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
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
• A little history (Chapter 1)
• The plant and its needs (Chapters 2, 3)
• Basic hydroponic systems (Chapter 5)

MONDAY January 5, 2015 – Tomato
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:
• Mist house (more on plant propagation)
• Teaching Greenhouse (intro to the greenhouse, control systems, experiment, greenhouse set-up) (Chapter 3)
• Tomato plant rep assignments for the course
11:00 – 12:00pm Greenhouse set-up (Chapter 3) – CEAC Classroom
• Basic components including environmental settings
• Crop layout
• Crop scheduling
12:00 – 1:00 pm Lunch provided – CEAC Classroom
1:00 – 2:00 pm Crop maintenance – Emphasis on tomatoes (Chapter 3) – CEAC Classroom
• Training & pruning
• Physiological disorders – leaves, stems, trusses (briefly, fruit)
• Factors controlling plant architecture
Schedule is subject to change

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.
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
<table>
<thead>
<tr>
<th>Time</th>
<th>Activities</th>
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<tr>
<td><strong>FRI</strong></td>
<td><strong>DAY January 9, 2015 – Tomato</strong></td>
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<tr>
<td>9:00 – 9:15 am</td>
<td>Discussion and questions from previous day – CEAC Classroom</td>
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<tr>
<td>9:00 – 11:00 am</td>
<td>Greenhouse Basics</td>
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<td>- Greenhouse site selection (Chapter 11)</td>
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<td>- Greenhouse designs &amp; materials (Chapter 12)</td>
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<td>- Environmental control – including sizing heaters &amp; fans (Chapter 13)</td>
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<td>- A bit about greening the greenhouse (Chapter 14)</td>
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<td>11:00 – 12:00 pm</td>
<td>Round table discussion with greenhouse engineers</td>
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<td>Includes professors of Agricultural &amp; Biosystems Engineering Department</td>
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<td>at The University of Arizona and CEAC / CAC personnel (as available):</td>
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<td>- Will include Gene Giacomelli, Ph.D. and Murat Kacira, Ph.D.</td>
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<td>12:00 – 1:00 pm</td>
<td>Lunch provided &amp; <strong>Round table continues</strong> – CEAC Classroom</td>
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<td>1:00 – 3:00 pm</td>
<td>Environmental control requirements</td>
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<td>- Set-points</td>
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<td>- How the environment effects the plants and vice versa</td>
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<td>- Real-time monitoring – CEAC/tomatoes live</td>
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<td>- Deciphering your greenhouse – “Virtual Grower”</td>
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<td>3:00 – 4:30 pm</td>
<td>Food safety &amp; GHP/GAP certification</td>
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<td>- Safe production &amp; handling procedures</td>
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<td>4:30 – 5:45 pm</td>
<td>CEAC Classroom &amp; CEAC Teaching Greenhouse</td>
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<td>- Peer review of plant work</td>
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<td>- Tomato course wrap – up: Q &amp; A</td>
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<td>6:00 – 8:00 pm</td>
<td>Dinner provided by CEAC</td>
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<td>- Dinner speaker: Merle Jensen, Ph.D.</td>
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