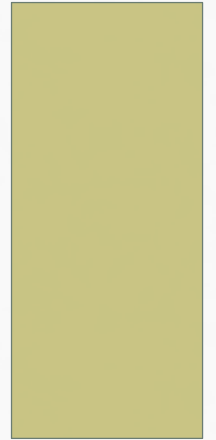


# CREATING A SUSTAINABLE CURRICULA

HOLLY WEIR  
ENVIRONMENT SECTOR PROJECT DIRECTOR  
NC COMMUNITY COLLEGE SUPER CIP  
DAVIDSON COUNTY COMMUNITY COLLEGE



# NC COMMUNITY COLLEGE SYSTEM

**NC Community Colleges**

**Hope • Opportunity • Jobs**

**Creating Success**

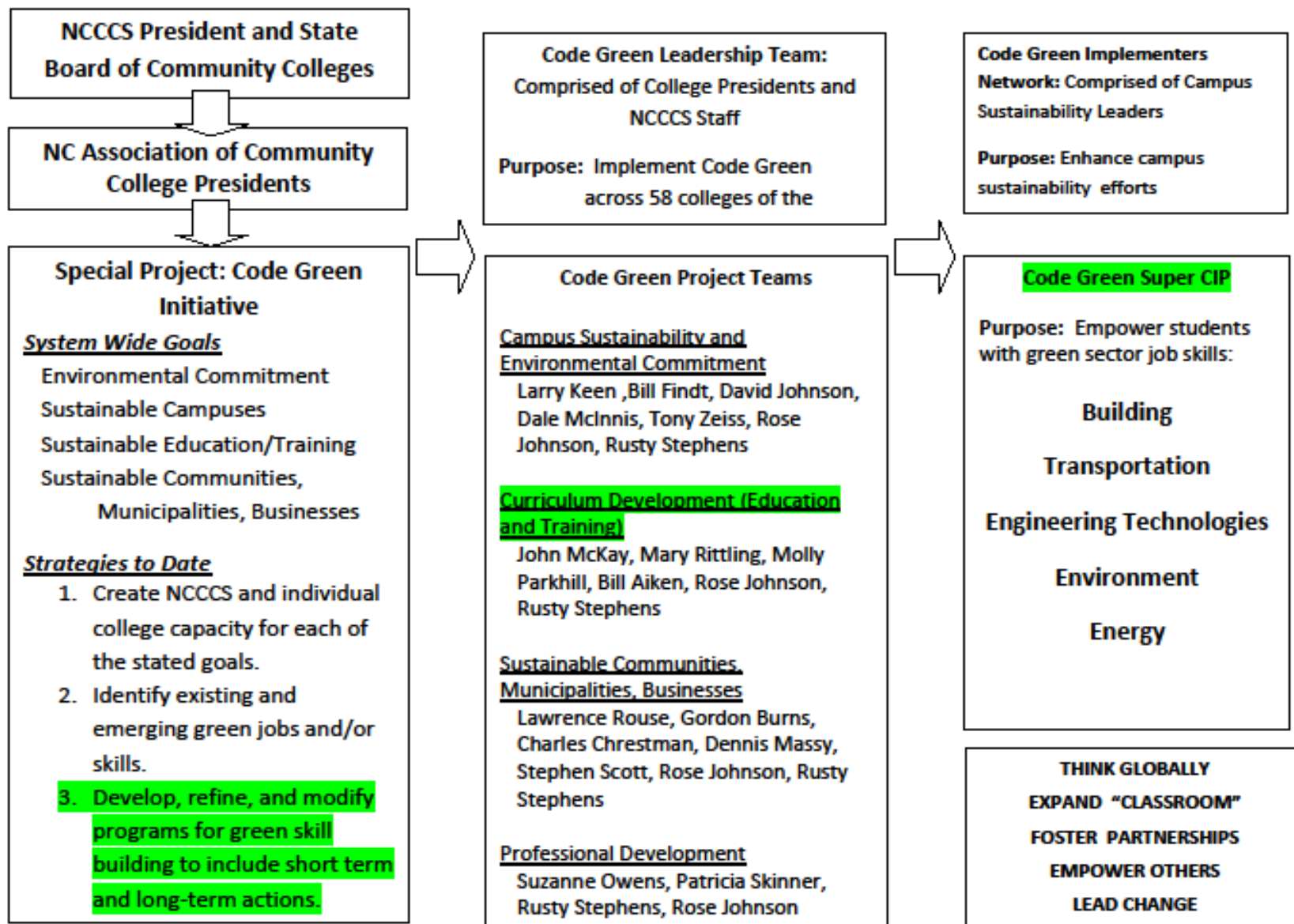
<http://www.nccommunitycolleges.edu/>

# **SPECIAL PROJECT: CODE GREEN INITIATIVE**

NCCCS President

State Board of Community Colleges

NC Association of Community College Presidents



# WHAT IS A SUPER CIP?



# CODE GREEN SUPER CIP

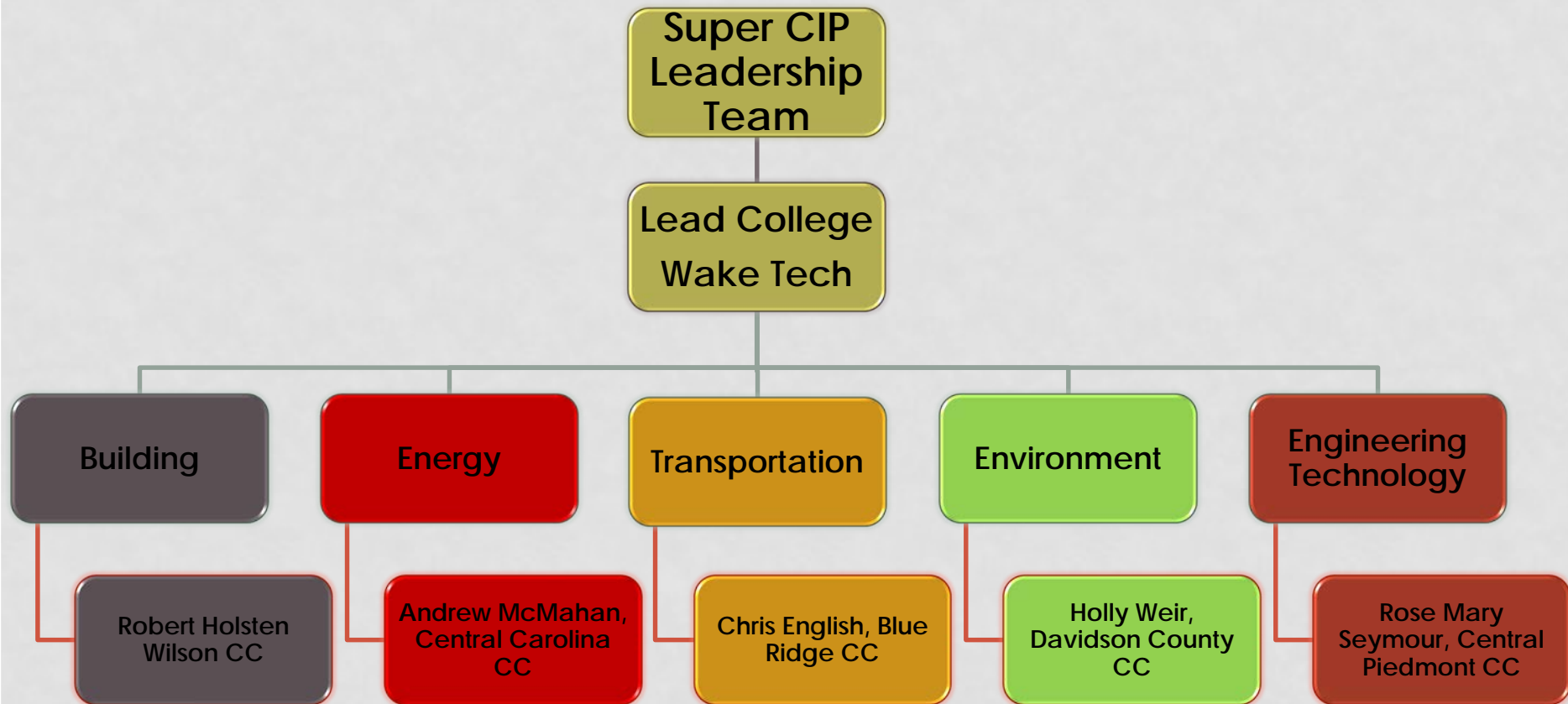
Empower students with green  
sector job skills

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



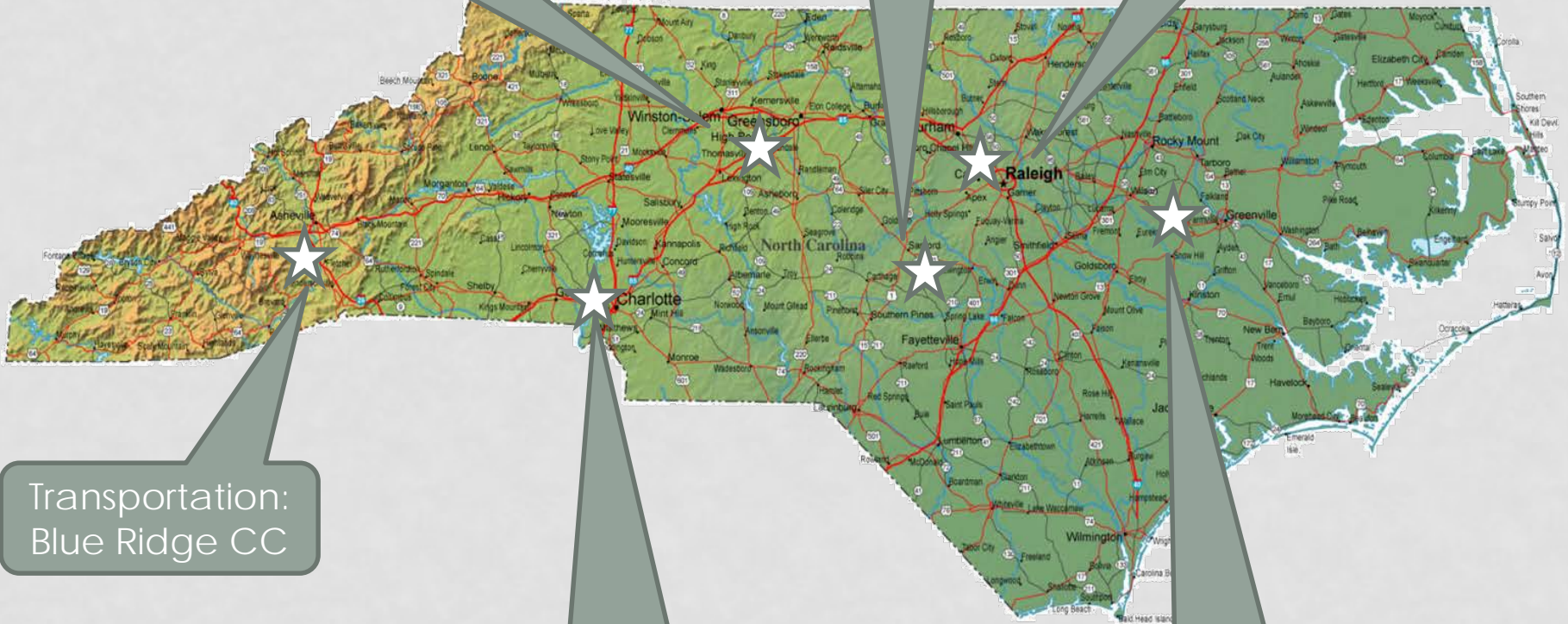


# CIP INDUSTRY SECTOR AREAS

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.

## GOALS

Increase the number of students skilled in sustainable technologies.

Create continuing education to curriculum articulations.

## 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

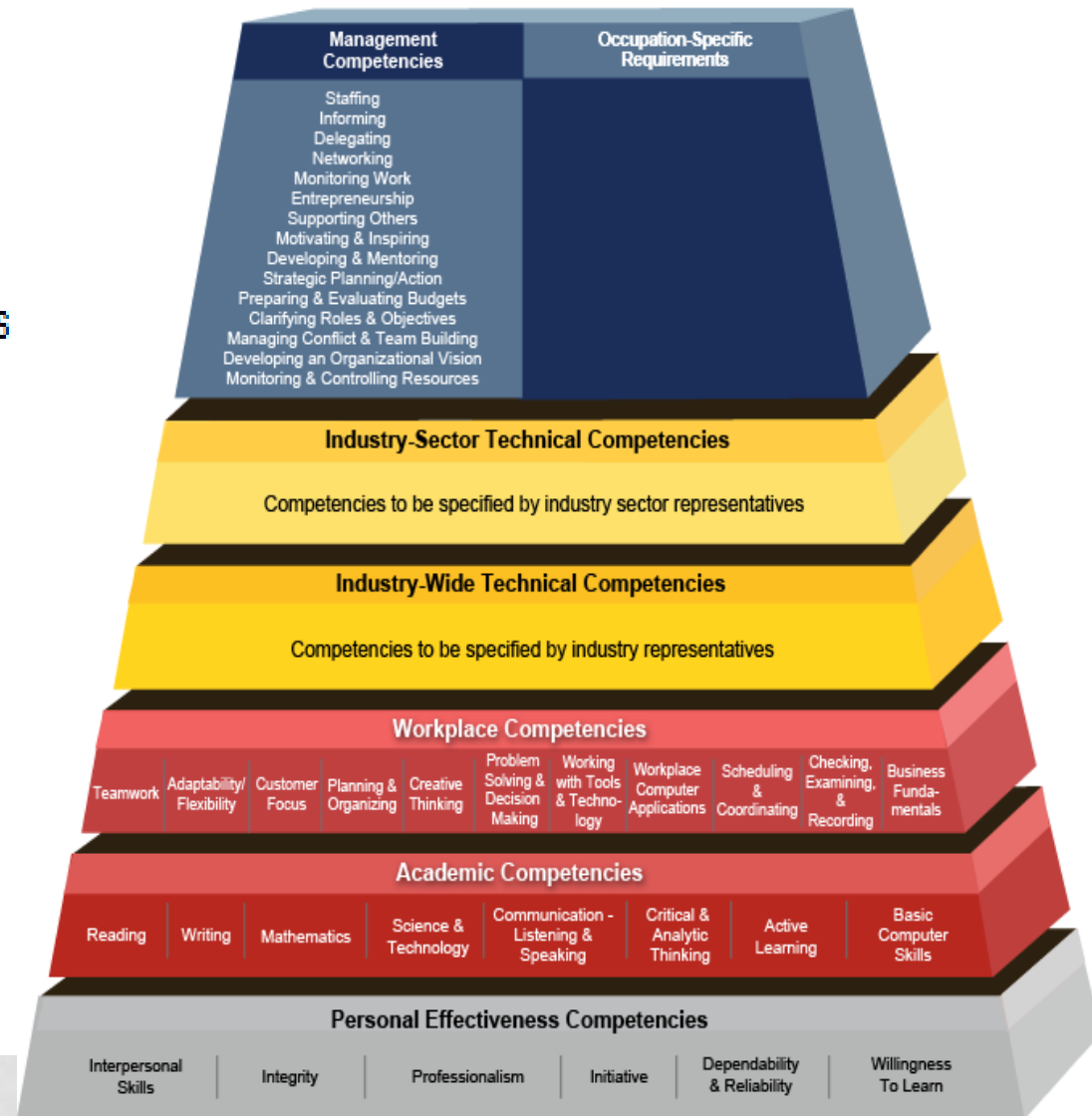
Tier 4 – Industry-Wide Technical Competencies

## Foundational Competencies

Tier 3 – Workplace Competencies

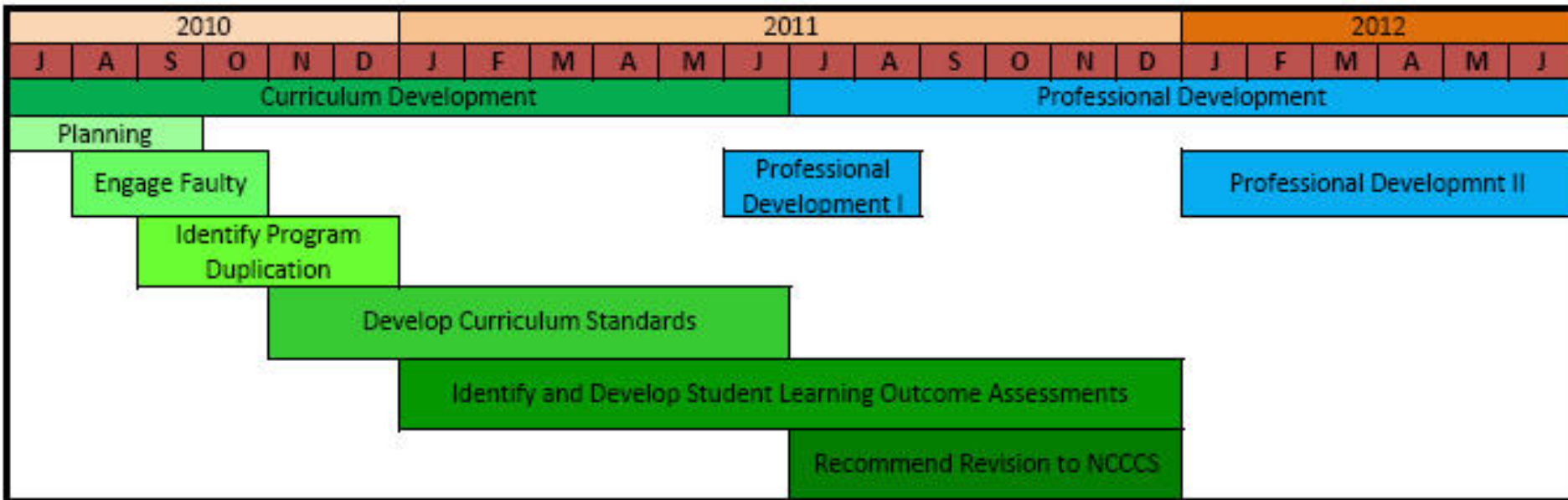
Tier 2 – Academic Competencies

Tier 1 – Personal Effectiveness Competencies

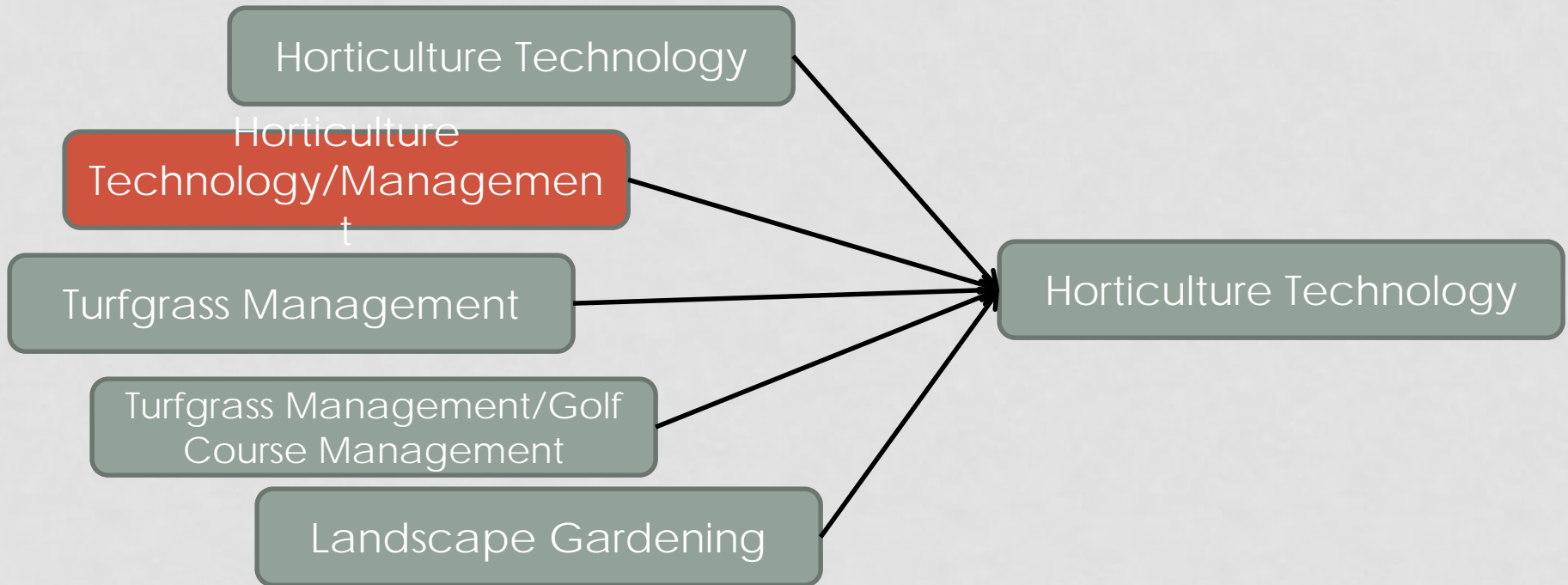


# PROJECT TIMELINE

## Overall Project Timeline



# CREATING A SUSTAINABLE CURRICULA



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



# PROGRAM MAJOR AREAS

## **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 <u>Maint</u> 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 <i>or</i>
HOR 134 Greenhouse Operations	3 SHC <i>or</i>
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, 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.

# REVISE COURSE DESCRIPTIONS

**ANS-110\_1997SU**

**Animal Science**

**ANS-110**

CIS Course ID S10653

Effective Term Summer 1997

End Term

Class 3 Lab 0 Clinical 0 Work 0 Credit 3

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.

**ANS 110**      **Animal Science**      Class 3      Lab 0      Credit 3

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

**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, 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.
3. Prepare for the North Carolina Pesticide Applicator's exam.

# STUDENT LEARNING OUTCOMES

**ANS 110      Animal Science**

Class 3      Lab 0      Credit 3

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.

# NABCEP ENTRY LEVEL EXAMPLE

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

1. <b>PV Markets and Applications</b> <i>Suggested Percentage Time Allotment: 5% or less</i>	<b>Learning Priority</b>
1.1 Identify key contributions to the development of PV technology.	Useful
1.2 Identify common types of PV system applications for both stand-alone and utility interactive systems with and without energy storage.	Important
1.3 Associate key features and benefits of specific types of PV systems, including residential, commercial, BIPV, concentrating PV, and utility-scale.	Useful
1.4 List the advantages and disadvantages of PV systems compared to alternative electricity generation sources.	Useful
1.5 Describe the features and benefits of PV systems that operate independently of the electric utility grid.	Useful
1.6 Describe the features and benefits of PV systems that are interconnected to and operate in parallel with the electric utility grid.	Useful
1.7 Describe the roles of various segments of the PV industry and how they interact with one other.	Useful
1.8 Understand market indicators, value propositions, and opportunities for both grid-tied and stand-alone PV system applications.	Useful
1.9 Discuss the importance of conservation and energy efficiency as they relate to PV system applications.	Useful

# ALT-220 - PHOTOVOLTAIC SYS TECH

## 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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