

Schedule is subject to change

## **January 2015 UA/CEAC Intensive Greenhouse Crop Production Course**

1951 East Roger Road, Tucson, AZ 85719

<http://ag.arizona.edu/ceac/> 520-626-9566

**EMPHASIS ON TOMATOES:** Instructor – Patricia A. Rorabaugh, Ph.D.

The tomato course will use the PLS 217 class manual as a reference.

Course materials: Flash drive with PLS 217 manual, power points  
Folder with handouts, loupe & supplies

### **SUNDAY January 4, 2015 – Tomato**

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| 2:00 – 5:30 pm | Check-in at the CEAC – CEAC Classroom  |
| 5:00 – 5:30 pm | Brief tour of the CEAC / CAC facilities  |
| 5:30 – 6:30 pm | Light dinner at CEAC – CEAC Classroom  |
| 6:30 – 8:00 pm | Introduction to CEA and Hydroponics – CEAC Classroom <ul style="list-style-type: none"><li>• A little history (Chapter 1)</li><li>• The plant and its needs (Chapters 2, 3)</li><li>• Basic hydroponic systems (Chapter 5)</li></ul> |

### **MONDAY January 5, 2015 – Tomato**

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| 9:00 – 9:15 am   | Discussions and questions from previous day – CEAC Classroom   |
| 9:15 – 10:00 am  | A bit about plant propagation (Chapter 6) – CEAC Classroom   |
| 10:00 – 11:00 am | Tour of the Controlled Environment Agriculture Center (CEAC) including: <ul style="list-style-type: none"><li>• Mist house (more on plant propagation)</li><li>• Teaching Greenhouse (intro to the greenhouse, control systems, experiment, greenhouse set-up) (Chapter 3)</li><li>• Tomato plant rep assignments for the course</li></ul> |
| 11:00 – 12:00pm  | Greenhouse set-up (Chapter 3) – CEAC Classroom <ul style="list-style-type: none"><li>• Basic components including environmental settings</li><li>• Crop layout</li><li>• Crop scheduling</li></ul>   |
| 12: 00 – 1:00 pm | Lunch provided – CEAC Classroom  |
| 1:00 – 2:00 pm   | Crop maintenance – Emphasis on tomatoes (Chapter 3) – CEAC Classroom <ul style="list-style-type: none"><li>• Training &amp; pruning</li><li>• Physiological disorders – leaves, stems, trusses (briefly, fruit)</li><li>• Factors controlling plant architecture</li></ul>   |

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- 2:00 – 4:00 pm Plant work: crop training & pruning – CEAC Teaching Greenhouse
- Finding the tomato head – Stem clipping & pruning
  - Nodes, internodes and location of leaves & clusters on the stem
  - Leaning & Lowering – proper techniques
- 4:00 – 5:30 pm Controlling plant architecture – CEAC Teaching Greenhouse
- “Steering” your plants to success (Chapter 3)
  - Exercise: recognizing vegetative vs reproductive characteristics
- 5:30 pm Dinner on your own

**TUESDAY January 6, 2015 – Tomato**

- 9:00 – 9:15 am Discussion and questions from previous day – CEAC Classroom
- 9:15 – 10:00 am Crop registration forms – CEAC Classroom  
What to measure & what it means
- 10:00 am – 12:00 pm Crop registration – measurements – CEAC Teaching Greenhouse  
Analysis of measurements
- 12:00 – 1:00 pm Lunch provided – CEAC Classroom
- 1:00 – 2:30 pm Flowers, pollination and the fruit – CEAC Classroom
- Bee hives / bee management (Chapter 7)
  - Cluster maintenance (Chapter 8)
  - Fruit problems (fresh fruit & Chapter 3)
  - Harvest / grading / storage (Chapter 8)
- 2:30 – 4:00 pm Harvesting and grading – CEAC Teaching Greenhouse
- Individual versus cluster (TOV) harvesting
  - Fruit categories including fruit problems
  - Weighing & record keeping
  - Types of packaging
- 4:00 – 5:30 pm Flowers to fruit – CEAC Teaching Greenhouse
- Exercise: Pollination % calculations – are the bees working?
  - Cluster maintenance – pruning & clipping
- 5:30 pm Dinner on your own.

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**WEDNESDAY January 7, 2015 - Tomato**

- 9:00 – 9:15 am Discussions and questions from previous day – CEAC Classroom
- 9:15 – 12:00 pm Plant protection – CEAC Classroom (Chapter 4)
- Introduction to the pests: Insects, Mites & Diseases
  - Integrated pest management (IPM)
- 12:00 – 1:00 pm Lunch provided – CEAC Classroom
- 1:00 – 2:00 pm Plant work – CEAC Teaching Greenhouse
- Leaves & leaflets – Removing lower leaves, how and why.
- 2:00 – 4:00 pm Plant protection / Keeping plants healthy – CEAC Teaching Greenhouse
- Exercise: Pest ID & scouting
  - Record keeping for pest problems
- 4:00 – 5:30 pm A bit about business – CEAC Classroom
- Costs & sources for tomato production items
  - Introduction to GHP / GAP certification notebooks for tomato
- 5:30pm Dinner on your own

**THURSDAY January 8, 2015 – Tomato**

- 9:00 – 9:15 am Discussion and questions from previous day – CEAC Classroom
- 9:15 – 11:00 am Plant nutrition basics – CEAC Classroom
- Tomato nutrients & deficiencies (Chapter 9)
  - Nutrient delivery systems (Chapter 10)
- 11:00am – 12:00 pm TOUR: Nutrient delivery systems in different greenhouses
- 12:00 – 1:00 pm Lunch provided
- 1:00 – 3:00 pm Nutrient recipes & calculations (Chapter 10) – CEAC Classroom
- Exercise: nutrient solution calculations
- 3:00 – 4:00 pm Making the concentrated solutions – CEAC Teaching Greenhouse
- Components (keeping things separate), weighing & mixing the tanks
- 4:00 – 5:30 pm Group Ex. - What's the problem here? Plus Q & A – CEAC Classroom
- 5:30 pm Dinner on your own

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**FRIDAY January 9, 2015 – Tomato**

- 9:00 – 9:15 am Discussion and questions from previous day – CEAC Classroom
- 9:00 – 11:00 am Greenhouse Basics
- Greenhouse site selection (Chapter 11)
  - Greenhouse designs & materials (Chapter 12)
  - Environmental control – including sizing heaters & fans (Chapter 13)
  - A bit about greening the greenhouse (Chapter 14)
- 11:00 – 12:00 pm Round table discussion with greenhouse engineers  
Includes professors of Agricultural & Biosystems Engineering Department at The University of Arizona and CEAC / CAC personnel (as available):
- Will include Gene Giacomelli, Ph.D. and Murat Kacira, Ph.D.
- 12:00 – 1:00 pm Lunch provided & *Round table continues* – CEAC Classroom
- 1:00 – 3:00 pm Environmental control requirements
- Set-points
  - How the environment effects the plants and vice versa
  - Real-time monitoring – CEAC/tomatoes live
  - Deciphering your greenhouse – “Virtual Grower”
- 3:00 – 4:30 pm Food safety & GHP/GAP certification
- Safe production & handling procedures
- 4:30 – 5:45 pm CEAC Classroom & CEAC Teaching Greenhouse
- Peer review of plant work
  - Tomato course wrap – up: Q & A
- 6:00 – 8:00 pm Dinner provided by CEAC
- Dinner speaker: Merle Jensen, Ph.D.