooster.
Credits: 3

Instructors:
Dr. Steven Schwartz, 235 Parker Building, Phone 614-292-2934, email schwartz.177@osu.edu
Dr. Joseph Scheerens, 116 Gourley (Wooster), Phone 330-263-3826, email scheerens.1@osu.edu
Robin Ralston, 213 Parker Building, Phone 614-292-6487, email ralston.67@osu.edu

Office Hours: Arranged by appointment

Teaching Assistants: TBD

Prerequisite requirements: Required: Biochemistry 4511 (511), Biochemistry 5613 (613) or equivalent or Approval of Instructor.

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:

- Explain the function of secondary metabolites and phytochemicals in plants and horticultural methods to manipulate secondary metabolite and phytochemical levels in plants.
- Describe the impact of phytochemicals from plants, food ingredients, and food products on human health.
- Summarize factors to consider when designing studies involving ‘crops to the clinic’ research, including the delivery of foods and phytochemicals.
- Describe policy and sustainability considerations when developing plant-based foods with enhanced health benefits.
Course Outline (lectures 80 minutes each)

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

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Lecture Topic/Activity</th>
<th>Readings</th>
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<tbody>
<tr>
<td><strong>Fundamentals of Studies on Plant Foods and Health</strong></td>
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<tr>
<td>Week 1-A</td>
<td></td>
<td>Joseph Scheerens – Introduction to course</td>
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<td>Week 1-B</td>
<td></td>
<td>Joseph Scheerens – What are secondary metabolites and phytochemicals and why do we study them?</td>
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<tr>
<td>Week 2-A</td>
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<td>Susan Olivo-Marston – Contribution of Epidemiology to Study of Plant Foods and Health (Types of epidemiological studies; Challenges of collecting fruit, vegetable, and phytochemical intake data in epidemiological studies; How to measure fruit, vegetable, and phytochemical intake in populations; Plant-based food patterns and health)</td>
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<tr>
<td>Week 2-B</td>
<td></td>
<td>Susan Olivo-Marston – Contribution of Epidemiology to Study of Plant Foods and Health (Types of epidemiological studies; Challenges of collecting fruit, vegetable, and phytochemical intake data in epidemiological studies; How to measure fruit, vegetable, and phytochemical intake in populations; Plant-based food patterns and health)</td>
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<td>Week 3-A</td>
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<td>Joseph Scheerens – Function of secondary products in plants: Oxidative stress</td>
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<td>Week 3-B</td>
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<td>Joseph Scheerens – Function of secondary products in plants: Abiotic stresses</td>
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<tr>
<td>Week 4-A</td>
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<td>David Mackey – Function of secondary products in plants: Biotic stresses</td>
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<td>Week 4-B</td>
<td></td>
<td>Mark Failla/Earl Harrison – Use of animal and cell models in nutrition and food research: bioavailability and bioaccessibility studies</td>
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<td>Week 5-A</td>
<td></td>
<td>Martha Belury – Use of animal and cell models in nutrition and food research: efficacy studies (1st half of class) Greg Lesinski – Use of animal and cell models for nutrition and food research: inflammation (second half of class)</td>
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<tr>
<td>Week 5-B</td>
<td></td>
<td>Yael Vodovotz – Development of food-based targeted delivery systems using plant foods</td>
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<tr>
<td>Week 6-A</td>
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<td>Steven Clinton/Beth Grainger – Contribution of Clinical Studies to the Research of Plant Foods and Health (Types of clinical studies; How to measure fruit, vegetable, and phytochemical intake in clinical studies)</td>
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<tr>
<td>Week 6-B</td>
<td></td>
<td>Steven Clinton – Challenges for human studies with plant foods and phytochemicals</td>
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<tr>
<td>Week 7-A</td>
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<td>Colleen Spees – Interface between fruits, vegetables, and nutritional genomics</td>
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<td>Week 7-B</td>
<td></td>
<td>Neal Hooker – Food and nutrition policy: health claims, novel ingredients, nutrition advertising for plant-based foods</td>
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| Week 8-A | **MIDTERM EXAM** (first half of class)  
Ken Riedl – Analysis of phytochemicals from foods and biological samples (second half of class) |
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<tr>
<td><strong>Case Studies and Specific Examples of Plant Foods for Health</strong></td>
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<tr>
<td>Week 8-B</td>
<td>Matt Kleinhenz – Examples of horticultural manipulation to control crop nutrient quality</td>
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<tr>
<td>Week 9-A</td>
<td>David Francis – Horticulture case study: genetic determinants of nutritional quality in tomatoes</td>
</tr>
<tr>
<td>Week 9-B</td>
<td>Mark Failla/Earl Harrison – Case Studies: Use of animal and cell models in nutrition and food research: bioavailability and bioaccessibility</td>
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<tr>
<td>Week 10-A</td>
<td>Martha Belury – Plant lipids in health and disease; Implications for sustainability</td>
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<tr>
<td>Week 10-B</td>
<td>Rich Bruno – Plant tocopherols/tocotrienols and health</td>
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<tr>
<td>Week 11-A</td>
<td>Rich Bruno – Tea and coffee and health</td>
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<tr>
<td>Week 11-B</td>
<td>Greg Lesinski – Examples of plant phytochemicals for immune function</td>
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<tr>
<td>Week 12-A</td>
<td>Monica Giusti – Stability, bioavailability, biotransformation and health benefits of polyphenols</td>
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<td>Week 12-B</td>
<td>Yael Vodovotz – Examples of plant food-based targeted delivery systems</td>
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<tr>
<td>Week 13-A</td>
<td>Steven Schwartz – Naturally occurring and processing induced plant toxicants in the food supply</td>
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<td>Week 13-B</td>
<td>Chris Weghorst – From Crops to the Clinic: Berries and health</td>
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<td>Week 14-A</td>
<td>Steven Schwartz – From Crops to the Clinic: Tomatoes, carotenoids, and health</td>
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<tr>
<td>Week 14-B</td>
<td>Robin Ralston – From Crops to the Clinic: Cruciferous vegetables and health</td>
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<td>Finals week</td>
<td><strong>FINAL EXAM</strong></td>
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**Course assessment:**

**Written Assignment:** Pairs of students (2 per group) will research a plant food or phytochemical and its health benefits, including (1) epidemiology, (2) horticulture and crop science, (3) preclinical animal and cell studies, (4) food science studies, and (5) human clinical studies. Each pair of students will prepare a written paper describing and interpreting their findings (8 pages maximum). Based on their findings, students will propose as research study to continue investigation of the health benefits of their food. The proposal will include an overall hypothesis, two to four aims, and a short justification for each aim (1 page maximum). The assignment is due during week 14.

**Exams:** This course includes one mid-term exam held during the usual class period and one final exam held during finals week.
Late Assignments and Make-up Exams: Late term papers are penalized at a rate of 10% loss in points per day late including weekends. Term papers will not be accepted more than 7 days late. Make-up exams and changes in due dates will be only allowed by the discretion of the instructor with documented certificates. Instructor must be informed within 48 hours of missing the exam due date. All make-up exams must be completed within 7 days of the originally scheduled date of the exam or the student will receive a grade of zero.

Grading

You will earn up to 100 points through the term paper, midterm exam, and final exam:

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<th>Points</th>
<th>Percentage of Final Grade</th>
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<tr>
<td>Term paper</td>
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<tr>
<td>Mid Term Exam</td>
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<tr>
<td>Final Exam</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
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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).

Academic Misconduct

Academic misconduct is defined in the Code of Student Conduct (3335-31-02, http://trustees.osu.edu/rules/university-rules.html) and the Rules of the University Faculty (3335-31-04, http://studentlife.osu.edu/pdfs/csc_12-31-07.pdf). Some examples of misconduct are:

1. Using someone else’s work without proper citation of the source – plagiarism
2. Using an assignment from a previous course to meet an assignment in this course
3. Copying another student’s homework, exam or quiz.

Suspected academic misconduct will be referred automatically to the Committee on Academic Misconduct as required by Faculty Rules.

Ohio State University Disability Services

Any student who may need an accommodation based on the impact of a disability should contact me privately to discuss your specific needs. The Office for Disability Services assists faculty in verifying the need for accommodations and developing accommodation strategies. If you have not done so, you are encouraged to contact the Office for Disability Services at 614-292-3307 in 150 Pomerene Hall to register your disability.