

Vegetable Crop Production and Management (HORT 471)

Course Description

Welcome to HORT 471. This course is designed to provide you with an introduction to vegetable crops and the theoretical knowledge and hands-on experience required for successfully producing them. We will be spending most of our time learning the elements of successful vegetable production including the what, where, when and how of growing specific crops. Topics will include crop classification; planting methods; crop climatic conditions, physiological growth and development; soil, water, and pest management; organic production; cover cropping; crop rotation; season extension strategies; postharvest handling/management and marketing. Course involves visits to vegetable production sites in Iowa to observe/experience and learn from growers and entrepreneurs in the field of vegetable production. Laboratory section of the course will provide an opportunity to grow a variety of vegetables in a heated greenhouse; conduct experiments; observe and/or operate equipment for field production. It is expected that upon completion of the course, students would be able to put into practice what they have learned. For students seriously considering entering a vegetable production business, internship (paid) opportunities could be provided through collaboration with vegetable growers in surrounding areas of Ames.

Objectives

- to prepare students to successfully grow vegetables for commercial vegetable production
- to describe the climate and soil requirements needed for raising good quality vegetable crops
- to be able to identify seed, plant characteristics, important pests of the major vegetable crops
- to define specific growth processes of each crop studied that leads to a harvestable product
- to analyze and interpret data through greenhouse and lab experimentations

Instructor:

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Office Hours: Monday and Wednesday 9am to 10am

Class schedule:

Monday and Wednesday, 8:00am to 8:50am, Rm 13 Curtiss Hall
Lab: Wednesday 3:10pm to 6pm, Rm 160 Horticulture Building

Required field trips:

We will have at least two required field trips during the year.

Required text:

Producing Vegetable Crops by John M. Swiader & George W. Ware, Interstate Publishers, Inc., Danville, Illinois, 5th edition

Other interesting reads:

Vegetable Crops, Dennis R. Decoteau, Prentice-Hall, Inc., NJ
Knott's Handbook for Vegetable Growers, Donald N. Maynard and George J. Hochmuth, 4th Edition

Online resources with required reading:

- Ontario IPM guide: <http://www.omafra.gov.on.ca/IPM/english/index.html>
- Managing Cover Crops Profitably, 3rd Edition, Free download: <http://www.sare.org/Learning-Center/Books/Managing-Cover-Crops-Profitably-3rd-Edition>
- Midwest Vegetable Production Guide: <http://www.btny.purdue.edu/Pubs/ID/id-56/>

Course Outline

- Introduction to vegetable crops – Vegetable classification, production statistics, and current markets.
- Location and size of the vegetable industry
- Production and management
- Soil management
- Fertilization practices, composts
- Tillage, cover cropping, weed management
- Crop rotation
- Irrigation practices and techniques (includes hydroponics)
- Integrated Pest Management
- Postharvest handling/storage
- Marketing opportunities

Specific Crops

- Asparagus
- Cole crops (broccoli, cabbage, cauliflower)
- Solanaceae crops (eggplant, pepper, potato, tomato)
- Bulb crops (celery, garlic, onion)
- Vine crops (cucumber, melon, pumpkin, squashes, zucchini)
- Salad greens (spinach, lettuce, kale, collard, chard)
- Root crops (beets, carrots, radish, turnip,)
- Other: peas, rhubarb, snap beans, sweet corn

Grading:	<u>Percent</u>
Participation (including attendance)	10%
Exams x 3	45%
Lab notebook/quizzes	15%
Lab reports	15%
Independent/group project	15%
Total	100%

Late Assignment Policy. Grades for late assignments will be reduced 5 percentage points for each day late. For example, if you turned in an excellent lab report with a grade of 95% (=4.0) one week late, you'd get a 60% (=1.0)...so, don't be late!!

Academic Honesty and Integrity. I assume that all course work and examinations represent the student's own work. Violations of ISU's academic integrity policy such as cheating or plagiarism are grounds for academic action and/or disciplinary sanction as described in the university's student conduct code. Incidents of plagiarism are taken very seriously. Students are strongly cautioned not to copy any text (including website content) verbatim or use someone else's ideas on assignments without using appropriate quotations and source citations.

Independent/group Project. This is an opportunity for you to explore in more detail some aspect of vegetable production of particular interest to you, and to share that information with the class. Details provided in the laboratory handout

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Topic Outline and Reading Assignments [As of 01/08/12]

Class	Day	Date	Topic(s)	Reading Assignments (SW = Swiader and Ware; OIPM = Ontario IPM Guide online)
1	M	1/9	Course overview Getting started: Seeds and transplants	Review syllabus, texts
2	W	1/11	Vegetable Classification	SW: 33-41; "Classification of Vegetables"
Lab 1	W	1/11	Lab Overview Planting; Start transplant size experiment	SW: 75-102
	M	1/16	Martin Luther King Holiday	
3	W	1/18	Vegetable Farm Diversity: Scale and Markets	SW:1-31
Lab 2	W	1/18	Compost Making	
4	M	1/23	Soil Management 1: Vegetable soils & soil health	SW: 103-127; "What is Soil?"
5	W	1/25	Soil Management 2: Tillage and cover cropping	"Overview of cover crops and green manures"; Managing Cover Crops Profitably
Lab 3	W	1/25	Nutrient deficiencies; Start weed threshold study; Thin plants in transplant study	
6	M	1/30	Irrigation of vegetable crops	SW: 145-162; "Principles & Practices of Irrigation"
7	W	2/1	Organic Vegetable Production: Principles and Practices (Dr. Kathleen Delate)	Purdue Organic Production Guide (pdf provided)
Lab 4		2/1	Irrigation; Start germination study; Transplant tomatoes/peppers into pots	Project Outline Due
8	M	2/6	ASTERACEAE: Lettuce; Leafy Salad Crops	SW: 357-378, 481-498
9	W	2/8	EXAM 1	
Lab 5		2/8	Hydroponic systems; Turn compost pile; Clip and incorporate cover crop residue	SW: 583-602; "Growing Plants in Solution Culture"
10	M	2/13	Crop rotation, diversity and pests	pdf will be provided
11	W	2/15	Weed ecology and management	SW: 129-143; "Weed Management"
Lab 6		2/15	Pot transplant size experiment; Sow veggies into cover crop residue; collect data from germination expt	

Class	Day	Date	Topic(s)	Reading Assignments (SW = Swiader and Ware; OIPM = Ontario IPM Guide online)
12	M	2/20	Disease Management and IPM	SW: 163-179; "Integrated Pest Management"; "Insect Management"
13	W	2/22	Insect management; Integrated Pest Management (Dr. Donald Lewis)	SW: 163-179; "Integrated Pest Management"; "Disease Management"
Lab 7		2/22	Weed ID; Sow veggies2 into cover crop residue; collect data from germination expt	
14	M	2/27	BRASSICACEAE 1: Turnips; Radish, Rutabaga	SW: 316-320
15	W	3/29	FABACEAE: Snap beans and peas	SW: 245-262, 427-440
Lab 8		2/29	Insect/disease lab; harvest veggies1	
16	M	3/5	BRASSICACEAE 2: Broccoli, Cauliflower, Brussels Sprouts, Cabbage	SW: 267-292 OIPM: "Brassica" tab
17	W	3/7	CUCURBITACEAE I: Pumpkins, squash, and melons	SW: 379-400; 569-577 OIPM: "Cucurbits" tab
Lab 9		3/7	Discussion; harvest veggies2; finish weed threshold expt	
3/12-3/16 No Class SPRING BREAK!!!				
18	M	3/19	CUCURBITACEAE II: Cucumber	
19	W	3/21	Role of plastics in vegetable production	Visit plasticulture website (Penn State)
Lab 10		3/21	Discussion; finish transplant size expt; Cleanup; finish germination expt	Weed Threshold Report Due
20	M	3/26	Vegetable harvest and post-harvest	SW: 181-208; "131-150"
21	W	3/28	EXAM 2	
Lab 11		3/28	Field Trip 1	Cover Crop Report Due
22	M	4/2	APIACEAE: Carrots, Parsnips, Celery	SW: 293-322
23	W	4/4	LILIACEAE: Asparagus	SW: 221-238
Lab 12		4/4	Hort Farm 1: Tractors & tillage	Germination Report Due
24	M	4/9	Field Trip 2	
25	W	4/11	ALLIACEAE: Onions and Garlic	SW: 401-426; 323-337 OIPM: "Onions" tab
Lab 13		4/11	Field Trip 3	Transplant Size Report Due
26	M	4/16	POACEAE: Sweet corn	SW: 499-520 OIPM: "Sweet corn" tab

27	W	4/18	SOLANACEAE: Tomatoes, Pepper, Eggplant, Potatoes	SW: 441-480; 539-569; OIPM: "Tomato" tab
Lab 14		4/18	Hort Farm 2: Planters, mulch layer	
28	M	4/23	Project Presentations	
29	W	4/25	Project Presentations	
Lab 15		4/25	Project Presentations	Project Written Reports Due 4/27
29	W	5/01	Final Exam 7:30-9:30 am	