CREATING A SUSTAINABLE CURRICULA

HOLLY WEIR
ENVIRONMENT SECTOR PROJECT DIRECTOR
NC COMMUNITY COLLEGE SUPER CIP
DAVIDSON COUNTY COMMUNITY COLLEGE
SPECIAL PROJECT: CODE GREEN INITIATIVE

NCCCS President

State Board of Community Colleges

NC Association of Community College Presidents
Code Green Initiative

NCCCS President and State Board of Community Colleges

NC Association of Community College Presidents

Special Project: Code Green Initiative

System Wide Goals
- Environmental Commitment
- Sustainable Campuses
- Sustainable Education/Training
- Sustainable Communities, Municipalities, Businesses

Strategies to Date
1. Create NCCCS and individual college capacity for each of the stated goals.
2. Identify existing and emerging green jobs and/or skills.
3. Develop, refine, and modify programs for green skill building to include short term and long-term actions.

Code Green Leadership Team:
Comprised of College Presidents and NCCCS Staff
Purpose: Implement Code Green across 58 colleges of the

Code Green Project Teams

Campus Sustainability and Environmental Commitment
- Larry Keen, Bill Findt, David Johnson, Dale McInnis, Tony Zeiss, Rose Johnson, Rusty Stephens

Curriculum Development (Education and Training)
- John McKay, Mary Ritting, Molly Parkhill, Bill Aiken, Rose Johnson, Rusty Stephens

Sustainable Communities, Municipalities, Businesses
- Lawrence Rouse, Gordon Burns, Charles Chrestman, Dennis Massy, Stephen Scott, Rose Johnson, Rusty Stephens

Professional Development
- Suzanne Owens, Patricia Skinner, Rusty Stephens, Rose Johnson

Code Green Implementers
Network: Comprised of Campus Sustainability Leaders
Purpose: Enhance campus sustainability efforts

Purpose: Empower students with green sector job skills:
- Building
- Transportation
- Engineering Technologies
- Environment
- Energy

THINK GLOBALLY EXPAND "CLASSROOM" FOSTER PARTNERSHIPS EMPOWER OTHERS LEAD CHANGE

Dr. Rose Johnson, President - Haywood Community College
WHAT IS A SUPER CIP?
Empower students with green sector job skills

Launched by the Code Green Curriculum Development Committee, comprised of and led by College Representatives
CODE GREEN LEADERSHIP TEAM

- Implement Code Green across the 58 colleges of the NCCCS
- Comprised of College Presidents and NCCCS Staff
- Industry representatives
CIP PROGRAM SECTOR AREAS

Super CIP Leadership Team

Lead College
Wake Tech

Building
Robert Holsten
Wilson CC

Energy
Andrew McMahan,
Central Carolina CC

Transportation
Chris English,
Blue Ridge CC

Environment
Holly Weir,
Davidson County CC

Engineering Technology
Rose Mary Seymour,
Central Piedmont CC
CIP INDUSTRY SECTOR AREAS

Environment: Davidson County CC
Energy: Central Carolina CC
Lead: Wake Tech
Transportation: Blue Ridge CC
Engineering Tech: Central Piedmont CC
Building: Wilson CC
Revitalized applied science programs and courses with specialized credentials in both continuing education and curriculum.

Provide a streamlined program structure with more flexibility for colleges.

Increase the number of students skilled in sustainable technologies.

Create continuing education to curriculum articulations. 

GOALS
Occupation-Related Competencies

Tier 9 – Management Competencies
Tier 8 – Occupation-Specific Requirements
Tier 7 – Occupation-Specific Technical Competencies
Tier 6 – Occupation-Specific Knowledge Competencies

Industry-Related Competencies

Tier 5 – Industry-Sector Technical Competencies
Tier 4 – Industry-Wide Technical Competencies

Foundational Competencies

Tier 3 – Workplace Competencies
Tier 2 – Academic Competencies
Tier 1 – Personal Effectiveness Competencies
PROJECT TIMELINE

Overall Project Timeline

- 2010
  - Planning
    - Engage Faculty
    - Identify Program Duplication
  - Curriculum Development
  - Develop Curriculum Standards
  - Identify and Develop Student Learning Outcome Assessments
  - Recommend Revision to NCCCS

- 2011
  - Professional Development I

- 2012
  - Professional Development II
CREATING A SUSTAINABLE CURRICULA

Horticulture Technology
Horticulture Technology/Management
Turfgrass Management
Turfgrass Management/Golf Course Management
Landscape Gardening
Curriculum Title: Horticulture Technology

Recommended General Education Academic Core

Horticulture Technology Applied Technical Education Core

Program Majors

- Horticultural Science
- Landscape Gardening
- Golf Course Management
- Turf Grass Management
COMMON TECHNICAL CORE

A. Technical Core:

* Plant Identification. Choose one:
  HOR 160 Plant Materials I 3 SHC
  TRF 110 Intro Turfgrass Cult & ID 4 SHC

* Pest Management. Choose one:
  HOR 164 Horticulture Pest Mgmt 3 SHC
  TRF 240 Turfgrass Pest Control 3 SHC

* Design. Choose one:
  HOR 112 Landscape Design I 3 SHC
  TRF 120 Turf Irrigation & Design 4 SHC
  TRF 151 Intro to Landscape Design 3 SHC

* Soil Science. Choose one:
  SSC 210 Soil Science 3 SHC
  LSG 111 Basic Landscape Technique 2 SHC
B. Program Major(s). Choose one:

**Golf Course Management**

_Courses required for the Golf Course Management Diploma are designated with #_

*Select additional courses from the GCM prefix for a minimum of 12 SHC.*

- #GCM 220 Golf Course Maint Systems 3 SHC
- #GCM 230 Golf Course Org & Admin 3 SHC
- #GCM 240 Golf Course Design 3 SHC

**Horticultural Science**

_The Horticultural Science diploma requires a minimum of 12 SHC extracted from the required technical/program major core of the AAS degree._

*Select additional courses from the HOR or LSG prefixes for a minimum of 12 SHC.*

- HOR 162 Applied Plant Science 3 SHC
- HOR 168 Plant Propagation 3 SHC
- HOR 124 Nursery Operations 3 SHC or
- HOR 134 Greenhouse Operations 3 SHC or
- LSG 121 Fall Gardening Lab 2 SHC
PROGRAM MAJOR AREAS

Landscape Gardening
Courses required for the Landscape Gardening Diploma are designated with + Select 12 SHC:

- COE 111 Co-op Work Experience I 1 SHC
- +HOR 114 Landscape Construction 3 SHC
- +HOR 134 Greenhouse Operations 3 SHC
- +LSG 111 Basic Landscape Techniques 2 SHC
- +LSG 121 Fall Gardening Lab 2 SHC
- +LSG 122 Spring Gardening Lab 2 SHC
- LSG 123 Summer Gardening Lab 2 SHC
- +LSG 231 Landscape Supervision 4 SHC

Turfgrass Management
Courses required for the Turfgrass Management Diploma are designated with ^

- TRF 152 Landscape Maintenance 3 SHC
- ^TRF 210 Turfgrass Equipment Management 3 SHC
- ^TRF 230 Turfgrass Management Applications 2 SHC
- TRF 260 Adv Turfgrass Management 4 SHC
REVISE COURSE DESCRIPTIONS

HOR-164_1997SU Hort Pest Management HOR-164

CIS Course ID S13629
Effective Term Summer 1997
End Term
Class 2 Lab 2 Clinical 0 Work 0 Credit 3

This course covers the identification and control of plant pests including insects, diseases, and weeds. Topics include pest identification and chemical regulations, safety, and pesticide application. Upon completion, students should be able to meet the requirements for North Carolina Commercial Pesticide Ground Applicators license.

HOR 164 Hort Pest Management Class 2 Lab 2 Credit 3

Minimum State Prerequisites: None
Minimum State Corequisites: None

This course covers the identification and management of plant pests including insects, diseases, and weeds. Topics include pest identification and beneficial organisms, least toxic methods of management. Upon completion, students should be able to manage common landscape pests using least toxic methods of control and are prepared to sit for North Carolina Commercial Pesticide Ground Applicators license.
This course introduces the livestock industry. Topics include nutrition, reproduction, production practices, diseases, meat processing, and marketing. Upon completion, students should be able to demonstrate a basic understanding of livestock production practices and the economic impact of livestock in North Carolina.
STUDENT LEARNING OUTCOMES

HOR 164  Hort Pest Management

Minimum State Prerequisites:  None
Minimum State Corequisites:  None

This course covers the identification and management of plant pests including insects, diseases, and weeds. Topics include pest identification and beneficial organisms, pesticide application safety and use of least toxic methods of management. Upon completion, students should be able to manage common landscape pests using least toxic methods of control and are prepared to sit for North Carolina Commercial Pesticide Ground Applicators license.

Student Learning Outcomes:

1. Demonstrate pest identification and management using sustainable methods.
2. Identify major horticultural pests, such as insects, pathogen and weeds and create an integrated pest management plan.
ANS 110  Animal Science

Minimum State Prerequisites:  None
Minimum State Corequisites:  None

This course introduces the livestock industry. Topics include nutrition, reproduction, production practices, diseases, meat processing, sustainable livestock production, and marketing. Upon completion, students should be able to demonstrate a basic understanding of livestock production practices and the economic impact of livestock locally, regionally, state-wide, and internationally.

**Student Learning Outcomes:**

1. Describe the importance of animal production and explain the major issues related to the production of livestock on an international, national, and state level.
2. Explain the relationship of science and animal production through the studies of biotechnology, technology, genetics, physiology, nutrition, and health.
3. Describe the basic physiology and terminology of the animal industries.
4. Describe the production (including sustainable production) methodologies of the swine, beef, dairy, sheep and horse industries.
5. Recognize the requirements of production animals, and the benefits of proper care, nutrition, genetics, and environment to the animal’s productivity levels.
Listed below are the ten major categories for the NABCEP Entry Level Program:

1. PV Markets and Applications
2. Safety Basics
3. Electricity Basics
4. Solar Energy Fundamentals
5. PV Module Fundamentals
6. System Components
7. PV System Sizing Principles
8. PV System Electrical Design
9. PV System Mechanical Design
10. Performance Analysis, Maintenance and Troubleshooting
# LEARNING OBJECTIVES FOR THE NABCEP PV ENTRY LEVEL PROGRAM

<table>
<thead>
<tr>
<th></th>
<th>PV Markets and Applications</th>
<th>Learning Priority</th>
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<tbody>
<tr>
<td>1.</td>
<td>Identify key contributions to the development of PV technology.</td>
<td>Useful</td>
</tr>
<tr>
<td>1.1</td>
<td>Identify common types of PV system applications for both stand-alone and utility interactive systems with and without energy storage.</td>
<td>Important</td>
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<tr>
<td>1.2</td>
<td>Associate key features and benefits of specific types of PV systems, including residential, commercial, BIPV, concentrating PV, and utility-scale.</td>
<td>Useful</td>
</tr>
<tr>
<td>1.3</td>
<td>List the advantages and disadvantages of PV systems compared to alternative electricity generation sources.</td>
<td>Useful</td>
</tr>
<tr>
<td>1.4</td>
<td>Describe the features and benefits of PV systems that operate independently of the electric utility grid.</td>
<td>Useful</td>
</tr>
<tr>
<td>1.5</td>
<td>Describe the features and benefits of PV systems that are interconnected to and operate in parallel with the electric utility grid.</td>
<td>Useful</td>
</tr>
<tr>
<td>1.6</td>
<td>Describe the roles of various segments of the PV industry and how they interact with one another.</td>
<td>Useful</td>
</tr>
<tr>
<td>1.7</td>
<td>Understand market indicators, value propositions, and opportunities for both grid-tied and stand-alone PV system applications.</td>
<td>Useful</td>
</tr>
<tr>
<td>1.8</td>
<td>Discuss the importance of conservation and energy efficiency as they relate to PV system applications.</td>
<td>Useful</td>
</tr>
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Expected Student Learning Outcomes:

Upon completion of this course, students should be able to...

1. Identify common types of PV system applications for both stand-alone and utility interactive systems with and without energy storage. *(NABCEP Entry Level Learning Objective 1.2)*

2. Identify the various safety hazards associated with both operating and non-operating PV systems and components. *(2.1)*

3. Understand the fundamentals of electric utility system operations. *(3.6)*

4. Define basic terminology, including solar radiation, solar irradiance, solar irradiation, solar insolation, solar constant, air mass, ecliptic plane, equatorial plane, pyranometer, solar declination, solstice, equinox, solar time, solar altitude angle, solar azimuth angle, solar window, array tilt angle, array azimuth angle, and solar incidence angle. *(4.1)*

5. Identify the five key electrical output parameters for PV modules using manufacturers’ literature and label these points on a current-voltage curve. *(5.3)*

6. Describe the purpose and principles of operation for major PV system components. *(6.1)*

7. Understand the basic principles, rationale and strategies for sizing stand-alone PV systems versus utility-interactive PV systems. *(7.1)*

8. Understand how PV modules are configured interfacing with inverters, charge controllers, batteries and other equipment. *(8.2)*

9. Discuss various potential problems related to PV system design, components, installation, operation or maintenance that may affect the performance and reliability of PV systems. *(10.1)*
LIST OF PROFESSIONAL DEVELOPMENT ACTIVITIES

- Pervious Pavement
- Recycle Block Techniques
- Building Design with Structure Insolated Panel
- Weatherization Basics
- Green Building with Green Advantage Exam
- GeoExchange Train the Trainer
- Residential Wind
- Biofuels Train the Trainer
- Fundamentals of Renewable Energy
- OSHA Train the Trainer
- Lean Manufacturing and Six Sigma
- Renewable Energy Systems Case Studies on College Campuses
- Advanced PV
- Industrial Ecology
- Life Cycle Assessment
LIST OF PROFESSIONAL DEVELOPMENT ACTIVITIES

- Virtualizations
- Organic Land care
- Crop Protection
- Water Wise Certification
- Aquaculture
- Invasive species and Non-native Forest Plants
- Mycology Workshop
- Mycoremediation
- NCADIA
- Hybrid / Electric
- Light Duty Diesel
- Toyota Hybrid
- Biofuels Production
- Alternative Fuels First Responders Train the trainer
- Sustainability Across the Curriculum Workshop
SUSTAINABILITY ACROSS THE CURRICULUM

• Dr. Peggy Barlett from Emory University
  • Hosting “train the trainer” workshops for faculty leaders who wish to develop curriculum change programs
  • Focus on infusing sustainability into the courses and curricula offered on campuses
OUR NEXT STEPS

- Creating a Sustainability Association
- Continue goals of CODE GREEN INITIATIVE
  - Campus Sustainability and Environmental Commitment
  - Curriculum Development
  - Sustainable Communities, Municipalities, Businesses
  - Professional Development
NEED MORE INFORMATION?

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