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### NORTH CAROLINA COMMUNITY COLLEGE SYSTEM Dr. R. Scott Ralls, President

August 20, 2012

#### **MEMORANDUM**

- TO: Presidents Chief Academic Officers
- FROM: Sharon E. Morrissey Senior Vice President and Chief Academic Officer
- SUBJECT: State Board Action on August 16, 2012 Code Green Super CIP Revised Program Application Process/Accountability Report

On August 16, 2012, the State Board of Community Colleges approved thirty-two curriculum standards, accompanied by a new curriculum standard format, which represents the work of the Code Green Super Curriculum Improvement Project (CIP). *Recall that on May 29, 2012, the Curriculum Review Committee approved action to approximately 360 courses as a result of course requests from the Code Green Super CIP (CC12-017).* Colleges may begin utilizing the revised standards as early as fall of 2013, but must have implemented the revisions by no later than one year after the effective term (fall of 2014).

The curriculum standards, developed by the Code Green Super CIP, are aligned with Career Cluster titles which assist in identification of secondary and postsecondary pathways. The attached crosswalk is provided to assist you in locating the placement of current program titles. A complete set of the approved curriculum standards is also attached.

Colleges currently approved to offer Automotive Systems Technology (A60160) have been provided with *optional* State Board approval for the following new programs upon completion of the attached form:

Alternative Transportation Technology (D60420) Automotive Light-Duty Diesel Technology (D60430)

In order to secure the optional approval, please complete the attached form. We encourage colleges to submit the completed form to us as quickly as possible. Please note that the form must be completed and submitted prior to June 1, 2013, in order to obtain the optional approval. Requests for the Alternative Transportation Technology and/or Automotive Light-Duty Diesel Technology program(s) received <u>after</u> June 1, 2013 will need to be accompanied by a full program application.

MAILING ADDRESS: 5016 MAIL SERVICE CENTER ~ RALEIGH, NC 27699-5016

Presidents Chief Academic Officers Page 2 August 20, 2012

In additional action, the State Board of Community Colleges approved the revision of the Program Application process. The revised process allows colleges to tie program planning to economic development initiatives; emphasizes local board of trustee certification of the program feasibility plan; simplifies the system-wide impact assessment process and requires colleges to complete an *Accountability Report* which will be sent to the State Board within three years of program implementation. **Program applications received on/after October 1, 2012, are required to utilize the requirements of the revised process.** The new program application process (defined in Sections 3, 3A and 3B of the *Curriculum Procedures Reference Manual*) is attached.

Further State Board action included the approval of the requested revisions to the following attached curriculum standards:

Healthcare Business Informatics (A25510) Medical Dosimetry (Diploma) (D45450) Positron Emission Tomography (Diploma) (D45820)

Please be aware that you must implement the Code Green Super CIP revised standards and the traditional revised curriculum standards no later than one year after the effective term. This process includes updating your college's electronic programs of study and receiving approval from the System Office prior to implementation of the revised program. (*Programs of Study filed for Fall 2013 and beyond should only be filed in Colleague. Please do not enter these into IIPS. Colleges will receive additional information about Colleague training in the immediate future.*) You may view all curriculum standards and courses by visiting the Programs website at:

http://www.nccommunitycolleges.edu/Programs/index.html

If you have any questions concerning the State Board action items, please contact Jennifer Frazelle at (919) 807-7120 or <u>frazellej@nccommunitycolleges.edu</u>.

SEM/JF/gr Attachments c: Dr. Van Wilson

Ms. Jennifer Haygood Ms. Elizabeth Self Ms. Jennifer Frazelle Program Coordinators

#### Alternative Transportation Technology (D60420) Automotive Light-Duty Diesel Technology (D60430)

#### **Request for Approval**

Our college is currently approved for the Automotive Systems Technology (A60160) program. We would like to obtain program approval for one or both of the following programs:

College Name

Signature, President of College

Date

Please submit the completed/signed form to:	Jennifer Frazelle, Director Academic Programs 5016 Mail Service Center Raleigh, NC 27699-5016
Forms may be faxed to:	919-807-7173

Your college will receive a letter of program approval within two weeks of receipt of this completed/signed form. Your college will then be directed to file an electronic program of study for review. The electronic POS must be submitted and approved prior to implementation of the program(s).

Requests for the Alternative Transportation Technology and/or Automotive Light-Duty Diesel Technology program(s) received <u>after</u> June 1, 2013, will need to be accompanied by a full program application.

Current Program Major Code	Current Program Major Title	Program major is now located on this New Curriculum Standard Title	Program Major is Classified under this Career Cluster
AGRICUI	LTURAL AND NATURAL RESOURCES TECHNOLOGY		
A15100	Agribusiness Technology ( <i>Revised</i> )	Agribusiness: Agricultural Science Technology	Agriculture, Food and Natural Resources
A15280	Applied Animal Science Technology (Revised)	Animal Systems: Applied Animal Science Technology	Agriculture, Food and Natural Resources
A1528B	Applied Animal Science Technology/Swine Management (Archived 08/16/12 - Converted to Swine Management Technology A15150). Colleges currently approved for A1528B will receive approval for A15150.	Archived - Not Applicable	Archived - Not Applicable
A15120	Aquaculture Technology (Revised)	Animal Systems: Aquaculture Technology	Agriculture, Food and Natural Resources
A15170	Equine Business Technology (New)	Animal Systems: Equine Science Technology	Agriculture, Food and Natural Resources
A15140	Equine Technology (Archived 08/16/12 - Split into Equine Business Technology A15170 and Equine Training Technology A15190). Colleges approved for A15140 will receive approval for A15170 and A15190.	Archived - Not Applicable	Archived - Not Applicable
A15190	Equine Training Technology (New)	Animal Systems: Equine Science Technology	Agriculture, Food and Natural Resources
A15160	Fish and Wildlife Management Technology (Revised)	Natural Resources Technology	Agriculture, Food and Natural Resources
A15200	Forestry Management Technology (Revised)	Natural Resources Technology	Agriculture, Food and Natural Resources
A15230	Golf Course Management Technology (New)	Plant Systems: Horticultural Science Technology	Agriculture, Food and Natural Resources
A15240	Horticulture Technology (Revised)	Plant Systems: Horticultural Science Technology	Agriculture, Food and Natural Resources
A1524A	Horticulture Technology/Management (Archived 08/16/12)	Archived - Not Applicable	Archived - Not Applicable
A15260	Landscape Gardening (Revised)	Plant Systems: Horticultural Science Technology	Agriculture, Food and Natural Resources
A15310	Marine Science (Revised)	Natural Resource Systems: Marine Technology	Agriculture, Food and Natural Resources
A15320	Marine Technology (Revised)	Natural Resource Systems: Marine Technology	Agriculture, Food and Natural Resources

Current Program Major Code	Current Program Major Title	Program major is now located on this New Curriculum Standard Title	Program Major is Classified under this Career Cluster
A15360	Parks and Natural Resource Management (Archived 08/16/12)	Archived - Not Applicable	Archived - Not Applicable
A15130	Poultry Management Technology (New)	Animal Systems: Applied Animal Science Technology	Agriculture, Food and Natural Resources
A15410	Sustainable Agriculture (Revised)	Agribusiness: Agricultural Science Technology	Agriculture, Food and Natural Resources
A15150	Swine Management Technology (New)	Animal Systems: Applied Animal Science Technology	Agriculture, Food and Natural Resources
A15420	Turfgrass Management Technology (Revised)	Plant Systems: Horticultural Science Technology	Agriculture, Food and Natural Resources
A1542A	Turfgrass Management Technology/Golf Course Management (Archived 08/16/12 - Converted to Golf Course Management Technology A15230). Colleges currently approved for A1542A will receive approval for A15230.	Archived - Not Applicable	Archived - Not Applicable
A15430	Viticulture and Enology Technology	Plant Systems: Viticulture and Enology Technology	Agriculture, Food and Natural Resources
BIOLOG	ICAL AND CHEMICAL TECHNOLOGIES		
A20110	Agricultural Biotechnology (Revised)	Science and Math: Biotechnology	Science, Technology, Engineering, and Math
A20260	Aquarium Science Technology (New)	Science and Math: Zoo and Aquarium Science Technology	Science, Technology, Engineering, and Math
A20100	Biotechnology (Revised)	Science and Math: Biotechnology	Science, Technology, Engineering, and Math
A20150	Environmental Biotechnology (New)	Science and Math: Biotechnology	Science, Technology, Engineering, and Math
A20230	Environmental Management Technology (New)	Science and Math: Environmental Science Technology	Science, Technology, Engineering, and Math
A20140	Environmental Science Technology (Revised)	Science and Math: Environmental Science Technology	Science, Technology, Engineering, and Math
A2014A	Environmental Science Technology/Water Resources Management (Archived 08/16/12 - Converted to Environmental Management Technology A20230). Colleges currently approved for A2014A will receive approval for A20230.	Archived - Not Applicable	Archived - Not Applicable
A2014B	Environmental Science Technology/Environmental Management	Archived - Not Applicable	Archived - Not Applicable

Current Program Major Code	Current Program Major Title	Program major is now located on this New Curriculum Standard Title	Program Major is Classified under this Career Cluster
	(Archived 08/16/12 - Converted to Environmental Management Technology A20230). Colleges currently approved for A2014B will receive approval for A20230.		
A2014C	Environmental Science Technology/Invasive Species Management (Archived 08/16/12 - Converted to Invasive Species Management Technology A20240). Colleges currently approved for A2014C will receive approval for A20240.	Archived - Not Applicable	Archived - Not Applicable
A20240	Invasive Species Management Technology (New)	Science and Math: Environmental Science Technology	Science, Technology, Engineering, and Math
A20160	Laboratory Technology (Revised)	Science and Math: Biotechnology	Science, Technology, Engineering, and Math
A20170	Marine Biotechnology (New)	Science and Math: Biotechnology	Science, Technology, Engineering, and Math
A20220	Zoo and Aquarium Science Technology (Archived 08/16/12 - Split into Zoological Science Technology A20250 and Aquarium Science Technology A20260. Colleges currently approved for A20220 will receive approval for A20250 and A20260.	Archived - Not Applicable	Archived - Not Applicable
A20250	Zoological Science Technology (New)	Science and Math: Zoo and Aquarium Science Technology	Science, Technology, Engineering, and Math
CONSTR	UCTION TECHNOLOGIES	_	
A35100	Air Conditioning, Heating and Refrigeration Technology ( <i>Revised</i> )	Air Conditioning, Heating, and Refrigeration Technology	Architecture and Construction
D35120	Boat Building (Revised)	Construction: Boat Building	Architecture and Construction
A35140	Building Construction Technology (Revised)	Construction: Architecture & Construction Technology	Architecture and Construction
D35180	Carpentry (Revised)	Construction: Architecture & Construction Technology	Architecture and Construction
A35190	Construction Management Technology (Revised)	Construction: Architecture & Construction Technology	Architecture and Construction
A35220	Electrical/Electronics Technology (Archived 8/16/12 - Converted to Electrical Systems Technology A35130). Colleges currently	Archived - Not Applicable	Archived - Not Applicable

Current Program Major Code	Program Major Current Program Major Title this New Curriculum Standard Title		Program Major is Classified under this Career Cluster	
	approved for A35220 will receive approval for A35130.			
A35130 <del>A35220</del>	Electrical Systems Technology (New) Electrical/Electronics Technology	Electrical Systems Technology	Architecture and Construction	
A35110	Historic Preservation Technology (Revised)	Construction: Historic Preservation Technology	Architecture and Construction	
D35280	Masonry (Revised)	Construction: Architecture & Construction Technology	Architecture and Construction	
D35300	Plumbing (Revised)	Construction: Architecture & Construction Technology	Architecture and Construction	
ENGINE	ERING TECHNOLOGIES			
A40130	Applied Engineering Technology (Revised)	Engineering and Technology: Applied, Automation, Mechatronics Engineering Technology	Science, Technology, Engineering, and Mathematics	
A40100	Architectural Technology (Revised)	Construction: Architecture & Construction Technology	Architecture and Construction	
A40120	Automation Engineering Technology (Revised)	Engineering and Technology: Applied, Automation, Mechatronics Engineering Technology	Science, Technology, Engineering, and Mathematics	
A40140	Civil Engineering Technology (Revised)	Engineering and Technology: Civil Engineering and Geomatics Technologies	Science, Technology, Engineering, and Mathematics	
A40160	Computer Engineering Technology (Revised)	Engineering and Technology: Electrical Engineering Technology	Science, Technology, Engineering, and Mathematics	
A40180	Electrical Engineering Technology (Revised)	Engineering and Technology: Electrical Engineering Technology	Science, Technology, Engineering, and Mathematics	
A40200	Electronics Engineering Technology (Revised)	Engineering and Technology: Electrical Engineering Technology	Science, Technology, Engineering, and Mathematics	
A40150	Environmental Engineering Technology (New)	Engineering and Technology: Civil Engineering and Geomatics Technologies	Science, Technology, Engineering, and Mathematics	
A40420	Geomatics Technology (New)	Engineering and Technology: Civil	Science, Technology, Engineering, and	
A40380	Surveying Technology	Engineering and Geomatics Technologies	Mathematics	
A40110	Geospatial Mapping Technology (New)	Engineering and Technology: Civil Engineering and Geomatics Technologies	Science, Technology, Engineering, and Mathematics	
A40220	Geospatial Technology (Revised)	Engineering and Technology: Geospatial	Science, Technology, Engineering, and	

Current Program Major Code	Current Program Major Title	Program major is now located on this New Curriculum Standard Title	Program Major is Classified under this Career Cluster
		Technology	Mathematics
A40240	Industrial Engineering Technology (Revised)	Manufacturing Production and Process Development: Manufacturing and Industrial Engineering Technology	Manufacturing
A40260	Landscape Architecture Technology (Revised)	Construction: Landscape Architecture Technology	Architecture and Construction
A40280	Laser and Photonics Technology (Revised)	Engineering and Technology: Electrical Engineering Technology	Science, Technology, Engineering, and Mathematics
A40290	Low Impact Development (Revised)	Construction: Low Impact Development	Architecture and Construction
A40320	Mechanical Engineering Technology (Revised)	Engineering and Technology: Mechanical Engineering Technology	Science, Technology, Engineering, and Mathematics
A40350	Mechatronics Engineering Technology (Revised)	Engineering and Technology: Applied, Automation, Mechatronics Engineering Technology	Science, Technology, Engineering, and Mathematics
A40380	Surveying Technology (Archived 08/16/12 - Converted to Geomatics Technology A40420. Colleges currently approved for A40380 will receive approval for A40420.	Archived - Not Applicable	Archived - Not Applicable
A40370	Sustainability Technologies (Revised)	Sustainability Technologies	Science, Technology, Engineering, and Mathematics
A40400	Telecommunications and Network Engineering Technology ( <i>Revised</i> )	Engineering and Technology: Electrical Engineering Technology	Science, Technology, Engineering, and Mathematics
	IAL TECHNOLOGIES	1	1
A50100	Biomedical Equipment Technology (Revised)	Engineering and Technology: Electrical Engineering Technology	Science, Technology, Engineering, and Mathematics
A50150	Computer-Aided Drafting Technology (Revised)	Engineering and Technology: Drafting Technology	Science, Technology, Engineering, and Mathematics
A50240	Industrial Systems Technology (Revised)	Industrial Systems Technology	Manufacturing
A50260	Industrial Management Technology (Revised)	Manufacturing Production and Process Development: Manufacturing and Industrial Engineering Technology	Manufacturing
A50320	Manufacturing Technology (Revised)	Manufacturing Production and Process Development: Manufacturing and Industrial Engineering Technology	Manufacturing
A5032D	Manufacturing Technology/Composites (Archived 08/16/12)	Archived - Not Applicable	Archived - Not Applicable

Current Program Major Code	Current Program Major Title	Program major is now located on this New Curriculum Standard Title	Program Major is Classified under this Career Cluster
A5032C	Manufacturing Technology/Integrated Operations (Archived 08/16/12)	Archived - Not Applicable	Archived - Not Applicable
A5032A	Manufacturing Technology/Plastics (Archived 08/16/12)	Archived - Not Applicable	Archived - Not Applicable
A50340	Mechanical Drafting Technology (Revised)	Engineering and Technology: Drafting Technology	Science, Technology, Engineering, and Mathematics
A50350	Nondestructive Examination Technology (Revised)	Quality Assurance: Nondestructive Examination Technology	Manufacturing
A50550	Quality Assurance and Continuous Improvement (New)	Manufacturing Production and Process Development: Manufacturing and Industrial Engineering Technology	Manufacturing
A50420	Welding Technology (Revised)	Production: Welding Technology	Manufacturing
PUBLIC S	SERVICE TECHNOLOGIES Animal Care and Management Technology ( <i>Revised</i> )	Animal Systems: Animal Care	Agriculture, Food and Natural Resources
		Management Technology	
A55330	Outdoor Leadership (Revised)	Education/Training: Outdoor Leadership	Education & Training
TRANSPO	ORT SYSTEMS TECHNOLOGIES		
A60410	Agricultural Systems Technology (New)	Mobile Equipment Maintenance and Repair	Transportation, Distribution and Logistics
D60420	Alternative Transportation Technology (New)	Mobile Equipment Maintenance and Repair	Transportation, Distribution and Logistics
A60190	Automotive Customizing Technology (Revised)	Mobile Equipment Maintenance and Repair	Transportation, Distribution and Logistics
D60430	Automotive Light-Duty Diesel Technology (New)	Mobile Equipment Maintenance and Repair	Transportation, Distribution and Logistics
D60140	Automotive Restoration Technology (Revised)	Mobile Equipment Maintenance and Repair	Transportation, Distribution and Logistics
A60160	Automotive Systems Technology ( <i>Revised</i> ) (Colleges currently approved for Automotive Systems Technology A60160 may receive <i>optional</i> approval for Alternative Transportation Technology D60420 and/or Automotive Light-Duty Diesel Technology D60430. See CC12-024 for instructions/form.)	Mobile Equipment Maintenance and Repair	Transportation, Distribution and Logistics

Current Program Major Code	Current Program Major Title	Program major is now located on this New Curriculum Standard Title	Program Major is Classified under this Career Cluster
A60130	Collision Repair and Refinishing Technology (Revised)	Mobile Equipment Maintenance and Repair	Transportation, Distribution and Logistics
A60450	Construction Equipment Systems Technology (New)	Mobile Equipment Maintenance and Repair	Transportation, Distribution and Logistics
A60460	Diesel and Heavy Equipment Technology (New)	Mobile Equipment Maintenance and Repair	Transportation, Distribution and Logistics
A60240	<ul> <li>Heavy Equipment and Transport Technology (Archived 08/16/12</li> <li>Converted to Diesel and Heavy Equipment Technology</li> <li>A60460). Colleges currently approved for A60240 will receive approval for A60460.</li> </ul>	Archived - Not Applicable	Archived - Not Applicable
A6024A	Heavy Equipment and Transport Technology/Agricultural Systems (Archived 08/16/12 - Converted to Agriculture Systems Technology A60410). Colleges currently approved for A6024A will receive approval for A60410.	Archived - Not Applicable	Archived - Not Applicable
A6024B	Heavy Equipment and Transport Technology/Construction Equipment Systems (Archived 08/16/12 - Converted to Construction Equipment Systems Technology A60450). Colleges currently approved for A6024B will receive approval forA60450.	Archived - Not Applicable	Archived - Not Applicable
A6024C	Heavy Equipment and Transport Technology/Marine Systems (Archived 08/16/12 - Converted to Diesel and Heavy Equipment Technology A60460). Colleges currently approved for A6024C will receive approval for A60460.	Archived - Not Applicable	Archived - Not Applicable
A60260	Motorcycle Mechanics ( <i>Program was converted from a diploma to an Associate in Applied Science program.</i> ) Colleges currently approved for D60260 will receive approval for A60260. Motorcycle Mechanics (Diploma)	Mobile Equipment Maintenance and Repair	Transportation, Distribution and Logistics
D60310	Recreational Vehicle Maintenance and Repair Technology ( <i>Revised</i> )	Mobile Equipment Maintenance and Repair	Transportation, Distribution and Logistics

## NC Community Colleges Hope • Opportunity • Jobs

Curriculum Procedures Reference Manual Section 3

## Curriculum Program Application for Existing Program Titles Procedures and Accountability Report

(Associate in Applied Science, Diploma, and Certificate Curriculum Programs)

## Implementation October 1, 2012

Originally Approved by the State Board of Community Colleges on January 21, 2000. Revised on April 17, 2002; March 7, 2005; August 26, 2005; November 8, 2006; April 18, 2008; September 19, 2008; January 21, 2011 and August 16, 2012.

## North Carolina Community College System Curriculum Program Application Procedures and Accountability Report for Existing Program Titles

Please note that colleges may utilize the Special Curriculum Program Application process when applying for a concentration program if the applying college already has approval for the parent program. Please see Section 3A of the Curriculum Procedures Manual for information concerning the Special Curriculum Program Application process.

The State Board of Community Colleges has established rules to guide the approval of programs:

- (1) The approval of a college or of a group of colleges in a collaborative arrangement to award the associate degree, diploma, or certificate shall be by individual curriculum program title. Approval by the State Board shall be granted when the college has demonstrated an established need and has provided evidence to the State Board of sufficient instructional faculty, facilities, equipment, and materials required to meet the needs of the communities served without supplanting or duplicating existing programs.
- (2) The application shall be signed by the college president and the chairman of the college's board of trustees.
- (3) The System President shall recommend action on the college's curriculum program application to the State Board.
- (4) Approval to grant degrees, diplomas, and certificates shall be withdrawn if the State Board determines that a college is not maintaining approved programs or graduation requirements.

SBCCC 02E.0201

In addition, the State Board has adopted the attached Curriculum Program Application Procedures to guide community colleges in preparing and submitting applications for curriculum program approval.

#### Submission of Program Application:

Colleges seeking curriculum program approval should submit an application using the attached procedures. All items must be completed and documented as indicated before the program can be considered for approval by the State Board. Colleges are encouraged to contact the appropriate program coordinator at the System Office for assistance in the completion of this application. (See Section 7 of the *Curriculum Procedures Reference Manual* for a list of Program Coordinators).

Two (2) copies of the application with original signatures should be submitted to:

Senior Vice President and Chief Academic Officer North Carolina Community College System Office 5016 Mail Service Center Raleigh, North Carolina 27699-5016

#### **Deadlines:**

Program applications may be submitted at any time, but should be submitted within a reasonable amount of time after the initial planning notification.

Program applications for existing program titles that meet the following criteria will be "fast-tracked" and may be processed within 60 days of submission:

- The application is complete, requires no further analysis or documentation, and is received by the System Office by the first working day of the month;
- There are no negative impact assessments; and
- The college does not go outside of its service area for planning purposes.

Example TimelineMarch 1- Application received by System OfficeApril Board Meeting- System Office presents to Board as "Fast Track for Action"

Completed applications that do *not* meet the "Fast Track for Action" criteria that are received by the first working day of the month will be processed within 90 days of submission.

Example Timeline	
March 1 -	Application received by System Office
April Board Meeting	- System Office presents to Board "For Future Action"
May Board Meeting	- System Office presents to Board "For Action"

The approval process for applications which are received after the first working day of the month, are incomplete, or require further analysis may exceed this 90-day schedule. Since the State Board normally does not meet in June or December, application processing schedules which include these months may also exceed 90 days.

The *Three Year Accountability Report* must be submitted three years after program implementation.

## CURRICULUM PROGRAM APPLICATION PROCEDURES

#### **Instructions for Completing Attached Application:**

All items must be completed and documented as indicated before the program can be considered for approval by the State Board. Please note that colleges may utilize the Special Curriculum Program Application process when applying for a concentration program if the applying college already has approval for the parent program. Please see Section 3A of the Curriculum Procedures Manual for information concerning the Special Curriculum Program Application process.

#### I. Program Planning

Items A and B should be presented in narrative format and include appropriate documentation to support the case for the proposed program. This narrative will serve as the primary resource for the State Board's consideration. The narrative is restricted to three to five pages.

#### A. Purpose:

Discuss the purpose of the proposed program and demonstrate how the proposed program directly relates to the mission of the college and the college's Institutional Effectiveness Plan.

#### **B.** Rationale:

Build a narrative case for starting the new program. The narrative may include the following: an analysis of employment opportunities using existing labor market databases; illuminating excerpts from letters of support from existing businesses and industries; an explanation of the tie-in to local or regional economic development board initiatives; or excerpts from letters of support from county commissioner boards, chambers of commerce, or other relevant stakeholders who can express significant need for the program to be implemented at the college. The rationale should also indicate the method of delivery for the program. Additional information may be provided to substantiate the college's rationale and justification for starting the new program.

#### C. Local Certification:

Complete the institutional certification. A copy of the minutes from the Board of Trustees meeting(s) at which the proposed program was discussed and approved must be attached to the application.

## **II. Program Planning Notification**

Using the *Curriculum Program Planning Notification Form* to notify all community college presidents, all chief academic officers, and the Senior Vice President and Chief Academic Officer at the System Office that the college intends to apply for the proposed program.

In the notification, please indicate the intended planning area (the specific counties to be served by the program), as well as the anticipated starting semester. If the planning area includes counties served by other community colleges, please identify those colleges in the planning announcement. If the planning area is redefined as part of the application process, a revised program planning notification must be sent to all parties listed above.

Attach a copy of the notification to the application.

A separate notification is required for each program application.

This notification of the intent to apply for the proposed program does not imply or give proprietary right to any college to offer the proposed program.

## III. Impact of the Proposed Program on Other Programs in the System

#### A. Impact Assessment Form

The applying college must send completed hard copies of the *Impact Assessment Form* to other colleges which have been identified as approved to offer the same or similar program(s). Please follow these guidelines:

- If the proposed program does NOT include a clinical requirement, send the Impact Assessment Form to colleges that are approved to offer the same or similar programs and that have a service area which is contiguous to the counties in your service area. The Impact Assessment Forms must document the perceived impact of implementing the proposed program on the existing program(s) at the contiguous colleges.
- If the proposed program includes a clinical requirement, send the Impact Assessment Form to all NCCCS colleges approved to offer the same or similar programs. The Impact Assessment Form should document the perceived impact of the proposed program on existing program(s) at other colleges, including the impact on clinical sites used by other colleges.

#### **B.** Documenting Impact Assessment

Include in the application a list of colleges who received an Impact Assessment Form and a narrative summary of the responses received. If the applying college does not receive a response from a college, please attempt to contact that college's president to obtain a response. Attach copies of signed Impact Assessment Forms from all responding college(s). If the applying college receives a negative response as a result of the original Notification or the Impact Assessment Form, provide a narrative summary of the actions the college took to resolve the negative responses and the outcome of those actions. Document the outcome of a resolution meeting using the Impact Assessment Resolution Form.

#### C. Impact Assessment Conflict Resolution Appeals Process

If the college presidents cannot reach agreement on the impact of the proposed program, the Senior Vice President and Chief Academic Officer will refer the issue to the System President. If a meeting with the System President does not resolve the issues, the presidents may request a hearing before the Program Committee of the State Board. The Program Committee will make a recommendation to the State Board on the disposition of the proposed program. The State Board's decision regarding resolution of the matter is final.

## **IV. Implementation of Level III Instructional Service Agreement (ISA) Plan**

(Required for both the "parent" and concentration program application, if applicable)

If the applying college intends to collaborate with one or more colleges to offer the proposed program, a Level III Instructional Agreement (ISA) should be included with the program application. Please utilize Section 6 of the *Curriculum Procedures Reference Manual* to obtain the guidelines and suggested format for Level III ISAs.

## V. Proposed Program of Study

(Required for Both the "Parent" and Concentration Program Applications)

The proposed program of study should be designed to be in compliance with the curriculum standard approved by the State Board of Community Colleges. The State Board approved curriculum standard for each program is located at: <a href="http://www.nccommunitycolleges.edu/Programs/curriculum\_standards.html">http://www.nccommunitycolleges.edu/Programs/curriculum\_standards.html</a>.

The proposed program of study should also be designed using the appropriate courses listed in the *Combined Course Library* which is located at: <u>http://www.nccommunitycolleges.edu/ccl.html</u>.

## VI. Three Year Accountability Report

A *Three Year Accountability Report* must be submitted three years after program implementation. The report must include information on enrollment, completers, employment, licensure/accreditation and other pertinent information.

## NC Community Colleges Hope • Opportunity • Jobs

## **CURRICULUM PROGRAM APPLICATION**

College		
Program Title		
Concentration Title(If applicable)		
Program Code		
Credential (Indicate the highest creden	tial to be awarded)	
AAS	Diploma	Certificate
Proposed Semester and Year of Imple	mentation	
Spring	Summer	Fall 20
Contact Person (Name/Title):		
Phone ()	_ Extension	_E-mail
Does this application include the use o	f a Level III Instructi	onal Service Agreement (ISA)?
	Yes No	
( If yes, please be s	sure to include the ISA with	your application.)

### **I. Program Planning**

Items A and B should be completed in a narrative format. This narrative is limited to three to five pages.

Curriculum Program Application – Existing Program – State Board revised 08/16/12.

**A. Purpose:** Provide a narrative which outlines the purpose of the proposed program and demonstrate how the proposed program directly relates to the mission of the college and the college's Institutional Effectiveness Plan. (*Attach additional completed pages.*)

**B. Rationale:** Build a narrative case for starting the new program. (See instructions provided on page 4.) (*Attach additional completed pages.*)

**C. Institutional Certification:** *Complete the following form and obtain required signatures. Form with original signatures should be included in the application.* 

#### **Institutional Certification**

This curriculum program

(Program Title)

(Program Code)

will enhance the workforce of North Carolina, will provide educational and training opportunities consistent with the mission of the college, and will not duplicate the opportunities currently offered.

(Community College Name)

has assessed the need for this program and the resources required to maintain a viable program and certifies that the college can operate this program efficiently and effectively within the resources available to the college.

The college understands that this proposed program will require a program accountability report that will include items such as student success measures, enrollment trends, completion rates, and employment data three years after implementation if the program is approved by the State Board.

(A copy of the minutes from the Board of Trustees meeting(s) where the proposed program was discussed and approved must be attached to the application.)

Signature, President of College

Signature, Board of Trustees Chair

Curriculum Program Application – Existing Program – State Board revised 08/16/12.

Date

Date

**II. Program Planning Notification**: *Complete the form below and utilize to notify all community college presidents, chief academic officers, and the Senior Vice President and Chief Academic Officer at the System Office of your intent to apply for the proposed program. Include a copy of the completed form with the application.* 

## **Curriculum Program Planning Notification**

(Date of Notification)

intends to in	itiate a planning process for
College	Program Title/Code
The planning process is expected to be completed by	by, with program implementation in <i>Date</i>
	to be served by this program is
Semester Year	List Each County
The following colleges are located within the plann For colleges interested in participating in the plann	ing area for the new program:
person for the program planning process is	
	Include contact person's name and phone number

*Note:* If the planning area is redefined as part of the application process, a revised program planning notification must be sent to all parties listed above.

## III. Impact of the Proposed Program on Other Programs in the System:

**A. Impact Assessment Form**: The applying college should complete Section A <u>or</u> B, and sign. Send completed copies of the Impact Assessment Form to colleges which are approved to offer the same or similar program(s)(see guidelines provided on page 5). The college with the same or similar program should complete and sign their response. Include copies of signed forms in your application.

#### Impact Assessment Form Section A: (For Programs <u>without</u> a Clinical Requirement):

inte	ends to apply for appro-	al to offer	
Applying College		Program Title/Code	
The college has determined tha <i>Name of college with same or similar program</i>		is located in a contiguous	3
service area and is currently offering	the same or similar prog	gram entitled and coded as	
		Program Title/Cod	le
Section B: (For Programs <u>with</u> a Cl	inical Requirement):		
intends to apply	y for approval to offer		which
Applying College		Program Title/Code	
contains a clinical requirement. Th	ne college has determin	ed that	
contains a clinical requirement. Th		Name of college with same or similar pr	rogram
is currently offering the same or simil	ar program entitled and	coded as	<u>-</u> •
		Program Title/Code	
The following clinical site(s) m	ay be utilized in offerir	g this program:	
Impact Assessment: Our college's assessment of the impact	on your program is iden	tified below:	
Signature of President of Applying College		Date	
<b>Response to Applying College:</b> Please indicate your response to this asses within two weeks may be construed as co			nd
Yes, I agree with the impact asses	sment.	No, I do not agree with the impact assess	sment.
If you do not agree with the impact assess	sment, please provide an e	xplanation (use an additional page if need	ed):
Signature of President of College with Same o	r Similar Program	Date	

**B.** Documenting Impact Assessment: *Provide a list of colleges who received an Impact Assessment Form and a narrative of the responses received.* 

Name of College(s) Receiving Impact Assessment Form	Program Title

\_\_\_\_\_

#### Narrative of Responses Received:

If a negative response was received, provide a narrative summary of the actions taken to resolve the negative response and the outcome of those actions:

\_\_\_\_\_

If a negative response was received, document the outcome of the resolution by completing the following Impact Resolution Form. Include copies of the signed resolution in the application.

<b>Impact Assessment</b>	Resolution	Form
--------------------------	------------	------

	ntends to apply for approval to of	ter
Applying College		Program Title/Code
		l be an impact on its program. The identified
College with Same or Similar Pa	rogram	
impact is:		
	has resolved the possible im	pact by:
Applying College		
Signature of President of Apply	ing College	Date
	e to this impact assessment resolu	ation within <b>two weeks</b> of the date of this form. neurrence with the impact assessment resolution.)
Yes, I agree with the	impact assessment resolution ide	ntified above.
No, I do not agree with	th the impact assessment resolution	on identified above.
	mpact assessment resolution ider	ntified above, please provide an explanation (attach an
		<u> </u>
Signature of President of Co	llege with Same or Similar Program	Date

### IV. Level III Instructional Service Agreement (ISA): Include a Level III

Instructional Service Agreement with the application if the applying college intends to collaborate with one or more colleges to offer the proposed program. (See Section 6 of the Curriculum Procedures Reference Manual for guidelines.)

## **V. Proposed Program of Study:** *Complete the following to indicate the proposed program of study.*

**A. GENERAL EDUCATION:** Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours must be in communications. General education is optional in certificate programs.

#### 1. Communication:

The following course(s) are required: **Course Number Course Title (Credit)** ENG 111 Expository Writing (3) (Example format)

**Communication Pick List if applicable:** Select a course(s) from the following:

#### **2.Humanities/Fine Arts:**

The following course(s) are required: Course Number Course Title (Credit)

#### Humanities/Fine Arts Pick List if applicable:

Select a course(s) from the following:

#### **3.Social/Behavioral Sciences:**

The following course(s) are required: Course Number Course Title (Credit)

#### Social/Behavioral Pick List if applicable:

Select a course(s) from the following:

#### 4.Natural Sciences/Mathematics:

The following course(s) are required: Course Number Course Title (Credit)

#### **Natural Sciences/Mathematics Pick List if applicable:** Select a course(s) from the following:

Total General Education Semester Hour Credits Required \_\_\_\_

#### Program of Study (Continued) B. MAJOR HOURS

#### 1. Core

The core is comprised of specific courses and/or subject areas which are required for each curriculum program. These are identified on the curriculum standard for each program.

The following course(s) are required: Course Number Course Title (Credit)

**Required Subject Area(s) if applicable:** 

Total Core Semester Hour Credits\_\_\_\_

#### 2. Concentration (if applicable)

If the proposed program is a concentration, please list the required courses and/or subject areas. Only utilize the courses and/or subject areas identified on the curriculum standard.

The following course(s) are required: Course Number Course Title (Credit)

**Required Subject Area(s) if applicable:** 

Total Concentration Semester Hour Credits\_\_\_\_

#### Program of Study (Continued)

#### 3. Other Major Hours

Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from any prefix listed, with the exception of prefixes listed in the core or unique prefixes as noted on the standard.

The following course(s) are required: Course Number Course Title (Credit)

**Required Subject Area(s) if applicable:** 

Total Other Major Semester Hour Credits \_\_\_\_\_

Total Major Semester Hour Credits\_\_\_\_\_

Please note:

Work experience may be included in associate in applied science degrees up to a maximum of 8 semester hours of credit; in diploma programs up to a maximum of 4 semester hours of credit; and in certificate programs up to a maximum of 2 semester hours of credit.

Selected topics or seminar curriculum courses may be included in associate in applied science degree up to a maximum of 3 semester hours of credit; and in diploma or certificate programs up to a maximum of 3 semester hours of credit. Such curriculum courses shall be listed on a program of study as "other major" hours. Selected topics and seminar curriculum courses shall not be used more than once in a program.

#### **Program of Study (Continued)**

#### C. **OTHER REQUIRED COURSES** (*If applicable*)

A college may require other courses in order to meet graduation or local employer requirements. These requirements may be met through a maximum of 7 semester hours of credit in a degree program; 4 semester hours of credit in a diploma program, and 1 semester hour of credit in a certificate program. Restricted, unique or free elective courses may not be included as other required courses.

The following course(s) are required: Course Number Course Title (Credit)

Total Other Required Semester Hour Credits\_\_\_\_\_

Total Semester Hours Credit in Program\_\_\_\_

**Course Substitution (if applicable)** 

Course in Program\_\_\_\_\_ Substitute Course(s)\_\_\_\_\_

Course in Program\_\_\_\_\_ Substitute Course(s)\_\_\_\_\_

**VI. Three Year Accountability Report:** *The Three Year Accountability Report must be submitted three years <u>after program implementation</u>. Use the following template for the report.* 

## NCCCS New Curriculum Program Application Procedures Template for Three Year Accountability Report

Name of College:						
Title of Curriculum Progran	n:					
Date of State Board Approval:						
Semester Program Started a	t College:	Fall 🗆	Spring	Summer 🗆	20	
<b>Number of Students Enrolled</b> (Please break down by certific	0		•	-	on:	
First Year						
Second Year						
Third Year						
Number of Program Completers by Year: (Include additional years if applicable.)						
First Year	Certific	cate	Diploma	a A	AAS	
Second Year	Certific	cate	Diploma	a A	AAS	
Third Year	Certific	cate	Diploma	a A	AAS	

## Graduates Employment:

•	Number and Percentage of Graduates Employed in Major or Related FieldFirst Graduating Class:%Second Graduating Class:%
•	Number and Percentage of Graduates Employed in Other FieldsFirst Graduating Class:%Second Graduating Class:%
•	Number and Percentage of Students Continuing Education

**Program Outlook for Next Five Years (Brief Narrative)** 

#### Are there external accrediting or licensing requirements for this program?

Yes No No I If so, please provide date of accreditation/approval: \_\_\_\_\_ 20 \_ \_ or projected date of accreditation/approval: \_\_\_\_\_ 20 \_ \_

Attach minutes of local advisory committee meetings since program implementation.

Attach any other information pertaining to the program.

## NC Community Colleges Hope • Opportunity • Jobs

Curriculum Procedures Reference Manual Section 3A

## Special Curriculum Program Application for Selected Curriculum Titles Procedures and Accountability Report

(Associate in Applied Science, Diploma, and Certificate Selected Curriculum Programs)

## Implementation October 1, 2012

## North Carolina Community College System Special Curriculum Program Application Procedures and Accountability Report for Selected Curriculum Titles

The State Board of Community Colleges is authorized to approve curriculum programs (23 SBCCC 02E .0201). The State Board has delegated to the President of the North Carolina Community College System the authority to approve new curriculum programs utilizing the special application process for the selected titles. Curriculum programs recommended to the State Board for placement on the Special Curriculum Application process list by a college or by System Office staff must meet the following criteria to be eligible:

- 1. There is a widespread, immediate need for the job training and there will be minimal impact on college programs if multiple colleges offer the program; or
- 2. The program is a concentration (applying college must be approved to offer the parent program.)

## The following curriculums have been approved by the State Board of Community Colleges for the Special Application process:

- Community Spanish Interpreter (A55370)
- Entrepreneurship (A25490)
- Global Logistics (A25170)
- Industrial Systems Technology (A50240)
- Infant/Toddler Care (Certificate)(C55290)
- Information Systems Security (A25270)
- Lateral Entry (Certificate)(C55430)

- Low Impact Development (A40290)
- Medical Office Administration (A25310)
- Networking Technology (A25340)
- School-Age Care (Certificate)(C55450)
- Sustainability Technologies (A40370)
- Web Technologies (A25290)
- Welding Technology (A50420)

The following curriculums have been approved by the State Board of Community Colleges for the Special Application process, but require that the college have prior approval for the Cosmetology (A55140) program:

- Cosmetology Instructor (Certificate)(C55160)
- Esthetics Instructor (Certificate)(C55270)
- Esthetics Technology (Certificate)(C55230)
- Manicuring Instructor (Certificate)(C55380)
- Manicuring/Nail Tech. (Certificate)(C55400)

The following curriculum has been approved by the State Board of Community Colleges for the Special Application process, but requires that the college have prior approval for the Real Estate (A25400) program:

• Real Estate Licensing (Certificate) (C25480)

The following curriculum has been approved by the State Board of Community Colleges for the Special Application process, but requires that the college have prior approval for the Culinary Arts (A55150) program:

• Foodservice Technology (Diploma) (D55250)

<u>All</u> concentrations have been approved by the State Board of Community Colleges for the Special Application process, but require that the college have prior approval for the parent program. See Section 7 of the Curriculum Procedures Reference Manual for a list of concentration/parent programs.

#### Submission of Special Program Application:

Colleges seeking curriculum program approval process, through the special application process, should submit an application using the attached procedures. The following items must be completed and documented as indicated before the program can be considered for approval by the State Board:

- 1) Local Certification
- 2) Proposed Program of Study
- 3) Impact Assessment Form(s) from colleges in counties contiguous to applying college's service area approved to offer the same or similar program; *and*
- 4) Three Year Accountability Report (must be submitted three years <u>after program implementation</u>)

#### Two (2) copies of the application with original signatures on each copy should be submitted to:

Senior Vice President and Chief Academic Officer North Carolina Community Colleges System Office 5016 Mail Service Center Raleigh, North Carolina 27699-5016

#### **Deadlines:**

Special program applications may be submitted at any time. Please allow approximately three weeks for System Office review and approval. Colleges will be notified of program approval and will be instructed to submit an electronic program of study. Approval of the program and the program of study must be complete prior to implementation of the program.

#### SPECIAL CURRICULUM PROGRAM APPLICATION PROCEDURES

#### **Instructions for Completing Attached Application:**

All items must be completed and documented as indicated before the program can be considered for approval by the System Office. Please note that colleges may only utilize the Special Curriculum Program Application process when applying for a concentration program if the applying college already has approval for the parent program or when applying for an approved special application program title. See page 2 for a list of approved titles.

#### I. Local Certification:

Complete the institutional certification form. A copy of the minutes from the Board of Trustees meeting(s) at which the proposed program was discussed and approved must be attached to the application.

#### **II.** Proposed Program of Study

The proposed program of study should be designed to be in compliance with the curriculum standard approved by the State Board of Community Colleges. The State Board approved curriculum standard for each program is located at:

http://www.nccommunitycolleges.edu/Programs/curriculum\_standards.html.

The proposed program of study should also be designed using the appropriate courses from the *Combined Course Library* which is located at: <u>http://www.nccommunitycolleges.edu/ccl.html</u>.

#### III. Impact of the Proposed Program on Other Programs in the System

#### A. Impact Assessment Form

The applying college must send completed hard copies of the *Impact Assessment Form* to any college that is approved to offer the same or similar program and which is contiguous to the counties in the applying college's service area. The Impact Assessment Forms must document the perceived impact of implementing the proposed program on the existing program(s) at the contiguous colleges.

#### **B.** Documenting Impact Assessment

Include in the application a list of colleges who received an Impact Assessment Form and a narrative summary of the responses received. If the applying college does not receive a response from a college, please attempt to contact that college's president to obtain a response. Attach copies of signed Impact Assessment Forms from all responding college(s).

If the applying college receives a negative response as a result of the original Notification or the Impact Assessment Form, provide a narrative summary of the actions the college took to resolve the negative responses and the outcome of those actions. Document the outcome of a resolution meeting using the Impact Assessment Resolution Form.

#### C. Impact Assessment Conflict Resolution Appeals Process

If the college presidents cannot reach agreement on the impact of the proposed program, the Senior Vice President and Chief Academic Officer will refer the issue to the System President. If a meeting with the System President does not resolve the issues, the presidents may request a hearing before the Program Committee of the State Board. The Program Committee will make a recommendation to the State Board on the disposition of the proposed program. The State Board's decision regarding resolution of the matter is final.

### **IV. Three Year Accountability Report**

A *Three Year Accountability Report* must be submitted by the college three years after program implementation. The report must include information on enrollment, completers, employment, licensure/accreditation and other pertinent information.

## NC Community Colleges Hope • Opportunity • Jobs

## SPECIAL CURRICULUM PROGRAM APPLICATION

College					
Program Title					
Concentration Title					
(If applicable)					
Program Code					
Credential (Indicate the highest credential to be awarded)					
AAS	Dinloma	Certificate			
/ M NS					
Proposed Semester and Year of Impler	nentation				
Convince.	<b>C</b>	E-11 20			
Spring	Summer	Fall 20			
Contact Person (Name/Title):					
Phone ()	Fytonsion	F-mail			
		_ E-man			
Does this application include the use of a Level III Instructional Service Agreement (ISA)?					
	Yes No				
( If yes, please be si	ure to include the ISA with	your application.)			

#### I. Institutional Certification: Complete the following form and obtain required signatures. Form with

original signatures should be included in the application.

## **Institutional Certification**

This curriculum program

(Program Title)

(Program Code)

will enhance the workforce of North Carolina, will provide educational and training opportunities consistent with the mission of the college, and will not duplicate the opportunities currently offered.

(Community College Name)

has assessed the need for this program and the resources required to maintain a viable program and certifies that the college can operate this program efficiently and effectively within the resources available to the college.

The college understands that this proposed program will require a program accountability report that will include items such as student success measures, enrollment trends, completion rates, and employment data three years after implementation if the program is approved by the State Board.

(A copy of the minutes from the Board of Trustees meeting(s) where the proposed program was discussed and approved must be attached to the application.)

Signature, President of College

Signature, Board of Trustees Chair

Date

Date

## II. Proposed Program of Study: Complete the following to indicate the proposed program of study.

**A. GENERAL EDUCATION:** Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours of general education; 3 semester hours must be in communications. General education is optional in certificate programs.

#### 1. Communication:

The following course(s) are required:Course Number Course Title (Credit)ENG 111 Expository Writing (3)(Example format)

## **Communication Pick List if applicable:**

Select a course(s) from the following:

#### 2.Humanities/Fine Arts:

The following course(s) are required: Course Number Course Title (Credit)

#### **Humanities/Fine Arts Pick List if applicable:** Select a course(s) from the following:

#### **3.**Social/Behavioral Sciences:

The following course(s) are required: Course Number Course Title (Credit)

#### **Social/Behavioral Pick List if applicable:** Select a course(s) from the following:

#### 4.Natural Sciences/Mathematics: The following course(s) are required: Course Number Course Title (Credit)

#### **Natural Sciences/Mathematics Pick List if applicable:** Select a course(s) from the following:

Total General Education Semester Hour Credits Required \_\_\_\_\_

#### Program of Study (Continued) B. MAJOR HOURS

#### 1. Core

The core is comprised of specific courses and/or subject areas which are required for each curriculum program. These are identified on the curriculum standard for each program.

The following course(s) are required: Course Number Course Title (Credit)

**Required Subject Area(s) if applicable:** 

Total Core Semester Hour Credits\_\_\_\_

2. Concentration (if applicable)

If the proposed program is a concentration, please list the required courses and/or subject areas. Only utilize the courses and/or subject areas identified on the curriculum standard.

The following course(s) are required: Course Number Course Title (Credit)

**Required Subject Area(s) if applicable:** 

Total Concentration Semester Hour Credits\_\_\_\_\_

Special Curriculum Program Application – Existing Program – State Board revised 08/16/12.

#### Program of Study (Continued)

#### 3. Other Major Hours

Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from any prefix listed, with the exception of prefixes listed in the core or unique prefixes as noted on the standard.

The following course(s) are required: Course Number Course Title (Credit)

**Required Subject Area(s) if applicable:** 

Total Other Major Semester Hour Credits \_\_\_\_\_

Total Major Semester Hour Credits\_\_\_\_\_

Please note:

Work experience may be included in associate in applied science degrees up to a maximum of 8 semester hours of credit; in diploma programs up to a maximum of 4 semester hours of credit; and in certificate programs up to a maximum of 2 semester hours of credit.

Selected topics or seminar curriculum courses may be included in associate in applied science degree up to a maximum of 3 semester hours of credit; and in diploma or certificate programs up to a maximum of 3 semester hours of credit. Such curriculum courses shall be listed on a program of study as "other major" hours. Selected topics and seminar curriculum courses shall not be used more than once in a program.

Special Curriculum Program Application – Existing Program – State Board revised 08/16/12.

#### **Program of Study (Continued)**

#### C. OTHER REQUIRED COURSES (If applicable)

A college may require other courses in order to meet graduation or local employer requirements. These requirements may be met through a maximum of 7 semester hours of credit in a degree program; 4 semester hours of credit in a diploma program, and 1 semester hour of credit in a certificate program. Restricted, unique or free elective courses may not be included as other required courses.

The following course(s) are required: Course Number Course Title (Credit)

Total Other Required Semester Hour Credits\_\_\_\_\_

Total Semester Hours Credit in Program\_\_\_\_\_

Course Substitution (if applicable)

Course in Program\_\_\_\_\_ Substitute Course(s)\_\_\_\_\_

Course in Program\_\_\_\_\_ Substitute Course(s)\_\_\_\_\_

### **III.** Impact of the Proposed Program on Other Programs in the System:

**A. Impact Assessment Form:** The applying college should complete the impact assessment form and sign. Send completed copies of the Impact Assessment Form to colleges which are approved to offer the same of similar program(s) and which are located in counties which are contiguous to counties in your college's service area. The college with the same or similar program should complete and sign their response. Include copies of signed forms in your application.

## Impact Assessment Form – Special Curriculum Program Application

intends to apply for approval to offer	·		
Applying College	nds to apply for approval to offer <i>Program Title/Concentration Title/Code</i>		
The college has determined that	is located in a contiguous county		
and is currently offering the same or similar program entitled a	and coded as		
	Program Title/Concentration Title/ Code		
Our college's assessment of the impact on your program is identi	ified below:		
Signature of President of Applying College	Date		
Please indicate your response to this assessment within <b>two weeks</b> o may be construed as concurrence with the impact assessment.)	f the date of this form. (Failure to respond within two weeks		
Yes, I agree with the impact assessment.	No, I do not agree with the impact assessment.		
Explanation (attach additional comments on other pages):			
Signature of President of College with Same or Similar Program	Date		

Special Curriculum Program Application – Existing Program – State Board revised 08/16/12.

**B.** Documenting Impact Assessment: Provide a list of colleges who received an Impact Assessment Form and a narrative of the responses received.

Name of College(s) Receiving Impact Assessment Form	Program Title (Same or Similar)

\_\_\_\_\_

## Narrative of Responses Received: \_\_\_\_\_

If a negative response was received, provide a narrative summary of the actions taken to resolve the negative response and the outcome of those actions:

**C. Impact Assessment Resolution:** If a negative response was received, document the outcome of the resolution by completing the following Impact Resolution Form. Include copies of the signed resolution in the application.

# **Impact Assessment Resolution Form**

intends to apply for approval to offer <i>Applying College</i> Program Title/Concentration Title/ Code			
14719118 0011080			
	has identified that there will be an	impact on its program. The identified impact is:	
ollege with Same or Similar H	rogram		
	has reaching the reacible impact by		
Applying College	has resolved the possible impact by	/.	
Apprying Conce			
Signature of President of Appl	ying College	Date	
Daga indicata your raspons	a to this impact assassment resolution w	ithin <b>two weeks</b> of the date of this form. (Failure to res	nond
	onstrued as concurrence with the impact a		pond
	include as concurrence while the impact		
Yes, I agree with the	impact assessment resolution identified	above.	
No, I do not agree w	ith the impact assessment resolution iden	itified above.	
Explanation (attach a	dditional comments on other pages):		
	dentional comments on other pages).		

**IV. Three Year Accountability Report:** *The Three Year Accountability Report must be submitted three years <u>after program implementation</u>. <i>Use the following template for the report.* 

Special Curriculum Program Application – Existing Program – State Board revised 08/16/12.

# NCCCS New Curriculum Program Application Procedures Template for Three Year Accountability Report

Name of College:				
Title of Curriculum Program	n:			
Date of State Board Approv	al:			
Semester Program Started a	t College: Fall □	Spring 🗆 Summer 🗆	20	
<b>Number of Students Enrolle</b> ( <i>Please break down by certific</i>	0		tion:	
First Year				
Second Year				
Third Year				
Number of Program Completers by Year: (Include additional years if applicable.)				
First Year	Certificate	_ Diploma	AAS	
Second Year	Certificate	_ Diploma	AAS	
Third Year	Certificate	_ Diploma	AAS	

## **Graduates Employment:**

- Number and Percentage of Graduates Employed in Major or Related Field First Graduating Class: \_\_\_\_\_%
   Second Graduating Class: \_\_\_\_\_%
- Number and Percentage of Graduates Employed in Other Fields First Graduating Class: \_\_\_\_\_% Second Graduating Class: \_\_\_\_\_%
- Number and Percentage of Students Continuing Education
   \_\_\_\_\_%

**Program Outlook for Next Five Years (Brief Narrative)** 

# NC Community Colleges Hope • Opportunity • Jobs

Curriculum Procedures Reference Manual Section 3B

Curriculum Program Application for a New-to-the-System Program Title Procedures and Accountability Report

(New-to-the-System Associate in Applied Science, Diploma, and Certificate Curriculums)

Implementation October 1, 2012

## North Carolina Community College System Curriculum Program Application Procedures and Accountability Report for New-to-the-System Program Titles

The State Board of Community Colleges has established rules to guide the approval of programs:

- (1) The approval of a college or of a group of colleges in a collaborative arrangement to award the associate degree, diploma, or certificate shall be by individual curriculum program title. Approval by the State Board shall be granted when the college has demonstrated an established need and has provided evidence to the State Board of sufficient instructional faculty, facilities, equipment, and materials required to meet the needs of the communities served without supplanting or duplicating existing programs.
- (2) The application shall be signed by the college president and the chairman of the college's board of trustees.
- (3) The System President shall recommend action on the college's curriculum program application to the State Board.
- (4) Approval to grant degrees, diplomas, and certificates shall be withdrawn if the State Board determines that a college is not maintaining approved programs or graduation requirements.

SBCCC 02E.0201

In addition, the State Board has adopted the attached Curriculum Program Application Procedures to guide community colleges in preparing and submitting applications for curriculum program approval.

## Submission of Program Application:

Colleges seeking curriculum program approval should submit an application using the attached procedures. All items must be completed and documented as indicated before the program can be considered for approval by the State Board. Colleges are encouraged to contact the appropriate program coordinator at the System Office for assistance in the completion of this application. (See Section 7 of the *Curriculum Procedures Reference Manual* for a list of Program Coordinators).

## Two (2) copies of the application with original signatures should be submitted to:

Senior Vice President and Chief Academic Officer North Carolina Community College System Office 5016 Mail Service Center Raleigh, North Carolina 27699-5016

**Deadlines:** 

Program applications may be submitted at any time, but should be submitted within a reasonable amount of time after the initial planning notification.

Completed applications that are received by the first working day of the month will be processed within 90 days of submission.

Example Timeline	
March 1 -	Application received by System Office
April Board Meeting	- System Office presents to Board "For Future Action"
May Board Meeting	- System Office presents to Board "For Action"

The approval process for applications which are received after the first working day of the month, are incomplete, or require further analysis may exceed this 90-day schedule. Since the State Board normally does not meet in June or December, application processing schedules which include these months may also exceed 90 days.

The *Three Year Accountability Report* must be submitted three years after program implementation.

## **CURRICULUM PROGRAM APPLICATION PROCEDURES**

## **Instructions for Completing Attached Application:**

All items must be completed and documented as indicated before the program can be considered for approval by the State Board.

## I. Program Planning

Items A and B should be presented in narrative format and include appropriate documentation to support the case for the proposed program. This narrative will serve as the primary resource for the State Board's consideration. The narrative is restricted to three to five pages.

#### A. Purpose:

Discuss the purpose of the proposed program and demonstrate how the proposed program directly relates to the mission of the college and the college's Institutional Effectiveness Plan.

#### **B.** Rationale:

Build a narrative case for starting the new program. The narrative may include the following: an analysis of employment opportunities using existing labor market databases; illuminating excerpts from letters of support from existing businesses and industries; an explanation of the tie-in to local or regional economic development board initiatives; or excerpts from letters of support from county commissioner boards, chambers of commerce, or other relevant stakeholders who can express significant need for the program to be implemented at the college. The rationale should also indicate the method of delivery for the program. Additional information may be provided to substantiate the college's rationale and justification for starting the new program.

## C. Local Certification:

Complete the institutional certification. A copy of the minutes from the Board of Trustees meeting(s) at which the proposed program was discussed and approved must be attached to the application.

## **II. Program Planning Notification**

Using the *Curriculum Program Planning Notification Form* to notify all community college presidents, all chief academic officers, and the Senior Vice President and Chief Academic Officer at the System Office that the college intends to apply for the proposed program.

In the notification, please indicate the intended planning area (the specific counties to be served by the program), as well as the anticipated starting semester. If the planning area includes counties served by other community colleges, please identify those colleges in the planning announcement. If the planning area is redefined as part of the application process, a revised program planning notification must be sent to all parties listed above.

Attach a copy of the notification to the application.

A separate notification is required for each program application.

This notification of the intent to apply for the proposed program does not imply or give proprietary right to any college to offer the proposed program.

## III. Impact of the Proposed Program on Other Programs in the System

#### A. Impact Assessment Form

The applying college must send completed hard copies of the *Impact Assessment Form* to other colleges which have been identified as approved to offer the same or similar program(s). Please follow these guidelines:

- If the proposed program does NOT include a clinical requirement, send the Impact Assessment Form to colleges that are approved to offer the same or similar programs and that have a service area which is contiguous to the counties in your service area. The Impact Assessment Forms must document the perceived impact of implementing the proposed program on the existing program(s) at the contiguous colleges.
- If the proposed program includes a clinical requirement, send the Impact Assessment Form to all NCCCS colleges approved to offer the same or similar programs. The Impact Assessment Form should document the perceived impact of the proposed program on existing program(s) at other colleges, including the impact on clinical sites used by other colleges.

#### **B.** Documenting Impact Assessment

Include in the application a list of colleges who received an Impact Assessment Form and a narrative summary of the responses received. If the applying college does not receive a response from a college, please attempt to contact that college's president to obtain a response. Attach copies of signed Impact Assessment Forms from all responding college(s).

If the applying college receives a negative response as a result of the original Notification or the Impact Assessment Form, provide a narrative summary of the actions the college took to resolve the negative responses and the outcome of those actions. Document the outcome of a resolution meeting using the Impact Assessment Resolution Form.

#### C. Impact Assessment Conflict Resolution Appeals Process

If the college presidents cannot reach agreement on the impact of the proposed program, the Senior Vice President and Chief Academic Officer will refer the issue to the System President. If a meeting with the System President does not resolve the issues, the presidents may request a hearing before the Program Committee of the State Board. The Program Committee will make a recommendation to the State Board on the disposition of the proposed program. The State Board's decision regarding resolution of the matter is final.

# IV. Implementation of Level III Instructional Service Agreement (ISA) Plan

(Required for both the "parent" and concentration program application, if applicable)

If the applying college intends to collaborate with one or more colleges to offer the proposed program, a Level III Instructional Agreement (ISA) should be included with the program application. Please utilize Section 6 of the *Curriculum Procedures Reference Manual* to obtain the guidelines and suggested format for Level III ISAs.

## V. Proposed Program of Study

(Required for Both the "Parent" and Concentration Program Applications)

The proposed program of study should be designed to be in compliance with the curriculum standard approved by the State Board of Community Colleges. The State Board approved curriculum standard for each program is located at: http://www.nccommunitycolleges.edu/Programs/curriculum\_standards.html.

The proposed program of study should also be designed using the appropriate courses listed in the *Combined Course Library* which is located at: <u>http://www.nccommunitycolleges.edu/ccl.html</u>.

## VI. Proposed Curriculum Standard

(Required for Both the "Parent" and Concentration Program Applications)

The proposed *traditional* Curriculum Standard should include:

**A. Curriculum Description.** The curriculum description should briefly describe the program, including statements concerning the purpose of the curriculum, subject areas or types of courses offered, and special features associated with the program.

**B.** Core Courses. List all the curriculum courses that must be included in the core as required courses or the standard. Include course credit hours and the total number of credit hours for the core. *A minimum of 12 semester credit hours is required in the core*.

**C. Concentrations** (if applicable). List all courses required for the concentration under the proposed curriculum standard. Identify those courses that are unique to the concentration and, therefore, may not be offered except in the concentration. Include credit hours for the courses and total hours for the concentration. *A minimum of 12 semester credit hours is required in the concentration. The majority of the credit hours must be unique to the concentration.* 

**D. Other Major Hours.** List all curriculum prefixes that would be appropriate for use when selecting courses to complete the local Program of Study. A maximum of 9 semester hours of credit (shc) may be selected from any prefix listed, with the exception of prefixes listed in the core or concentration which may utilize more than 9 shc.

If the applying college would like to utilize a curriculum standard which is aligned with a career cluster, the elements identified above should be included along with an indication of the appropriate career cluster, pathway, technical core, program major courses, recommended general education and employability competencies. The applying college should contact the appropriate Program Coordinator at the System Office to determine whether a cluster model curriculum standard should be utilized.

## VII. New Courses

If the application contains courses new to the *Combined Course Library*, please submit the proposed course including the proposed course title, hours, pre/corequisites (if applicable), course description, student learning outcomes (if applicable) and restrictions (if applicable). New courses will be reviewed by the State Board and are not required to be submitted to the Curriculum Review Committee (CRC).

## VIII. Three Year Accountability Report

A *Three Year Accountability Report* must be submitted three years after program implementation. The report must include information on enrollment, completers, employment, licensure/accreditation and other pertinent information.

# NC Community Colleges Hope • Opportunity • Jobs

# **CURRICULUM PROGRAM APPLICATION**

College			
Program Title			
Concentration Title(If applicable)			
Program Code			
Credential (Indicate the highest creden	ntial to be awarded)		
AAS	Diploma	Certificate	
Proposed Semester and Year of Imple	ementation		
Spring	Summer	Fall 20	
Contact Person (Name/Title):			
Phone ()	_ Extension	_E-mail	
Does this application include the use of a Level III Instructional Service Agreement (ISA)?			
	Yes No		
( If yes, please be s	sure to include the ISA with	your application.)	

## **I. Program Planning**

Items A and B should be completed in a narrative format. This narrative is limited to three to

#### five pages.

**A. Purpose:** Provide a narrative which outlines the purpose of the proposed program and demonstrate how the proposed program directly relates to the mission of the college and the college's Institutional Effectiveness Plan. (*Attach additional completed pages.*)

**B. Rationale:** Build a narrative case for starting the new program. (See instructions provided on page 4.) (*Attach additional completed pages.*)

**C. Institutional Certification:** *Complete the following form and obtain required signatures. Form with original signatures should be included in the application.* 

## **Institutional Certification**

This curriculum program \_

(Program Title)

(Program Code)

will enhance the workforce of North Carolina, will provide educational and training opportunities consistent with the mission of the college, and will not duplicate the opportunities currently offered.

(Community College Name)

has assessed the need for this program and the resources required to maintain a viable program and certifies that the college can operate this program efficiently and effectively within the resources available to the college.

The college understands that this proposed program will require a program accountability report that will include items such as student success measures, enrollment trends, completion rates, and employment data three years after implementation if the program is approved by the State Board.

(A copy of the minutes from the Board of Trustees meeting(s) where the proposed program was discussed and approved must be attached to the application.)

Signature, President of College

Signature, Board of Trustees Chair

Date

Date

**II. Program Planning Notification**: *Complete the form below and utilize to notify all community college presidents, chief academic officers, and the Senior Vice President and Chief Academic Officer at the System Office of your intent to apply for the proposed program. Include a copy of the completed form with the application.* 

# **Curriculum Program Planning Notification**

(Date of Notification)

intends to initiate a planning process for	
College	Program Title/Code
The planning process is expected to be completed by, with prog	gram implementation in
, The anticipated planning area to be served by this program is _	
Semester Year	List Each County
The following colleges are located within the planning area for the new program:	List colleges, if applicable
person for the program planning process is	
Include contact person's name as	nd phone number

*Note:* If the planning area is redefined as part of the application process, a revised program planning notification must be sent to all parties listed above.

## III. Impact of the Proposed Program on Other Programs in the System:

**A. Impact Assessment Form**: The applying college should complete Section A <u>or</u> B, and sign. Send completed copies of the Impact Assessment Form to colleges which are approved to offer the same or similar program(s)(see guidelines provided on page 5). The college with the same or similar program should complete and sign their response. Include copies of signed forms in your application.

#### Impact Assessment Form Section A: (For Programs <u>without</u> a Clinical Requirement):

intends to apply fo	r approval to offer		
Applying College	Program Title/Code		
The college has determined that	is located in a contiguous		
service area and is currently offering the same or similar	ilar program entitled and coded as		
	Program Title/Code		
Section B: (For Programs <u>with</u> a Clinical Requirer	nent):		
intends to apply for approval to	o offer which		
Applying College	Program Title/Code		
contains a clinical requirement. The college has do	etermined that		
	Name of college with same or similar program		
is currently offering the same or similar program entit	iled and coded as		
	Program Title/Code		
The following clinical site(s) may be utilized in	n offering this program:		
Impact Assessment: Our college's assessment of the impact on your program	n is identified below:		
Signature of President of Applying College	Date		
<b>Response to Applying College:</b> Please indicate your response to this assessment within <b>two</b> within two weeks may be construed as concurrence with the			
Yes, I agree with the impact assessment.	No, I do not agree with the impact assessment.		
If you do not agree with the impact assessment, please prov	vide an explanation (use an additional page if needed):		
Signature of President of College with Same or Similar Program	Date		

**B.** Documenting Impact Assessment: Provide a list of colleges who received an Impact Assessment Form and a narrative of the responses received.

Name of College(s) Receiving Impact Assessment Form	Program Title

\_\_\_\_\_

#### Narrative of Responses Received:

If a negative response was received, provide a narrative summary of the actions taken to resolve the negative response and the outcome of those actions:

\_\_\_\_\_

If a negative response was received, document the outcome of the resolution by completing the following Impact Resolution Form. Include copies of the signed resolution in the application.

Applying College	intends to apply for approval to offer	Program Title/Code
11 2 0 0		Program Title/Code
	has identified that there will be an	impact on its program. The identified
College with Same or Similar		
impact is:		
Applying College	has resolved the possible impact by	/:
hpprying conege		
·····		
Signature of President of App	lving College	Date
0 5 5 11		
Response to Applying Col	lege:	
Please indicate your respon	se to this impact assessment resolution wi	ithin <b>two weeks</b> of the date of this form.
Failure to respond within t		ce with the impact assessment resolution.)
-		-
Yes, I agree with the	wo weeks may be construed as concurren e impact assessment resolution identified	above.
Yes, I agree with the	wo weeks may be construed as concurren	above.
Yes, I agree with the No, I do not agree w If you do not agree with the	wo weeks may be construed as concurren e impact assessment resolution identified vith the impact assessment resolution iden e impact assessment resolution identified a	above. atified above.
Yes, I agree with the No, I do not agree w If you do not agree with the	wo weeks may be construed as concurren e impact assessment resolution identified vith the impact assessment resolution iden	above. atified above.
Yes, I agree with the No, I do not agree w	wo weeks may be construed as concurren e impact assessment resolution identified vith the impact assessment resolution iden e impact assessment resolution identified a	above. atified above.
Yes, I agree with the No, I do not agree w If you do not agree with the	wo weeks may be construed as concurren e impact assessment resolution identified vith the impact assessment resolution iden e impact assessment resolution identified a	above. atified above.
Yes, I agree with the No, I do not agree w If you do not agree with the	wo weeks may be construed as concurren e impact assessment resolution identified vith the impact assessment resolution iden e impact assessment resolution identified a	above. atified above.
Yes, I agree with the No, I do not agree w If you do not agree with the	wo weeks may be construed as concurren e impact assessment resolution identified vith the impact assessment resolution iden e impact assessment resolution identified a	above.

# IV. Level III Instructional Service Agreement (ISA): Include a Level III

Instructional Service Agreement with the application if the applying college intends to collaborate with one or more colleges to offer the proposed program. (See Section 6 of the Curriculum Procedures Reference Manual for guidelines.)

# **V. Proposed Program of Study:** *Complete the following to indicate the proposed*

program of study.

A. GENERAL EDUCATION: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours of semester hours must be in communications. General education is optional in certificate programs.

#### 1. Communication:

The following course(s) are required: **Course Number Course Title (Credit)** ENG 111 Expository Writing (3) (Example format)

**Communication Pick List if applicable:** Select a course(s) from the following:

#### **2.Humanities/Fine Arts:**

The following course(s) are required: Course Number Course Title (Credit)

**Humanities/Fine Arts Pick List if applicable:** Select a course(s) from the following:

#### **3.Social/Behavioral Sciences:**

The following course(s) are required: Course Number Course Title (Credit)

**Social/Behavioral Pick List if applicable:** Select a course(s) from the following:

#### 4.Natural Sciences/Mathematics:

The following course(s) are required: Course Number Course Title (Credit)

**Natural Sciences/Mathematics Pick List if applicable:** Select a course(s) from the following:

Total General Education Semester Hour Credits Required \_\_\_\_\_

#### Program of Study (Continued) B. MAJOR HOURS

#### 1. Core

The core is comprised of specific courses and/or subject areas which are required for each curriculum program. These are identified on the curriculum standard for each program.

The following course(s) are required: Course Number Course Title (Credit)

**Required Subject Area(s) if applicable:** 

Total Core Semester Hour Credits\_\_\_\_

#### 2. Concentration (if applicable)

If the proposed program is a concentration, please list the required courses and/or subject areas. Only utilize the courses and/or subject areas identified on the curriculum standard.

The following course(s) are required: Course Number Course Title (Credit)

**Required Subject Area(s) if applicable:** 

Total Concentration Semester Hour Credits\_\_\_\_

#### Program of Study (Continued)

#### 3. Other Major Hours

Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from any prefix listed, with the exception of prefixes listed in the core or unique prefixes as noted on the standard.

The following course(s) are required: Course Number Course Title (Credit)

**Required Subject Area(s) if applicable:** 

Total Other Major Semester Hour Credits \_\_\_\_\_

Total Major Semester Hour Credits\_\_\_\_\_

Please note:

Work experience may be included in associate in applied science degrees up to a maximum of 8 semester hours of credit; in diploma programs up to a maximum of 4 semester hours of credit; and in certificate programs up to a maximum of 2 semester hours of credit.

Selected topics or seminar curriculum courses may be included in associate in applied science degree up to a maximum of 3 semester hours of credit; and in diploma or certificate programs up to a maximum of 3 semester hours of credit. Such curriculum courses shall be listed on a program of study as "other major" hours. Selected topics and seminar curriculum courses shall not be used more than once in a program.

#### **Program of Study (Continued)**

#### C. **OTHER REQUIRED COURSES** (*If applicable*)

A college may require other courses in order to meet graduation or local employer requirements. These requirements may be met through a maximum of 7 semester hours of credit in a degree program; 4 semester hours of credit in a diploma program, and 1 semester hour of credit in a certificate program. Restricted, unique or free elective courses may not be included as other required courses.

The following course(s) are required: **Course Number Course Title (Credit)** 

Total Other Required Semester Hour Credits\_\_\_\_\_

Total Semester Hours Credit in Program\_\_\_\_

**Course Substitution (if applicable)** 

Course in Program\_\_\_\_\_ Substitute Course(s)\_\_\_\_\_

Course in Program\_\_\_\_\_ Substitute Course(s)\_\_\_\_\_

# VI. Proposed Curriculum Standard

**Curriculum Description** Complete this section using three paragraphs which define intent, content and graduate qualifications. Paragraphs are limited to three sentences with a maximum of 40 words for the paragraph

**Intent of the Curriculum** utilizing terms such as: This curriculum ( is designed to..., prepares individuals..., provides...., etc.)

**Curriculum Content** utilizing statements such as: Course work includes..., Students will..., etc.

**Graduates should qualify for or accomplish** (Include certifications, licensure examinations, employment opportunities, etc.)

## Curriculum Requirements\*

- I. General Education. Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours of general education; 3 semester hours must be in communications. General education is optional in certificate programs.
- II. Major Hours. AAS, diploma, and certificate programs must include courses which offer specific job knowledge and skills. Work experience, including cooperative education, practicums, and internships, may be included in associate in applied science degrees up to a maximum of 8 semester hours of credit; in diploma programs up to a maximum of 4 semester hours of credit; and in certificate programs up to a maximum of 2 semester hours of credit. (See second page for additional information.)
- III. Other Required Hours. A college may include courses to meet graduation or local employer requirements in a certificate, diploma, or associate in applied science program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit in Program	64-76	36-48	12-18

\*Within the degree program, the institution shall include opportunities for the achievement of competence in reading, writing, oral communication, fundamental mathematical skills, and basic use of computers.

# Major Hours

- A. Core. The subject/course core is comprised of subject areas and/or specific courses which are required for each curriculum program. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the subject/course core of the AAS program.
- **B. Concentration** (*if applicable*). A concentration of study must include a minimum of 12 semester hours of credit from required subjects and/or courses. The majority of the course credit hours are unique to the concentration. The required subjects and/or courses that make up the concentration of study are in addition to the required subject/course core.
- **C. Other Major Hours.** Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from any prefix listed, with the exception of prefixes listed in the core or concentration. Work experience, including cooperative education, practicums, and internships, may be included in associate in applied science degrees up to a maximum of 8 semester hours of credit; in diploma programs up to a maximum of 4 semester hours of credit; and in certificate programs up to a maximum of 2 semester hours of credit.

	Curriculum Title/Curriculun	n Code		
		AAS	Diploma	Certificate
Miı	nimum Major Hours Required	49 SHC	30 SHC	12 SHC
A.	CORE			
	<b>quired Courses:</b> (List required course titles/hours. Use an * to atify courses that are required for a diploma if applicable.)			
Rec	quired Subject Areas: (List subject areas if applicable.)			
В.	<b>CONCENTRATION</b> (list concentration courses if applicable)			
C.	<b>OTHER MAJOR HOURS</b> To be selected from the following prefixes: (List appropriate course prefixes. Core prefixes should be included.)			

# **VII.** New Course Request(s): Please complete a separate request form for each course.

Request for New Combined Course Library (CCL) Course
--

Name of College					
Chief Academic Officer					
(print or type)	Last Name	Ι	First Name	MI	
Chief Academic Officer					
	Signature			Date	
Contact Person			Phone		
Rationale for New Cours	e				
Supporting Documentati	on (Complete	all sections.)			
Litilize the keyword seem	h function los	ated at http://www.pacap	munityaallagaa adu/aa	htm to logoto similar	
courses.		ated at <u>http://www.nccon</u>	munityconeges.euu/cc	to locate similar	
List a current CCL course	that is most	How Is New Course Sign	ificantly Different from	the identified courses?	
similar to the requested co list any other similar CCL					
	eourse(s).				
Colleges That Have Been	Consulted	Response From Consulter	d College		
Proposed Course Informat	tion				
Three-Letter Prefix:		Three-Digit			
Short Title (30 characters i	including space	Number:			
Long Title (for clarificatio					
	I 1 /CL		Work	Total	
Hours: Classroom Prerequisite(s):	Lab/Sh		Experience	Credit	
Description:		Corequisi	te(s):		
A sentence summary of the course using a maximum of 40 words					
(This course provides/introduces/covers/is designed to/includes)					
A sentence listing the major components of the course using a maximum of 40 words					
(Topics include/Emphasis is placed on)					
A sentence listing the competencies of the course using a maximum of 50 words					
(Upon completion, students should be able to)					

## **REQUEST FOR NEW CCL COURSE**

(page 2 of 2)

<b>Student Learning Outcomes (SLOs): Student Learning Outcomes are not required.</b> Do Not Wish to Include SLOs					
<ul> <li>If included in the course request, SLOs should be concise, measurable and directly related to the course description. List SLOs for the new course if applicable. (<i>Expand if needed.</i>)</li> <li>1.</li> <li>2.</li> <li>3.</li> </ul>					
4. 5.					
6. Identify the curriculum(s) for which this co	urse is intended:				
Check the engranded has to indicate the e					
Check the appropriate box to indicate the a General Education	rea where this new course will be offered:				
Communications	Humanities/Fine Arts				
Mathematics	Social/Behavioral Sciences				
Natural Sciences					
Major Hours					
Core	Concentration				
Other Major Hours	Premajor/Elective (AA/AS/AFA only)				
Restrict to Major	Restrict to Concentration				
Other Please specify					
Identify all the credential levels for which this course is intended:					
AAS   Diploma   Certificate					
AA/AS/AFA*					
*If approved by the Curriculum Review Committee (CRC), course will be forwarded to the Transfer Advisory Committee for consideration for transfer through the Comprehensive Articulation Agreement.					

**VIII. Three Year Accountability Report:** *The Three Year Accountability Report must be submitted three years <u>after program implementation</u>. Use the following template for the report.* 

## NCCCS New Curriculum Program Application Procedures Template for Three Year Accountability Report

Thr	ee Year Accounta				
Name of College:					
Title of Curriculum Program	n:				
Date of State Board Approv	al:				
Semester Program Started a	<b>t College</b> : Fall □	Spring 🗆 Summer 🗆	20		
<b>Number of Students Enrolle</b> (Please break down by certific	e	v 1	ion:		
First Year					
Second Year					
Third Year					
Number of Program Comple	eters by Year: (Incl	ude additional years if ap	plicable.)		
First Year	Certificate	_ Diploma	AAS		
Second Year	Certificate	_ Diploma	AAS		
Third Year	Certificate	_ Diploma	AAS		

# Graduates Employment:

•	Number and Percentage of Graduates Employed in Major or Related FieldFirst Graduating Class:%Second Graduating Class:%
•	Number and Percentage of Graduates Employed in Other FieldsFirst Graduating Class:%Second Graduating Class:%
٠	Number and Percentage of Students Continuing Education

**Program Outlook for Next Five Years (Brief Narrative)** 

## Are there external accrediting or licensing requirements for this program?

Yes No No I If so, please provide date of accreditation/approval: \_\_\_\_\_ 20 \_ \_ or projected date of accreditation/approval: \_\_\_\_\_ 20 \_ \_

Attach minutes of local advisory committee meetings since program implementation.

Attach any other information pertaining to the program.

# **CURRICULUM STANDARD**

Effective Term Spring 2013 [2013\*01]

Curriculum Program Title

**Healthcare Business Informatics** 

A25510

Code

Concentration

(not applicable)

## Curriculum Description

The Healthcare Business Informatics curriculum prepares individuals for employment as specialists in installation, data management, data archiving/retrieval, system design and support, and computer training for medical information systems.

Students learn about the field through multidisciplinary coursework including the study of terminology relating to informatics, systems analysis, networking technology, computer/network security, data warehousing, archiving and retrieval of information, and healthcare computer infrastructure support.

Graduates should qualify for employment as database/data warehouse analysts, technical support professionals, informatics technology professionals, systems analysts, networking and security technicians, and computer maintenance professionals in the healthcare field.

## Curriculum Requirements\*

[for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204 (3)]

- I. General Education. Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours must be in communications. General education is optional in certificate programs.
- **II. Major Hours**. AAS, diploma, and certificate programs must include courses which offer specific job knowledge and skills. Work experience, including cooperative education, practicums, and internships, may be included in associate in applied science degrees up to a maximum of 8 semester hours of credit; in diploma programs up to a maximum of 4 semester hours of credit; and in certificate programs up to a maximum of 2 semester hours of credit. (*See second page for additional information.*)
- III. Other Required Hours. A college may include courses to meet graduation or local employer requirements in a certificate, diploma, or associate in applied science program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
<b>Total Semester Hours Credit (SHC)</b>	64-76	36-48	12-18

# *Major Hours* [ref. 23 NCAC 02E.0204 (3)]

- A. Core. The subject/course core is comprised of subject areas and/or specific courses which are required for each curriculum program. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the subject/course core of the AAS program.
- B. **Concentration** (*if applicable*). A concentration of study must include a minimum of 12 semester hours credit from required subjects and/or courses. The majority of the course credit hours are unique to the concentration. The required subjects and/or courses that make up the concentration of study are in addition to the required subject/course core.
- C. **Other Major Hours.** Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from any prefix listed, with the exception of prefixes listed in the core or concentration. Work experience, including cooperative education, practicums, and internships, may be included in associate in applied science degrees up to a maximum of 8 semester hours of credit; in diploma programs up to a maximum of 4 semester hours of credit; and in certificate programs up to a maximum of 2 semester hours of credit.

Healthcare Business Informatics A25510					
			AAS	Diploma	Certificate
Minimum	Major Hours Required		49 SHC	30 SHC	12 SHC
A. COL Cours	<b>RE</b> ses required for the diploma are designated with	h *	33-42 SHC		
Required (	Courses:				
	Hardware/Software Support	3 SHC			
*HBI 110	Issues and Trends in HBI	3 SHC			
*HBI 113	Survey of Med Insurance	3 SHC			
*HBI 250	Data Mgmt and Utilization	3 SHC			
Require St	ıbject Areas:				
	<i>puter Skills</i> . Select one:				
CIS 110	Introduction to Computers	3 SHC			
CIS 111	Basic PC Literacy	2 SHC			
<b>Operating</b>	Systems. Select one:				
	OS and Device Foundation	6 SHC			
NOS 110	Operating System Concepts	3 SHC			
Informatio	n Security. Select one:				
CTI 120	Network & Sec Foundation	3 SHC			
SEC 110	Security Concepts	3 SHC			
		Continued on next page			

Notwork S	ystems. Select one:	
NET 110		3 SHC
NET 110 NET 125	Networking Basics	3 SHC
TNE 111	Campus Networks I	3 SHC
	Campus Networks I	J SIL
Database.	Select one:	
DBA 110	Database Concepts	3 SHC
DBA 120	Database Programming I	3 SHC
	Database Administration	3 SHC
	erminology. Select one set:	
MED 120	Survey of Med Terminology	2 SHC
or		
MED 121	Medical Terminology I	3 SHC
and		
	Medical Terminology II	3 SHC
or		
	Med Terms I-Med Office	3 SHC
and		
OST 142	Med Terms II-Med Office	3 SHC
	egal and Regulatory Issues. Select on	
	Medical Law and Ethics	2 SHC
	Medical Legal Issues	3 SHC
HMT 215	Legal Asp of Healthcare Admin	3 SHC
Business N	Ianagement. Select one:	
	Introduction to Business	3 SHC
	Introduction to Entrepreneurship	3 SHC
	Intro to Healthcare Mgt	3 SHC
	Introduction to Logistics	3 SHC
	Info Sys Business Concepts	3 SHC
		5.5110
B. CON	NCENTRATION (Not applicable)	
	HER MAJOR HOURS	
To be	selected from the following prefixes/courses:	
ACC	, BIO, BUS, CIS, COE, COM, CSC, CTI,	CTS DBA ETR GIS GRO
	ISC, LOG, MAT, MED, MKT, NET, NOS	
TNE, and W		, , , , , , , , , , , , , , , , , , , ,
	ign language courses (including ASL) that	8
	oved other major hours may be included in	all programs up to a
maxi	mum of 3 semester hours of credit.	

# **CURRICULUM STANDARD**

Effective Term Spring 2013 [2013\*01]

Curriculum Program Title

**Medical Dosimetry (Diploma)** 

D45450

Code

Concentration

(not applicable)

## Curriculum Description

The curriculum is designed to prepare ARRT certified radiation therapists to work in the care of cancer patients as medical dosimetrist. The curriculum provides instruction to enable the participant to become a member of the radiation oncology team.

The curriculum content includes specific coursework to provide classroom and direct clinical experience to train the student in the fundamentals of medical dosimetry practice using current technology, tools and techniques. Students will participate in studies related to the role of the medical dosimetrist and professional ethics, radiation oncology anatomy, treatment planning, dose calculations, clinical oncology, brachytherapy, dosimetry physics, radiation protection, quality assurance and computer applications.

Graduates of the program will be able to obtain employment as a medical dosimetrist and apply to the Medical Dosimetrist Certification Board (MDCB) to sit for a national certification.

Admission criteria include the completion of a bachelors degree.

### Curriculum Requirements\*

[for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204 (3)]

- I. General Education. Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours must be in communications. General education is optional in certificate programs.
- **II. Major Hours**. AAS, diploma, and certificate programs must include courses which offer specific job knowledge and skills. Work experience, including cooperative education, practicums, and internships, may be included in associate in applied science degrees up to a maximum of 8 semester hours of credit; in diploma programs up to a maximum of 4 semester hours of credit; and in certificate programs up to a maximum of 2 semester hours of credit. (*See second page for additional information.*)
- III. Other Required Hours. A college may include courses to meet graduation or local employer requirements in a certificate, diploma, or associate in applied science program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
<b>Total Semester Hours Credit (SHC)</b>	64-76	36-48	12-18

\*Within the degree program, the institution shall include opportunities for the achievement of competence in reading, writing, oral communication, fundamental mathematical skills, and basic use of computers.

# *Major Hours* [ref. 23 NCAC 02E.0204 (3)]

- A. **Core.** The subject/course core is comprised of subject areas and/or specific courses which are required for each curriculum program. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the subject/course core of the AAS program.
- B. **Concentration** (*if applicable*). A concentration of study must include a minimum of 12 semester hours credit from required subjects and/or courses. The majority of the course credit hours are unique to the concentration. The required subjects and/or courses that make up the concentration of study are in addition to the required subject/course core.
- C. Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from any prefix listed, with the exception of prefixes listed in the core or concentration. Work experience, including cooperative education, practicums, and internships, may be included in associate in applied science degrees up to a maximum of 8 semester hours of credit; in diploma programs up to a maximum of 4 semester hours of credit; and in certificate programs up to a maximum of 2 semester hours of credit.

			AAS	Diploma	Certificate
Min	imum Major Hours Required		49 SHC	30 SHC	12 SHC
A.	CORE			37 SHC	
<b>D</b>					
кеq	uired Courses:				
	DOS 210 Introduction to Dosimetry	2 SHC			
	DOS 220 Treatment Planning I	3 SHC			
	DOS 221 Treatment Planning II	2 SHC			
	DOS 230 Clinical Research Exper	2 SHC			
	DOS 240 Clinical Education I	8 SHC			
	DOS 241 Clinical Education II	8 SHC			
	DOS 242 Clinical Education III	5 SHC			
	DOS 243 Dosimetry Physics II	2 SHC			
	DOS 250 Dose Calculations	2 SHC			
	DOS 260 Brachytherapy Planning	3 SHC			
B.	<b>CONCENTRATION</b> (Not applicable)				
C.	OTHER MAJOR HOURS				
	To be selected from the following prefixes:				
	CIS, COE, CSC, CTS, DOS, RAD, and RT	Т			
	Foreign language courses (including ASL) that				
	approved other major hours may be included in maximum of 3 semester hours of credit.	all programs up to a			

# **CURRICULUM STANDARD**

Effective Term Spring 2013 [2013\*01]

Curriculum Program Title

Positron Emission Tomography (Diploma)

D45820

Code

Concentration

## Curriculum Description

The Positron Emission Tomography curriculum prepares individuals, working in conjunction with PET Technologist, to perform related PET radiopharmacy, procedures, and safety.

Students will acquire the knowledge and skills necessary to perform PET studies, including the use of PET/CT and PET/CT fusion. Past, present and future PET issues and studies will also be discussed.

Graduates may be eligible to take the registry examination given by the Nuclear Medicine Technology Certification Board. Employment opportunities can be found in hospitals, freestanding PET centers and mobile PET companies.

Admission criteria include the completion of a diploma in Nuclear Medicine, Radiology or Radiation Therapy.

### Curriculum Requirements\*

[for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204 (3)]

- I. General Education. Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours must be in communications. General education is optional in certificate programs.
- **II. Major Hours**. AAS, diploma, and certificate programs must include courses which offer specific job knowledge and skills. Work experience, including cooperative education, practicums, and internships, may be included in associate in applied science degrees up to a maximum of 8 semester hours of credit; in diploma programs up to a maximum of 4 semester hours of credit; and in certificate programs up to a maximum of 2 semester hours of credit. (*See second page for additional information.*)
- III. Other Required Hours. A college may include courses to meet graduation or local employer requirements in a certificate, diploma, or associate in applied science program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
<b>Total Semester Hours Credit (SHC)</b>	64-76	36-48	12-18

# Major Hours

[ref. 23 NCAC 02E.0204 (3)]

- A. Core. The subject/course core is comprised of subject areas and/or specific courses which are required for each curriculum program. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the subject/course core of the AAS program.
- **B. Concentration** (*if applicable*). A concentration of study must include a minimum of 12 semester hours credit from required subjects and/or courses. The majority of the course credit hours are unique to the concentration. The required subjects and/or courses that make up the concentration of study are in addition to the required subject/course core.
- C. Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from any prefix listed, with the exception of prefixes listed in the core or concentration. Work experience, including cooperative education, practicums, and internships, may be included in associate in applied science degrees up to a maximum of 8 semester hours of credit; in diploma programs up to a maximum of 4 semester hours of credit; and in certificate programs up to a maximum of 2 semester hours of credit.

			AAS	Diploma	Certificate
Mir	nimum Major Hours Required		49 SHC	30 SHC	12 SHC
A.	CORE			15 SHC	
Req	juired Courses:				
	PET 112 PET Procedures	3 SHC			
	PET 125 PET Radiopharmaceuticals	3 SHC			
	PET 145 PET Physics	3 SHC			
	PET 218 PET Protection	3 SHC			
	PET 225 PET Instrumentation	3 SHC			
B.	CONCENTRATION (Not applicable)				
c.	<b>OTHER MAJOR HOURS</b> To be selected from the following prefixes:				
	CIS, COE, CSC, and PET				
	Foreign language courses (including ASL) that are approved other major hours may be included in all maximum of 3 semester hours of credit.				

#### **Curriculum Standard for Agribusiness: Agricultural Science Technology**

Career Cluster: Agriculture, Food, and Natural Resources \*\*

**Cluster Description:** The production, processing, marketing, distribution, financing, and development of agricultural commodities and resources including food, fuel, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources.

**Pathway:** Agribusiness Systems

#### **Effective Term:** Fall 2013 (2013\*03)

Program Majors Under Pathway					
Program Major / Classification of Instruction	n Programs (CIP)	Credential Level(s)	Program		
Code		Offered	Major Code		
Agribusiness Technology	CIP Code 01.0102	AAS/Diploma/Certificate	A15100		
Sustainable Agriculture	CIP Code: 01.0308	AAS/Diploma/Certificate	A15410		

#### **Pathway Description:**

These curriculum are designed to provide the entrepreneurial and technical skills necessary to manage a profitable, environmentally sound, community based small farm or agricultural business. The objective is the development of a workforce knowledgeable in sustainable agriculture practices.

Students will learn the fundamentals of agriculture, focusing on crop production and business. Emphasis is placed on entrepreneurial and field training. Students will also learn the basic principles of our economic system and government policies and programs relating to agriculture.

Graduates should qualify for a variety of jobs in agricultural businesses such as equipment, feed, and agricultural supply sales; store management; farm operations; wholesale and retail produce management; nursery operations; and environmental and agricultural education.

Program Major Description: Choose one of the following  $4^{th}$  paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each **Program Major**:

**Agribusiness Technology:** A program that prepares individuals to manage agricultural businesses and agriculturally related operations within diversified corporations. Potential course work includes instruction in agriculture, agricultural specialization, business management, accounting, finance, marketing, planning, human resources management, and other managerial responsibilities.

**Sustainable Agriculture:** A program that focuses on agricultural principles and practices that, over the long term, enhance environmental quality, make efficient use of nonrenewable resources, integrate natural biological cycles and controls, and are economically viable and socially responsible; and that may prepare individuals to apply this knowledge to the solution of agricultural and environmental problems. Potential course work includes instruction in principles of agroecology, crop and soil sciences, entomology, horticulture, animal science, weed science and management, soil fertility and nutrient cycling, applied ecology, agricultural economics, and rangeland ecology and watershed management.

		ms: Agricultural Science	i comoro	87	
Recommend	ed General Education Academic	Core	AAS	Diploma	Certificate
Minimum G	eneral Education Hours Require	d:	15 SHC	6 SHC	0 SHC
standard. Co	below are recommended general edu lleges may choose to include addition et local curriculum needs.	-			
*Recommende	d certificate and diploma level curri	culum courses. These courses may			
<u>not</u> be include	d in associate degree programs.				
Communicati	on:		6 SHC	3-6 SHC	Optional
	01 Workplace Communication	3 SHC	USHC	<b>5-0 SHC</b>	Optional
	10 Introduction to Communication	3 SHC			
COM 1		3 SHC			
COM 2		3 SHC			
	01 Applied Communications I	3 SHC			
	02 Applied Communications II	3 SHC			
	10 Freshman Composition	3 SHC			
	11 Expository Writing	3 SHC			
	12 Argument-Based Research	3 SHC			
	14 Prof Research & Reporting	3 SHC			
	15 Oral Communication	3 SHC			
	16 Technical Report Writing	3 SHC			
Litte I	recention report writing	5 5110	3 SHC	0-3 SHC	Optional
Humanities/F			5 5110	0-5 500	Optional
	01 Values in the Workplace	2 SHC			
	10 Technology and Society	3 SHC			
	15 Critical Thinking	3 SHC			
HUM 2	230 Leadership Development	3 SHC			
	30 Introduction to Logic	3 SHC			
PHI 2	40 Introduction to Ethics	3 SHC			
Social /Pahaw	ioral Sciences:		3 SHC	0-3 SHC	Optional
	51 Survey of Economics	3 SHC			
	51 Prin of Microeconomics	3 SHC			
	10 Introduction to Geography	3 SHC			
	11 World Regional Geography	3 SHC			
	01 Applied Psychology	3 SHC			
	02 Human Relations	2 SHC			
	18 Interpersonal Psychology	3 SHC			
	<ul><li>35 Group Processes</li><li>50 General Psychology</li></ul>	3 SHC			
	05 Social Relationships	3 SHC 3 SHC			
	210 Introduction to Sociology	3 SHC 3 SHC			
	215 Group Processes	3 SHC			
300 2	15 Gloup Hocesses	5 5110			
Natural Scien	ces/Mathematics:		3 SHC	0-3 SHC	Optional
	40 Environmental Biology	3 SHC			
	60 Introductory Life Science	3 SHC			
	01 Applied Mathematics I	3 SHC			
	10 Mathematical Measurement	3 SHC			
	15 Mathematical Models	3 SHC			
	20 Geometry and Trigonometry	3 SHC			
	21 Algebra/Trigonometry I	3 SHC			
	40 Survey of Mathematics	3 SHC			
	51 Statistics I	3 SHC			
	55 Statistical Analysis	3 SHC			
	10 Conceptual Physics	3 SHC			
	21 Applied Physics I	4 SHC			

- A. Technical Core. The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C.** Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from each prefix listed, with the exception of prefixes listed in the core.

Agribusiness Systems: Agricultural Sc	ience Technology	AAS	Diploma	Certificate
Minimum Major Hours Required:		49 SHC	30 SHC	12 SHC
A. Technical Core:				
#AGR 139 Intro to Sustainable Agriculture	3 SHC	28-30 SHC	12-18 SHC	
#AGR 170 Soil Science	3 SHC			
AGR 214 Agricultural Marketing	3 SHC			
ANS 110 Animal Science	3 SHC			
Co-op Experience. Choose one:				
#COE 111 Co-op Work Experience I	1 SHC			
COE 112 Co-op Work Experience I	2 SHC			
COE 113 Co-op Work Experience I	3 SHC			
Pesticides/Alternatives. Choose one:				
#AGR 121 Biological Pest Mgmt	3 SHC			
AGR 140 Agricultural Chemicals	3 SHC			
B. Program Major(s):				
Agribusiness Technology				
AGR 212 Farm Business and Management	3 SHC			
AGR 213 Ag Law & Finance	3 SHC			
Select additional courses from the AGR prefix for				
12 SHC for the Agribusiness Technology AAS prog	gram.			
An Agribusiness Technology diploma requires a mi				
extracted from the required technical/program majo	r core of the AAS degree.			
Sustainable Agriculture				
#AGR 111 Basic Farm Maintenance	2 SHC			
#AGR 160 Plant Science	3 SHC			
#AGR 265 Organic Crop Prod: Spring	3 SHC			
Select additional courses from the AGR prefix for	a minimum of 12 SHC			
for the Sustainable Agriculture AAS program.	7			
<i>Courses required for the Sustainable Agriculture L</i> with #	Diploma are designated			

#### C. Other Major Hours. To be selected from the following prefixes:

ACC, ACM, AGR, ANS, BIO, BTC, BUS, CHM, CIS, COE, CSC, DFT, ECO, ETR, FOR, GCM, GIS, HET, HOR, IVS, LAR, LSG, PED, PSY, SEL, TRF, VEN, WLD, and ZAS

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

#### **III. Other Required Hours**

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

#### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- **A.** Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- **H.** Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or self-employed business owner.

\*\*The North Carolina Career Clusters Guide was developed by the North Carolina Department of Public Instruction and the North Carolina Community College system to link the academic and Career and Technical Education programs at the secondary and postsecondary levels to increase student achievement. Additional information about Career Clusters is located at: <u>http://www.nc-net.info/NC career clusters quide.php</u> or <u>http://www.careertech.org</u>.

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

#### **Curriculum Standard for Animal Systems: Animal Care Management Technology Career Cluster:** Agriculture, Food, and Natural Resources \*\*

**Cluster Description:** The production, processing, marketing, distribution, financing, and development of agricultural commodities and resources including food, fuel, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources.

#### Pathway: Animal Systems

#### **Effective Term:** Fall 2013 (2013\*03)

Program Majors Under Pathway				
Program Major / Classification of Instruction	Programs (CIP)	Credential Level(s)	Program	
Code		Offered	Major Code	
Animal Care and Management Technology	CIP Code: 01.0599	AAS/Diploma/Certificate	A55100	

#### **Pathway Description:**

The Animal Care and Management Technology curriculum is designed to provide students with the opportunity to acquire the skills, knowledge, and attitudes necessary for employment in the animal care industry.

Course work includes instruction designed to educate students in the basic sciences pertinent to animal work including legal aspects, basic management skills needed to work with both people and animals, and hands-on skills necessary for safety and health.

Graduates should qualify for opportunities with humane organizations, kennels, city and county animal control agencies, animal shelters, zoos, residency facilities, and veterinarians.

Program Major Description: Choose one of the following  $4^{th}$  paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each **Program Major**:

Animal Care and Management Technology: A program that focuses on feeding, watering, grooming, bathing, exercising, or otherwise care for pets and agricultural animals, dogs, cats, or birds, zoo animals, and mice. Graduates may work in settings such as kennels, animal shelters, zoos and circuses. Potential coursework includes courses in keeping records of feedings, treatments, animals received or discharged, and cleaning, disinfecting, and repairing cages and pens.

		Animal Systems: Ani	imal Care Management	Technolo	pgy	
Recommen	ded	General Education Academic C	ore	AAS	Diploma	Certificate
Minimum (	Gene	eral Education Hours Required:		15 SHC	6 SHC	0 SHC
standard. Co	olleg	ow are recommended general educe es may choose to include additional cal curriculum needs.	-			
*Dagonnand	lad a	antificate and diploma loval aumious	hum country. These country men			
		ertificate and diploma level curricul associate degree programs.	um courses. These courses may			
<u>noi</u> be include	eu in	associate degree programs.				
Communicat				6 SHC	3-6 SHC	Optional
		Workplace Communication	3 SHC			
COM		Introduction to Communication	3 SHC			
COM		Intro Interpersonal Com	3 SHC			
COM 1 *ENG		Public Speaking	3 SHC			
	101 102	Applied Communications I Applied Communications II	3 SHC 3 SHC			
		Freshman Composition	3 SHC			
	111	Expository Writing	3 SHC			
	112	Argument-Based Research	3 SHC			
	112	Prof Research & Reporting	3 SHC			
	115	Oral Communication	3 SHC			
	116	Technical Report Writing	3 SHC			
LING	110	reenneur reeport writing	5 5110			
Humanities/I	Fine	Arts:				
*HUM	101	Values in the Workplace	2 SHC	3 SHC	0-3 SHC	Optional
		Technology and Society	3 SHC			
		Critical Thinking	3 SHC			
		Leadership Development	3 SHC			
	230	Introduction to Logic	3 SHC			
PHI	240	Introduction to Ethics	3 SHC			
Social /Behav	viore	Sciences:				
	151		3 SHC	3 SHC	0-3 SHC	Optional
	251	Prin of Microeconomics	3 SHC			
		Introduction to Geography	3 SHC			
	111	World Regional Geography	3 SHC			
	101	Applied Psychology	3 SHC			
	102	Human Relations	2 SHC			
	118	Interpersonal Psychology	3 SHC			
		Group Processes	3 SHC			
		General Psychology	3 SHC			
		Social Relationships	3 SHC			
		Introduction to Sociology	3 SHC			
		Group Processes	3 SHC			
Natural Saia	-	Mathematica				
		Mathematics: Environmental Biology	3 SHC	3 SHC	0-3 SHC	Optional
	160	Introductory Life Science	3 SHC	5 5110	0 5 SHC	Optional
		Applied Mathematics I	3 SHC			
		Mathematical Measurement	3 SHC			
		Mathematical Models	3 SHC			
		Geometry and Trigonometry	3 SHC			
		Algebra/Trigonometry I	3 SHC			
		Survey of Mathematics	3 SHC			
	140	-	3 SHC			
	151		3 SHC			
PHY		Conceptual Physics	3 SHC			
РНҮ		Applied Physics I	4 SHC			

- A. Technical Core. The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C.** Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from each prefix listed, with the exception of prefixes listed in the core.

Animal Systems: Animal Care Mana	gement Technology	AAS	Diploma	Certificate
Minimum Major Hours Required:		49 SHC	30 SHC	12 SHC
A. Technical Core:				
ACM 110 Intro to Animal Care	3 SHC	25 SHC		
ACM 111 Health Care for Animals	3 SHC			
ACM 112 Facility Management	3 SHC			
ACM 113 Animal Handling	3 SHC			
B. Program Major(s):				
Animal Care Management				
ACM 210 Law Pertaining to Animals	4 SHC			
ACM 211 Applied Animal Behavior	3 SHC			
ACM 212 Community Health	3 SHC			
ACM 213 Euthanasia	3 SHC			
C. Other Major Hours.				

To be selected from the following prefixes:

ACM, ANS, BIO, BUS, CIS, CJC, COE, CSC, POL, PSY, AND VET.

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

#### **III. Other Required Hours**

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

#### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- **A.** Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- **H.** Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or self-employed business owner.

\*\*The North Carolina Career Clusters Guide was developed by the North Carolina Department of Public Instruction and the North Carolina Community College system to link the academic and Career and Technical Education programs at the secondary and postsecondary levels to increase student achievement. Additional information about Career Clusters is located at: <u>http://www.nc-net.info/NC career clusters guide.php</u> or http://www.careertech.org.

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

#### Curriculum Standard for Animal Systems: Applied Animal Science Technology Career Cluster: Agriculture, Food, and Natural Resources \*\*

**Cluster Description:** The production, processing, marketing, distribution, financing, and development of agricultural commodities and resources including food, fuel, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources.

#### Pathway: Animal Systems

#### **Effective Term:** Fall 2013 (2013\*03)

Program Majors Under Pathway						
Program Major / Classification of Instruction Programs (CIP)Credential Level(s)Program						
Code		Offered	Major Code			
Applied Animal Science Technology	CIP Code 01.0302	AAS/Diploma/Certificate	A15280			
Poultry Management Technology	CIP Code 01.0907	AAS/Diploma/Certificate	A15XXX			
Swine Management Technology	CIP Code: 01.0906	AAS/Diploma/Certificate	A1528X			

#### **Pathway Description:**

This curriculum is designed to prepare students for careers in the production, processing, and distribution of livestock, swine, and poultry and their products according to scientific principles essential to efficient and profitable operation.

Students should learn skills necessary for the operation of efficient and profitable livestock, swine, and poultry enterprises. Coursework includes production practices, animal health, nutrition, reproduction, and management.

Graduates should qualify for entry-level jobs as herd or flock managers, field service persons, feed salespersons, equipment salespersons, feed mill workers, buyers of poultry and livestock, owners/operators, farm managers, department supervisors, field service representatives, and waste management technicians.

Program Major Description: Choose one of the following  $4^{th}$  paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each **Program Major**:

**Applied Animal Science Technology:** A program that prepares individuals to select, breed, care for, process, and market livestock and small farm animals. Potential course work includes instruction in basic animal science, animal nutrition, and animal health as applied to various species and breeds; design and operation of housing, feeding, and processing facilities; and related issues of safety, applicable regulations, logistics, and supply.

**Poultry Management Technology:** A program that focuses on the application of biological and chemical principles to the production and management of poultry animals and the production and handling of poultry products. Potential course work includes instruction in avian sciences, nutrition sciences, food science and technology, biochemistry, hatchery design, and related aspects of human and animal health and safety.

**Swine Management Technology:** A program that focuses on the application of biological and chemical principles to the production and management of swine animals and the production and handling of meat and other products. Potential course work includes instruction in animal sciences, range science, nutrition sciences, food science and technology, biochemistry, and related aspects of human and animal health and safety.

\*Within the degree program, the institution shall include opportunities for the achievement of competence in reading, writing, oral communication, fundamental mathematical skills, and basic use of computers.

		pplied Animal Science 7	rechnolog	<u>gy</u>	
Recommende	d General Education Academic C	Core	AAS	Diploma	Certificate
Minimum Ger	neral Education Hours Required		15 SHC	6 SHC	0 SHC
standard. Colle courses to meet	elow are recommended general educ ges may choose to include additional local curriculum needs. certificate and diploma level curricu	or alternative general education			
	in associate degree programs.	ium courses. These courses may			
COM 110 COM 231 *ENG 101 *ENG 102 ENG 110 ENG 111 ENG 112 ENG 114 ENG 115 ENG 116 Humanities/Fin *HUM 10	<ul> <li>Workplace Communication</li> <li>Introduction to Communication</li> <li>Intro Interpersonal Com</li> <li>Public Speaking</li> <li>Applied Communications I</li> <li>Applied Communications II</li> <li>Freshman Composition</li> <li>Expository Writing</li> <li>Argument-Based Research</li> <li>Prof Research &amp; Reporting</li> <li>Oral Communication</li> <li>Technical Report Writing</li> <li>e Arts:</li> <li>Values in the Workplace</li> </ul>	3 SHC 3 SHC	6 SHC 3 SHC	3-6 SHC 0-3 SHC	Optional
HUM 11 HUM 11 HUM 23 PHI 23 PHI 24	<ul> <li>Technology and Society</li> <li>Critical Thinking</li> <li>Leadership Development</li> <li>Introduction to Logic</li> <li>Introduction to Ethics</li> </ul>	3 SHC 3 SHC 3 SHC 3 SHC 3 SHC			
GEO 110 GEO 111 *PSY 101 *PSY 102 PSY 118 PSY 135 PSY 150 *SOC 100 SOC 210	Survey of Economics Prin of Microeconomics Introduction to Geography World Regional Geography Applied Psychology Human Relations	3 SHC 3 SHC 3 SHC 3 SHC 3 SHC 2 SHC 3 SHC 3 SHC 3 SHC 3 SHC 3 SHC 3 SHC 3 SHC	3 SHC	0-3 SHC	Optional
MAT 11. MAT 12	<ul> <li>Environmental Biology</li> <li>Introductory Life Science</li> <li>Applied Mathematics I</li> <li>Mathematical Measurement</li> <li>Mathematical Models</li> <li>Geometry and Trigonometry</li> <li>Algebra/Trigonometry I</li> <li>Survey of Mathematics</li> <li>Statistics I</li> <li>Statistical Analysis</li> <li>Conceptual Physics</li> </ul>	3 SHC 3 SHC 3 SHC 3 SHC 3 SHC 3 SHC 3 SHC 3 SHC 3 SHC 3 SHC 4 SHC	3 SHC	0-3 SHC	Optional

- A. Technical Core. The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C.** Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from each prefix listed, with the exception of prefixes listed in the core.

Animal Systems: Applied Anin	nal Science	AAS	Diploma	Certificate
Minimum Major Hours Required:		49 SHC	30 SHC	12 SHC
A. Technical Core:				
*ANS 110 Animal Science	3 SHC	24 SHC	6-18 SHC	
*ANS 115 Animal Feeds and Nutrition	3 SHC			
*ANS 120 Beef Production	3 SHC			
*ANS 130 Poultry Production	3 SHC			
B. Program Major(s):				
Applied Animal Science				
*ANS 140 Swine Production	3 SHC			
*ANS 150 Animal Health Management	3 SHC			
Select additional courses from the ANS prefix for a n	ninimum of 12 SHC			
for the Applied Animal Science AAS program.				
Courses required for the Applied Animal Science dip	loma are designated with *			
Poultry Management				
ANS 230 Poultry Management	3 SHC			
# ANS 232 Meatbird Production	3 SHC			
# ANS 234 Egg Production	3 SHC			
Select additional courses from the ANS prefix for a n	ninimum of 12 SHC for the			
Poultry Management AAS program.				
Courses required for the Poultry Management diplor	na are designated with #			
Swine Management				
Choose a minimum of 12 SHC from the following course	es for the Swine			
Management AAS program:				
+ ANS142 Swine Records and Analysis	3 SHC			
+ ANS143 Swine Health Management	3 SHC			
+ ANS144 Swine Housing & Waste Mgt	4 SHC			
+ ANS240 Swine Prod Issues	2 SHC			
BUS137 Principles of Management	3 SHC or			
1 0	3 SHC			
BUS153 Human Resource Management	3 SHC			

#### C. Other Major Hours.

#### To be selected from the following prefixes:

ACM, AGR, ANS, BUS, CIS, COE, CSC, ETR, GIS, and WLD

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

#### III. Other Required Hours

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

#### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- **A.** Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- **H.** Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or self-employed business owner.

\*\*The North Carolina Career Clusters Guide was developed by the North Carolina Department of Public Instruction and the North Carolina Community College system to link the academic and Career and Technical Education programs at the secondary and postsecondary levels to increase student achievement. Additional information about Career Clusters is located at: <u>http://www.nc-net.info/NC career clusters guide.php</u> or <u>http://www.careertech.org</u>.

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

#### **Curriculum Standard for Animal Systems: Aquaculture Technology**

Career Cluster: Agriculture, Food, and Natural Resources \*\*

**Cluster Description:** The production, processing, marketing, distribution, financing, and development of agricultural commodities and resources including food, fuel, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources.

#### Pathway: Animal Systems

#### **Effective Term:** Fall 2013 (2013\*03)

Program Majors Under Pathway					
Program Major / Classification of Instruction Programs (CIP)Credential Level(s)Program					
Code	-	Offered	Major Code		
Aquaculture Technology	CIP Code 01.0303	AAS/Diploma/Certificate	A15120		

#### **Pathway Description:**

The Aquaculture Technology curriculum prepares individuals for careers in aquaculture and management of aquatic ecosystems. It provides a broad background in science and math as well as specialized course work and practical experience in fish, shellfish, and aquatic plant production and management.

Course work includes biology, chemistry, and math, as well as water quality and limnology, nutrition and feeding, genetics and breeding, facilities construction, and business. Students will spend time working in the industry through the cooperative work experience or conducting an individualized study through the aquaculture project.

Graduates may find employment on private farms and government hatcheries or at public aquariums. Graduates may also start new businesses in fish, shellfish, or aquatic plant farming; pond and lake management services; or home/office aquarium or water garden management services.

Program Major Description: Choose one of the following  $4^{th}$  paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each **Program Major**:

Aquaculture Technology. A program that prepares individuals to select, culture, propagate, harvest, and market domesticated fish, shellfish, and marine plants, both freshwater and saltwater. Potential course work includes instruction in the basic principles of aquatic and marine biology; health and nutrition of aquatic and marine life; design and operation of fish farms, breeding facilities, culture beds, and related enterprises; and related issues of safety, applicable regulations, logistics, and supply.

Animal Systems: Aquaculture Technology						
Recommen	nded	<b>General Education Academic C</b>	Core	AAS	Diploma	Certificate
Minimum	Gene	eral Education Hours Required	:	15 SHC	6 SHC	0 SHC
standard. C courses to m	Colleg neet la	low are recommended general educters way choose to include additional pocal curriculum needs.	or alternative general education			
		ertificate and diploma level curricu 1 associate degree programs.	lum courses. These courses may			
Communica	ation:					
		Workplace Communication	3 SHC	6 SHC	3-6 SHC	Optional
		Introduction to Communication	3 SHC			
COM			3 SHC			
COM			3 SHC			
*ENG	101		3 SHC			
		Applied Communications II	3 SHC			
		Freshman Composition	3 SHC			
		Expository Writing	3 SHC			
		Argument-Based Research	3 SHC			
ENG	114		3 SHC			
ENG	115	Oral Communication	3 SHC			
		Technical Report Writing	3 SHC			
Humanitian	/Ein o	Auto		3 SHC	0-3 SHC	Ontional
Humanities/			2 5110	3 SHC	0-3 SHC	Optional
		Art Appreciation	3 SHC			
		Values in the Workplace	2 SHC			
		Technology and Society	3 SHC			
		Critical Thinking	3 SHC			
		Leadership Development	3 SHC			
PHI PHI	230 240	Introduction to Logic Introduction to Ethics	3 SHC 3 SHC			
			5 5110			
Social /Beha				3 SHC	0-3 SHC	Optional
		Survey of Economics	3 SHC			
		Prin of Microeconomics	3 SHC			
GEO		World Regional Geography	3 SHC			
*PSY	101	Applied Psychology	3 SHC			
*PSY	102		2 SHC			
PSY	118	Interpersonal Psychology	3 SHC			
PSY	135		3 SHC			
PSY		General Psychology	3 SHC			
*SOC		Social Relationships	3 SHC			
SOC		Introduction to Sociology	3 SHC			
SOC	215	Group Processes	3 SHC			
Natural Scie	ences	/Mathematics:		2 6110		0-4
BIO	140	Environmental Biology	3 SHC	3 SHC	0-3 SHC	Optional
BIO	160	Introductory Life Science	3 SHC			
*MAT	101		3 SHC			
MAT		Mathematical Measurement	3 SHC			
MAT		Mathematical Models	3 SHC			
MAT		Geometry and Trigonometry	3 SHC			
MAT		Algebra/Trigonometry I	3 SHC			
MAT	140		3 SHC			
MAT	151		3 SHC			
MAT	151		3 SHC			
MAT		Precalculus Algebra	3 SHC			
PHY		Conceptual Physics	3 SHC			
PHY	121	Applied Physics I	4 SHC		1	1

- A. Technical Core. The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C.** Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from each prefix listed, with the exception of prefixes listed in the core.

Animal Systems: Aquaculture Technology		AAS	Diploma	Certificate
Minimum Major Hours Required:		49 SHC	30 SHC	12 SHC
A. Technical Core:				
*AQU 111 Aquaculture I	3 SHC	26-27 SHC	25-27 SHC	
*AQU 220 Aquaculture Facilities	3 SHC			
*BIO 111 General Biology I	4 SHC			
*CHM 151 General Chemistry I	4 SHC			
B. Program Major(s):				
Aquaculture Technology				
*Culture Techniques. Choose one.				
AQU 112 Aquaculture II	3 SHC			
AQU 260 Aquariology	3 SHC			
* Business. Choose one:				
AQU 120 Aquabusiness	3 SHC			
BUS 110 Introduction to Business	3 SHC			
BUS 280 REAL Small Business	4 SHC			
* Culture Environment. Choose one:				
AQU 210 Limnology & Water Quality	3 SHC			
AQU 270 Water Gardens	3 SHC			
BIO 243 Marine Biology	4 SHC			
FWL 234 Aquatic Ecology	3 SHC			
Other. Choose one:				
AQU 280 Aquaculture Project	2 SHC			
COE 112 Co-op Work Experience I	2 SHC			
Select additional courses from the AQU, BIO, BUS, or	FWL prefix for a			
minimum of 12 SHC for the Aquaculture Technology A	AS program.			
<i>Courses required for the Aquaculture Technology Diplewith</i> *	loma are designated			

#### C. Other Major Hours.

#### To be selected from the following prefixes:

ACA, ACC, AGR, AQU, ART, BIO, BTC, BUS, CHM, CIS, COE, CSC, ECO, EGR, ETR FWL, GIS, HOR, MAT, MKT, PHY, TRF, and SRV

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

#### **III.** Other Required Hours

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

#### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- **A.** Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- H. Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or self-employed business owner.

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	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

#### **Curriculum Standard for Animal Systems: Equine Science Technology**

Career Cluster: Agriculture, Food, and Natural Resources \*\*

**Cluster Description:** The production, processing, marketing, distribution, financing, and development of agricultural commodities and resources including food, fuel, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources.

#### Pathway: Animal Systems

#### **Effective Term:** Fall 2013 (2013\*03)

Program Majors Under Pathway						
Program Major / Classification of Instruction Programs (CIP)         Credential Level(s)         Program						
Code		Offered	Major Code			
Equine Business Technology	CIP Code 01.0307	AAS/Diploma/Certificate	A15XXX			
Equine Training Technology	CIP Code 01.0507	AAS/Diploma/Certificate	A15XXX			

#### **Pathway Description:**

This curriculum is designed to prepare students for positions within the horse industry. The curriculum is management oriented, preparing graduates for the widest range of available equine jobs; areas of specialization may be pursued during the internship.

Course work includes farm management, breeding, nutrition, selection/judging, and health. Training, teaching, and riding are also included. Students are assigned a horse and practice day-to-day management at an equine facility.

Graduates should qualify for jobs with many different types of equine operations: grooms to assistant managers; private to recreational and racing barns; breed to discipline-oriented farms.

Program Major Description: Choose one of the following  $4^{th}$  paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each **Program Major**:

**Equine Business Technology:** A program that prepares individuals to manage the selection, breeding, care, and maintenance of work, athletic, and show horses; and to manage horse farms, stables, tracks and related equipment and operations. Potential course work includes instruction in applicable principles of animal science, care, and health; stable and track management; design and operation of facilities and equipment; and related issues such as regulations, business management; and logistics.

**Equine Training Technology:** A program that focuses on the horse, horsemanship, and related subjects and prepares individuals to care for horses and horse equipment; ride and drive horses for leisure, sport, show, and professional purposes; and manage the training of horses and riders. Potential course work includes instruction in horse breeding, nutrition, health, and safety; history of the horse and horsemanship; horse development and training; riding and equestrian technique; stable, paddock, and track management; and equipment maintenance and repair.

\*Within the degree program, the institution shall include opportunities for the achievement of competence in reading, writing, oral communication, fundamental mathematical skills, and basic use of computers.

	s: Equine Science Tech			
<b>Recommended General Education Academic C</b>		AAS	Diploma	Certificate
Minimum General Education Hours Required		15 SHC	6 SHC	0 SHC
Courses listed below are recommended general educe standard. Colleges may choose to include additional courses to meet local curriculum needs.	÷			
*Recommended certificate and diploma level curricu	lum courses. These courses may			
<u>not</u> be included in associate degree programs.				
Communication:	2.6110	6 SHC	3-6 SHC	Optional
*COM 101 Workplace Communication COM 110 Introduction to Communication	3 SHC 3 SHC			
COM 120 Introduction to Communication COM 120 Intro Interpersonal Com	3 SHC			
COM 231 Public Speaking	3 SHC			
*ENG 101 Applied Communications I	3 SHC			
*ENG 102 Applied Communications I	3 SHC			
ENG 110 Freshman Composition	3 SHC			
ENG 111 Expository Writing	3 SHC			
ENG 112 Argument-Based Research	3 SHC			
ENG 112 Prof Research & Reporting	3 SHC			
ENG 115 Oral Communication	3 SHC			
ENG 116 Technical Report Writing	3 SHC			
Live into reclinical report writing	5 5110	3 SHC	0-3 SHC	Optional
Humanities/Fine Arts:		5 SHC	0-3 5110	Optional
*HUM 101 Values in the Workplace	2 SHC			
HUM 110 Technology and Society	3 SHC			
HUM 115 Critical Thinking	3 SHC			
HUM 230 Leadership Development	3 SHC			
PHI 230 Introduction to Logic	3 SHC			
PHI 240 Introduction to Ethics	3 SHC			
Social /Behavioral Sciences:				
ECO 151 Survey of Economics	3 SHC	3 SHC	0-3 SHC	Optional
ECO 251 Prin of Microeconomics	3 SHC			
GEO 110 Introduction to Geography	3 SHC			
GEO 111 World Regional Geography	3 SHC			
*PSY 101 Applied Psychology	3 SHC			
*PSY 102 Human Relations	2 SHC			
PSY 118 Interpersonal Psychology	3 SHC			
PSY 135 Group Processes	3 SHC			
PSY 150 General Psychology	3 SHC			
*SOC 105 Social Relationships	3 SHC			
SOC 210 Introduction to Sociology	3 SHC			
SOC 215 Group Processes	3 SHC			
		3 SHC	0-3 SHC	Optional
Natural Sciences/Mathematics:	2 5110			
BIO 140 Environmental Biology	3 SHC			
BIO 160 Introductory Life Science	3 SHC			
*MAT 101 Applied Mathematics I	3 SHC			
MAT 110 Mathematical Measurement MAT 115 Mathematical Models	3 SHC 3 SHC			
MAT 120 Geometry and Trigonometry	3 SHC			
MAT 121 Algebra/Trigonometry I	3 SHC			
MAT 140 Survey of Mathematics	3 SHC			
MAT 151 Statistics I	3 SHC			
MAT 155 Statistical Analysis	3 SHC			
PHY110Conceptual PhysicsPHY121Applied Physics I	3 SHC 4 SHC			

- A. Technical Core. The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C.** Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from each prefix listed, with the exception of prefixes listed in the core or other Major Areas.

Animal Systems: Equine Science		AAS	Diploma	Certificate
Minimum Major Hours Required:		49 SHC	30 SHC	12 SHC
A. Technical Core: Courses required for the Equine Technology Diplome *EQU 111 Horse Science I *EQU 112 Horse Science II EQU 120 Horsemanship I *EQU 150 Equine Nutrition	a are designated with * 5 SHC 5 SHC 3 SHC 2 SHC	42-44 SHC	12 SHC	
EQU 211 Horse Farm Management I EQU 212 Horse Farm Management II EQU 241 Equine Reproduction EQU 270 Equine Business Law	6 SHC 6 SHC 4 SHC 1 SHC			
<ul> <li>B. Program Major(s):</li> <li>Equine Business</li> <li>BUS 135 Principles of Supervision</li> <li>BUS 230 Small Business Management</li> <li>EQU 270 Equine Business Law</li> </ul>	3 SHC 3 SHC 1 SHC			
Management/Marketing. Choose one: BUS 137 Principles of Management MKT 120 Principles of Marketing Select additional courses from the BUS, EQU, or a of 12 SHC for the Equine Business AAS program.	3 SHC 3 SHC MKT prefix for a minimum			
Equine Training EQU 121 Horsemanship II EQU 220 Horse Training I EQU 221 Horse Training II EQU 260 Basic Colt Training Select additional courses from the EQU prefix for the Equine Training AAS program.	2 SHC 2 SHC 2 SHC 2 SHC 2 SHC a minimum of 12 SHC for			

#### C. Other Major Hours.

#### *To be selected from the following prefixes:* AGR, ANS, BUS, CIS, COE, CSC, ETR, EQU, MKT

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

#### **III. Other Required Hours**

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

#### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- **A.** Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- H. Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or selfemployed business owner.

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	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

#### **Curriculum Standard for Natural Resources Technology**

Career Cluster: Agriculture, Food, and Natural Resources \*\*

**Cluster Description:** The production, processing, marketing, distribution, financing, and development of agricultural commodities and resources including food, fuel, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources.

Pathway: Natural Resource Systems

**Effective Term:** Fall 2013 (2013\*03)

Program Majors Under Pathway						
Program Major / Classification of Instruction	Credential Level(s)	Program				
Code		Offered	Major Code			
Fish and Wildlife Management Technology	CIP Code: 03.0601	AAS/Diploma/Certificate	A15160			
Forestry Management Technology	CIP Code 03.0511	AAS/Diploma/Certificate	A15200			

#### **Pathway Description:**

The Natural Resources System curriculum is designed to provide the practice and academic skills essential for success in Natural Resource Management.

Students will gain an understanding of the principles and develop competencies and technical skills in the production, utilization and conservation of natural resources. Students will also learn many technical and conservation skills.

Graduates qualify for positions in natural resources technician positions in a wide range of outdoor national venues.

Program Major Description: Choose one of the following  $4^{th}$  paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each **Program Major**:

**Fish and Wildlife Management Technology:** A program that prepares individuals to conserve and manage wilderness areas and the life therein, and manage wildlife reservations and zoological/aquarium facilities for recreational, commercial, and ecological purposes. Potential course work includes instruction in wildlife biology, marine/aquatic biology, environmental science, freshwater and saltwater ecosystems, natural resources management and policy, outdoor recreation and parks management, the design and operation of natural and artificial wildlife habitats, applicable law and regulations, and related administrative and communications skills.

**Forestry Management Technology:** A program that prepares individuals to manage and produce forest resources. Potential course work includes instruction in woods and field skills, tree identification, timber measurement, logging and timber harvesting, forest propagation and regeneration, forest fire-fighting, resource management, equipment operation and maintenance, record-keeping, sales and purchasing operations, and personnel supervision.

	• -		<b>Resources Technology</b>	~		
		General Education Academic C		AAS	Diploma	Certificate
Minimum (	Gene	eral Education Hours Required		15 SHC	6 SHC	0 SHC
standard. Co	ollege	'ow are recommended general educa es may choose to include additional cal curriculum needs.				
*Recommende	'ed ce	ertificate and diploma level curricu	lum courses. These courses may			
not be include	ed in	associate degree programs.				
Communicat	tions			6 SHC	3-6 SHC	Optional
		Workplace Communication	3 SHC	USIIC	<b>5-0 SHC</b>	Optional
		Introduction to Communication	3 SHC			
		Intro Interpersonal Com	3 SHC			
		Public Speaking	3 SHC			
	101	Applied Communications I	3 SHC			
	102	Applied Communications I	3 SHC			
		Freshman Composition	3 SHC			
	111	Expository Writing	3 SHC			
			3 SHC			
		Argument-Based Research				
	114 115	Prof Research & Reporting Oral Communication	3 SHC 3 SHC			
ENG	116	Technical Report Writing	3 SHC			
Humanities/I	Fine	Arts:		3 SHC	0-3 SHC	Optional
		Values in the Workplace	2 SHC			
		Technology and Society	3 SHC			
		Critical Thinking	3 SHC			
		Leadership Development	3 SHC			
		Introduction to Logic	3 SHC			
		Introduction to Edgle	3 SHC			
Social /Paha	viore	l Sciences				
Social /Behav ECO	<b>viora</b> 151	Survey of Economics	3 SHC	3 SHC	0-3 SHC	Optional
		Prin of Microeconomics	3 SHC			
	110	Introduction to Geography	3 SHC			
	111	World Regional Geography	3 SHC			
	101	Applied Psychology	3 SHC			
		Human Relations	2 SHC			
		Interpersonal Psychology	3 SHC			
		Group Processes	3 SHC			
		General Psychology	3 SHC			
		Social Relationships Introduction to Sociology	3 SHC 3 SHC			
		Group Processes	3 SHC			
		-	5 5110	<b>A</b> CH C		
		Mathematics:		3 SHC	0-3 SHC	Optional
	140	Environmental Biology	3 SHC			
	160	Introductory Life Science	3 SHC			
		Applied Mathematics I	3 SHC			
		Mathematical Measurement	3 SHC			
		Mathematical Models	3 SHC			
MAT	120	Geometry and Trigonometry	3 SHC			
	121	Algebra/Trigonometry I	3 SHC			
	140	Survey of Mathematics	3 SHC			
	151	Statistics I	3 SHC			
	155	Statistical Analysis	3 SHC			
	110	Conceptual Physics	3 SHC			
	121	Applied Physics I	4 SHC			

- A. Technical Core. The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C.** Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from each prefix listed, with the exception of prefixes listed in the core.

	e core. Natural Resources Techno	lagy	AAS	Diploma	Certificate
Minimum Major Hours Required:		49 SHC	30 SHC	12 SHC	
A. Technical Co					
	Dendrology	4 SHC	25-28 SHC	12-14 SHC	
	Forest Measurements	3 SHC			
FOR 212	Forest Survey & Aerial Interp	3 SHC			
GIS/GPS. Ch					
	Intro to GIS/GPS	3 SHC			
or GIS 111	Introduction to GIS	3 SHC and			
GIS 112	Introduction to GPS	3 SHC			
B. Program Maj	or(s):				
	ildlife Management Technology				
	mum of 12 SHC from the following co	urses for the Fish and			
Wildlife Man	agement Technology AAS program:				
	ce. Select one:				
	Wildlife Mgmt Techniques	3 SHC or			
REC 217	Maintenance/Facility Mgt	3 SHC			
#FOR 242	Fishery Management	3 SHC			
#FWL 126	Wildlife Ornithology	3 SHC			
#FWL 142	Wildlife Management	3 SHC			
#FWL 212	Wildlife Policy & Law	2 SHC			
FWL 222	Wildlife Mammalogy	3 SHC			
	quired for the Fish and Wildlife Mana e designated with #	igement Technology			
	anagement Technology				
	Introduction to Forest Resources	3 SHC			
FOR 232	Forest Mensuration	4 SHC			
Select add	itional courses from the FOR prefix	for a minimum of			
12 SHC fo	r the Forest Management Technolog	gy AAS program.			
of 12 SHC	<i>Management Technology diploma reg extracted from the required technic e AAS degree.</i>				

#### C. Other Major Hours.

#### To be selected from the following prefixes:

ACC, AGR, ANS, ARC, BIO, BTC, BUS, CHM, CIS, COE, CSC, CST, CUL, DFT, ECO, ETR, FOR, GCM, GIS, HET, HOR, IVS, LAR, LID, LSG, SEL, SST, TRF and VEN

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

#### **III. Other Required Hours**

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

#### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- **A.** Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- **H.** Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or self-employed business owner.

\*\*The North Carolina Career Clusters Guide was developed by the North Carolina Department of Public Instruction and the North Carolina Community College system to link the academic and Career and Technical Education programs at the secondary and postsecondary levels to increase student achievement. Additional information about Career Clusters is located at: <u>http://www.nc-net.info/NC career clusters guide.php</u> or http://www.careertech.org.

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

# Curriculum Standard for Natural Resource Systems: Marine Technology

Career Cluster: Agriculture, Food, and Natural Resources \*\*

**Cluster Description:** The production, processing, marketing, distribution, financing, and development of agricultural commodities and resources including food, fuel, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources.

**Pathway:** Natural Resource Systems

# **Effective Term:** Fall 2013 (2013\*03)

Program Majors Under Pathway							
Program Major / Classification of Instruction Programs (CIP) Credential Level(s) Program							
Code		Offered	Major Code				
Marine Science	CIP Code 26.1302	AAS/Diploma/Certificate	A15310				
Marine Technology	CIP Code: 03.0301	AAS/Diploma/Certificate	A15320				

### **Pathway Description:**

These curricula prepare individuals for a variety of marine-related occupations such as marine conservation, water analysis, marine scientific research support and commercial fishing. Individuals will be prepared as naturalists within the ecotourism industry and be trained in observational and measurement techniques aboard a variety of vessels including ocean-going research vessels.

Course work includes a unique blend of traditional and contemporary vocational, technical, and scientific marine education. Course work specific for Marine Sciences includes instruction in biological sciences, environmental sciences, and marine sciences. Field and laboratory experiences prepare students to identify, observe, and collect scientific data associated with the fauna and flora found in the rivers, estuaries, sounds, and ocean. Course work in Marine Technologies includes instruction in the use of physical, chemical, meteorological, biological, and geological oceanographic instrumentation and sampling equipment.

Graduates are prepared for employment opportunities with aquariums, fisheries, corps of engineers, marine patrol, ecotourism companies, commercial fishing industries, entry-level field or laboratory positions with industries, state and federal agencies, and educational facilities associated with marine science and research. Career opportunities include oceanography, environmental science, marine biology, geophysical exploration, and fisheries-related employment.

Program Major Description: Choose one of the following  $4^{th}$  paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each **Program Major**:

**Marine Science:** A program that focuses on the scientific study of the ecology and behavior of microbes, plants, and animals inhabiting oceans, coastal waters, and saltwater wetlands and their interactions with the physical environment. Potential course work includes instruction in chemical, physical, and geological oceanography; molecular, cellular, and biochemical studies; marine microbiology; marine botany; ichthyology; mammalogy; marine population dynamics and biodiversity; reproductive biology; studies of specific species, phyla, habitats, and ecosystems; marine paleocology and palentology; and applications to fields such as fisheries science and biotechnology.

**Marine Technology:** A program that focuses on the scientific study of the husbandry and production of nondomesticated fish and shellfish populations for recreational and commercial purposes and the management of fishing and marine/aquatic product processing to ensure adequate conservation and efficient utilization. Potential course work includes instruction in the principles of marine/aquatic biology, freshwater and saltwater ecosystems, water resources, fishing production operations and management, fishing policy and regulation, and the management of recreational and commercial fishing activities.

\*Within the degree program, the institution shall include opportunities for the achievement of competence in reading, writing, oral communication, fundamental mathematical skills, and basic use of computers.

[Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204(3)]: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours of semester hours must be in communications. General education is optional in certificate programs.

		ce Systems: Marine Tecl		1	1
<b>Recommended General</b>			AAS	Diploma	Certificate
Minimum General Edu	cation Hours Required	•	15 SHC	6 SHC	0 SHC
	hoose to include additional	cation courses for this curriculum l or alternative general education			
*Recommended certificate	and diploma level currici	lum courses. These courses may			
not be included in associat	e degree programs.				
Communication:			6 SHC	3-6 SHC	Optional
*COM 101 Workplac	a Communication	3 SHC	USIIC	5-0 5110	Optional
COM 101 Workplac COM 110 Introduct		3 SHC			
	rpersonal Com	3 SHC			
COM 231 Public Sp		3 SHC			
	Communications I	3 SHC			
	Communications II	3 SHC			
	n Composition	3 SHC			
	ry Writing	3 SHC			
	t-Based Research	3 SHC			
	earch & Reporting	3 SHC			
	nmunication	3 SHC			
ENG 116 Technica	l Report Writing	3 SHC			
			3 SHC	0-3 SHC	Optional
Humanities/Fine Arts:	4h - W/	2 5110			
*HUM 101 Values in		2 SHC			
HUM 110 Technolo		3 SHC			
HUM 115 Critical T		3 SHC			
	ip Development	3 SHC			
PHI 230 Introduct		3 SHC			
PHI 240 Introduct	ion to Ethics	3 SHC			
Social /Behavioral Science	es:		3 SHC	0-3 SHC	Optional
	f Economics	3 SHC	5 SHC	0-3 5110	Optional
	licroeconomics	3 SHC			
	ion to Geography	3 SHC			
	egional Geography	3 SHC			
	Psychology	3 SHC			
*PSY 102 Human R		2 SHC			
	onal Psychology	3 SHC			
PSY 135 Group Pr		3 SHC			
PSY 150 General I		3 SHC			
*SOC 105 Social Re		3 SHC			
	on to Sociology	3 SHC			
SOC 215 Group Pr		3 SHC			
SOC 213 Gloup FI	ocesses	5 SHC	3 SHC	0-3 SHC	Optional
Natural Sciences/Mathem	atics:				
BIO 140 Environn	nental Biology	3 SHC			
	ory Life Science	3 SHC			
*MAT 101 Applied I		3 SHC			
	tical Measurement	3 SHC			
MAT 115 Mathema		3 SHC			
	y and Trigonometry	3 SHC			
	Frigonometry I	3 SHC			
	f Mathematics	3 SHC			
MAT 151 Statistics		3 SHC			
	l Analysis	3 SHC			
	al Physics	3 SHC			
PHY 121 Applied I	rnysics I	4 SHC			

- A. Technical Core. The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C.** Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from each prefix listed, with the exception of prefixes listed in the core.

Natural Resource Systems:	Marine	AAS	Diploma	Certificate
Minimum Major Hours Required:		49 SHC	30 SHC	12 SHC
A. Technical Core:				
*MSC 122 Boat Handling/Seamanship	3 SHC	35 SHC	12-32	
*MSC 124 Industrial Skills	3 SHC		SHC	
*MSC 132 Fishing Gear Tech I	3 SHC			
*MSC 150 Marine Navigation	3 SHC			
*MSC 160 Oceanography	4 SHC			
MSC 180 Water Analysis	3 SHC			
MSC 276 Marine Vertebrate Zoo	4 SHC			
B. Program Major(s):				
Marine Science				
Select a minimum of 12 SHC from the following	g courses for the Marine			
Science AAS program:	4 0110			
BIO 111 General Biology I	4 SHC			
BIO 146 Regional Natural History	4 SHC			
BIO 243 Marine Biology	4 SHC			
Ecology. Select 4-7 SHC:				
BIO 145 Ecology	4 SHC or			
ENV 110 Environmental Science	3 SHC and			
ENV 220 Applied Ecology	4 SHC			
Select a minimum of 12 SHC from technical co	re or program major			
courses for a diploma in Marine Science.				
Marine Technology				
Select a minimum of 12 SHC from the following	g courses for the Marine			
Technology AAS program:				
*MSC 110 Training Cruise I	1 SHC			
*MSC 112 Training Cruise II	1 SHC			
*MSC 114 Training Cruise III	1 SHC			
*MSC 126 Marine Engines	2 SHC			
*MSC 134 Fishing Gear Technology II	2 SHC			
*MSC 152 Marine Instrumentation	2 SHC			
*MSC 172 Marine Biology	3 SHC			
*MSC 174 Marine Invertebrate Zoo	4 SHC			
Courses required for the Marine Technology d	iploma are			
designated with *				

#### C. Other Major Hours.

#### To be selected from the following prefixes:

AGR, AQU, BIO, BUS, CHM, CIS, COE, CSC, DFT, ELN, ETR. ENV, HEA, FOR, FWL, GIS, HOR, REC, TRF, MAT, MSC, PED, PHO, PHY, REC, TXY, VEN, WLD, WPP and ZAS

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

### III. Other Required Hours

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- A. Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- H. Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or selfemployed business owner.

\*\*The North Carolina Career Clusters Guide was developed by the North Carolina Department of Public Instruction and the North Carolina Community College system to link the academic and Career and Technical Education programs at the secondary and postsecondary levels to increase student achievement. Additional information about Career Clusters is located at: <u>http://www.nc-net.info/NC career clusters guide.php</u> or <u>http://www.careertech.org</u>.

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

# Curriculum Standard for Plant Systems: Horticultural Science Technology

Career Cluster: Agriculture, Food, and Natural Resources \*\*

**Cluster Description:** The production, processing, marketing, distribution, financing, and development of agricultural commodities and resources including food, fuel, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources.

### Pathway: Plant Systems

# **Effective Term:** Fall 2013 (2013\*03)

Program Majors Under Pathway						
Program Major / Classification of Instruction	Credential Level(s)	Program				
Code		Offered	Major Code			
Golf Course Management Technology	CIP Code 31.0302	AAS/Diploma/Certificate	A15XXX			
Horticultural Technology	CIP Code: 01.0601	AAS/Diploma/Certificate	A15240			
Landscape Gardening	CIP Code 01.0605	AAS/Diploma/Certificate	A15260			
Turfgrass Management Technology	CIP Code: 01.0607	AAS/Diploma/Certificate	A15420			

# **Pathway Description:**

These curricula are designed to prepare individuals for various careers in horticulture. Classroom instruction and practical laboratory applications of horticultural principles and practices are included in the program of study.

Course work includes plant identification, pest management, plant science and soil science. Also included are courses in sustainable plant production and management, landscaping, and the operation of horticulture businesses.

Graduates should qualify for employment in a variety of positions associated with nurseries, garden centers, greenhouses, landscape operations, governmental agencies/parks, golf courses, sports complexes, highway vegetation, turf maintenance companies, and private and public gardens. Graduates should also be prepared to take the North Carolina Pesticide Applicator's Examination and/or the North Carolina Certified Plant Professional Examination.

Program Major Description: Choose one of the following  $4^{th}$  paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each **Program Major**:

**Golf Course Management Technology:** A program that prepares individuals to manage the operation of golf courses. Potential course work includes instruction in turf grass science and management, golf course design and construction, grounds equipment and operation, pest control, and grounds management.

**Horticultural Science Technology:** A program that focuses on the general production and management of cultivated plants, shrubs, flowers, foliage, trees, groundcovers, and related plant materials; the management of technical and business operations connected with horticultural services; and the basic scientific principles needed to understand plants and their management and care.

**Landscape Gardening:** A program that prepares individuals to manage and maintain indoor and/or outdoor ornamental and recreational plants and groundcovers and related conceptual designs established by landscape architects, interior designers, enterprise owners or managers, and individual clients. Potential course work includes instruction in applicable principles of horticulture, gardening, plant and soil irrigation and nutrition, turf maintenance, plant maintenance, equipment operation and maintenance, personnel supervision, and purchasing.

**Turfgrass Management Technology:** A program that focuses on turfgrasses and related groundcover plants and prepares individuals to develop ornamental or recreational grasses and related products; plant, transplant, and manage grassed areas; and to produce and store turf used for transplantation. Potential course work includes instruction in applicable plant sciences, genetics of grasses, turf science, use analysis, turf management, and related economics.

\*Within the degree program, the institution shall include opportunities for the achievement of competence in reading, writing, oral communication, fundamental mathematical skills, and basic use of computers.

[Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204(3)]: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours of semester hours must be in communications. General education is optional in certificate programs.

Decommond	ed General Education Academic C	Iorticultural Science Tec	AAS	Diploma	Certificate
Minimum G	eneral Education Hours Required	•	15 SHC	6 SHC	0 SHC
standard. Col	below are recommended general educ leges may choose to include additional t local curriculum needs.	v			
*Recommended	d certificate and diploma level curricu	lum courses. These courses may			
<u>not</u> be included	d in associate degree programs.				
Communicati			6 SHC	3-6 SHC	Optional
	01 Workplace Communication	3 SHC			
	10 Introduction to Communication	3 SHC			
COM 12		3 SHC			
COM 2		3 SHC			
	01 Applied Communications I	3 SHC			
	02 Applied Communications II	3 SHC			
	10 Freshman Composition	3 SHC			
	11 Expository Writing	3 SHC			
	12 Argument-Based Research	3 SHC			
	14 Prof Research & Reporting	3 SHC			
	15 Oral Communication	3 SHC			
ENG 1	16 Technical Report Writing	3 SHC			
Humanities/Fi	ine Arts:		3 SHC	0-3 SHC	Optional
*HUM 1	01 Values in the Workplace	2 SHC			
HUM 1	10 Technology and Society	3 SHC			
HUM 1	15 Critical Thinking	3 SHC			
HUM 2	230 Leadership Development	3 SHC			
PHI 2.	30 Introduction to Logic	3 SHC			
PHI 24	40 Introduction to Ethics	3 SHC			
Social /Behavi			3 SHC	0-3 SHC	Optional
ECO 1:	•	3 SHC			1 -
	51 Prin of Microeconomics	3 SHC			
	10 Introduction to Geography	3 SHC			
	11 World Regional Geography	3 SHC			
	01 Applied Psychology	3 SHC			
	02 Human Relations	2 SHC			
	18 Interpersonal Psychology	3 SHC			
	35 Group Processes	3 SHC			
	50 General Psychology	3 SHC			
	05 Social Relationships	3 SHC			
	10 Introduction to Sociology	3 SHC			
SOC 2	15 Group Processes	3 SHC			
	ces/Mathematics:		3 SHC	0-3 SHC	Optional
	40 Environmental Biology	3 SHC			
	60 Introductory Life Science	3 SHC			
	01 Applied Mathematics I	3 SHC			
	10 Mathematical Measurement	3 SHC			
	15 Mathematical Models	3 SHC			
	20 Geometry and Trigonometry	3 SHC			
	21 Algebra/Trigonometry I	3 SHC			
	40 Survey of Mathematics	3 SHC			
	51 Statistics I	3 SHC			
	55 Statistical Analysis	3 SHC			
	10 Conceptual Physics	3 SHC			
PHY 1	21 Applied Physics I	4 SHC			

- A. Technical Core. The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C.** Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from each prefix listed, with the exception of prefixes listed in the core or other Major Areas.

Plant Systems: Horticultura	l Science	AAS	Diploma	Certificate
Minimum Major Hours Required:		49 SHC	30 SHC	12 SHC
A. Technical Core:				
Plant Identification. Choose one:		23-26 SHC	9-12 SHC	
HOR 160 Plant Materials I	3 SHC			
TRF 110 Intro Turfgrass Cult & ID	4 SHC			
Pest Management. Choose one:				
HOR 164 Hort Pest Mgmt	3 SHC			
TRF 240 Turfgrass Pest Control	3 SHC			
Design. Choose one.				
HOR 112 Landscape Design I	3 SHC			
^TRF 120 Turf Irrigat & Design	4 SHC			
TRF 151 Intro Landscape Design	3 SHC			
Soil Science. Choose one.				
AGR 170 Soil Science	3 SHC			
HOR 166 Soils and Fertilizers	3 SHC			
LSG 111 Basic Landscape Technique	2 SHC			
B. Program Major(s):				
Golf Course Management				
#GCM 220 Golf Course Maint Systems	3 SHC			
#GCM 230 Golf Course Org and Admin	3 SHC			
#GCM 240 Golf Course Design	3 SHC			
Select additional courses from the GCM prefix for a	n minimum of 12 SHC			
for the Golf Course Management AAS program.				
Courses required for the Golf Course Management I	Diploma are			
designated with #				

3. Program Major(s)(Continued)		
orticultural Science		
HOR 162 Applied Plant Science	3 SHC	
HOR 168 Plant Propagation	3 SHC	
Operations. Choose one:		
HOR 124 Nursery Operations	3 SHC	
HOR 134 Greenhouse Operations	3 SHC	
LSG 121 Fall Gardening Lab	2 SHC	
Select additional courses from the HOR or LSC	G prefix for a minimum	1
of 12 SHC for the Horticultural Science AAS p	1 0 0	
A Horticultural Science Technology diploma re	equires a minimum of	
12 SHC extracted from the required technical/p		
the AAS degree.		
ndscape Gardening		
Select a minimum of 12 SHC from the following	g courses for the Lands	cape
Gardening AAS program:	· ·	-
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 Technique	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	
Courses required for the Landscape Gardening		
designated with +	' 1	
rfgrass Management		
TRF 152 Landscape Maintenance	3 SHC	
^TRF 210 Turfgrass Eqmt Mgmt	3 SHC	
^TRF 230 Turfgrass Mgmt Apps	2 SHC	
TRF 260 Adv Turfgrass Mgmt	4 SHC	
Courses required for the Turfgrass Managemen		
designated with ^	T = T	
C. Other Major Hours.		I

ACC, AGR, ANS, ARC, BIO, BTC, BUS, CHM, CIS, COE, CSC, CST, CUL, DFT, ECO, ETR, FOR, FWL, GCM, GIS, HET, HOR, IVS, LAR, LID, LSG, SEL, SST, TRF and VEN

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

#### **III. Other Required Hours**

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

#### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- A. Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- H. Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or selfemployed business owner.

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	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

# Curriculum Standard for Plant Systems: Viticulture and Enology Technology Career Cluster: Agriculture, Food, and Natural Resources \*\*

**Cluster Description:** The production, processing, marketing, distribution, financing, and development of agricultural commodities and resources including food, fuel, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources.

### Pathway: Plant Systems

# **Effective Term:** Fall 2013 (2013\*03)

n Majors Under P	athway	
n Programs (CIP)	Credential Level(s)	Program
-	Offered	Major Code
CIP Code 01.0309	AAS/Diploma/Certificate	A15430
2	on Programs (CIP)	Offered

### **Pathway Description:**

This curriculum is designed to prepare individuals for various careers in the grape growing and wine making industry. Classroom instruction, practical laboratory applications of viticulture/enology principles and practices are included in the program of study.

Course work in viticulture includes aspects of plant science, vineyard stock selection and propagation, soils, vine nutrition and pest management, planning, layout, economics and management of vineyards. Those interested in enology will receive training in the classroom, laboratory and field in the tools and techniques of wine making. Related courses in microbiology and fermentation science, sensory analysis, winery economics and marketing are offered.

Graduates should qualify for employment opportunities in vineyards, wineries, garden centers, greenhouses, related sales areas and government agencies. Graduates should also be prepared to take the North Carolina Pesticide Applicators Examination and the North Carolina Certified Plant Professional Examination.

Program Major Description: Choose one of the following  $4^{th}$  paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each **Program Major**:

**Viticulture and EnologyTechnology:** A program that focuses on the application of scientific and agribusiness principles to the production of grapes, the making of wine, and the wine business. Potential course work includes instruction in grapes and wines of the world; grape production; winemaking technology; plant biology; chemistry; food science, safety, and packaging; soil science; pest management; and marketing and business management.

[Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204(3)]: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours of semester hours must be in communications. General education is optional in certificate programs.

Recommended General Education Academic Core         Minimum General Education Hours Required:         Courses listed below are recommended general education courses for this standard. Colleges may choose to include additional or alternative general courses to meet local curriculum needs.         *Recommended certificate and diploma level curriculum courses. These of not be included in associate degree programs.         Communication:	al education	Diploma 6 SHC 3-6 SHC	Certificate 0 SHC
Courses listed below are recommended general education courses for this standard. Colleges may choose to include additional or alternative genera courses to meet local curriculum needs. *Recommended certificate and diploma level curriculum courses. These of not be included in associate degree programs.	s curriculum al education courses may		0 SHC
standard. Colleges may choose to include additional or alternative general courses to meet local curriculum needs. *Recommended certificate and diploma level curriculum courses. These of not be included in associate degree programs.	al education courses may	3-6 SHC	
	6 SHC	3-6 SHC	
Communication:	6 SHC	3-6 SHC	
			Optional
*COM 101 Workplace Communication 3 SHC			
COM 110 Introduction to Communication 3 SHC			
COM 120 Intro Interpersonal Com 3 SHC			
COM 231 Public Speaking 3 SHC			
*ENG 101 Applied Communications I 3 SHC			
*ENG 102 Applied Communications II 3 SHC			
ENG 110 Freshman Composition 3 SHC			
ENG 111 Expository Writing 3 SHC			
ENG 112 Argument-Based Research 3 SHC			
ENG 114 Prof Research & Reporting 3 SHC			
ENG 115 Oral Communication 3 SHC			
ENG 116 Technical Report Writing 3 SHC			
	3 SHC	0-3 SHC	Optional
Humanities/Fine Arts:			- <b>r</b>
*HUM 101 Values in the Workplace 2 SHC			
HUM 110 Technology and Society 3 SHC			
HUM 115 Critical Thinking 3 SHC			
HUM 230 Leadership Development 3 SHC			
PHI 230 Introduction to Logic 3 SHC			
PHI 240 Introduction to Ethics 3 SHC			
Seciel (Debendene) Seineren	3 SHC	0-3 SHC	Optional
Social /Behavioral Sciences:			
ECO 151 Survey of Economics 3 SHC			
ECO 251 Prin of Microeconomics 3 SHC			
GEO 110 Introduction to Geography 3 SHC			
GEO 111 World Regional Geography 3 SHC			
*PSY 101 Applied Psychology 3 SHC			
*PSY 102 Human Relations 2 SHC			
PSY 118 Interpersonal Psychology 3 SHC			
PSY 135 Group Processes 3 SHC			
PSY 150 General Psychology 3 SHC			
*SOC 105 Social Relationships 3 SHC			
SOC         210 Introduction to Sociology         3 SHC           202         215         C         210			
SOC215Group Processes3SHC			
Natural Sciences/Mathematics:	3 SHC	0-3 SHC	Optional
BIO 140 Environmental Biology 3 SHC			
BIO 160 Introductory Life Science 3 SHC			
*MAT 101 Applied Mathematics I 3 SHC			
MAT 110 Mathematical Measurement 3 SHC			
MAT 115 Mathematical Models 3 SHC			
MAT 120 Geometry and Trigonometry 3 SHC			
MAT 120 Geometry and Highlightenery 3 SHC MAT 121 Algebra/Trigonometry 3 SHC			
MAT 121 Algeora/Highlonnery 5 SHC MAT 140 Survey of Mathematics 3 SHC			
MAT 151 Statistics I 3 SHC			
PHY110Conceptual Physics3 SHCPHY121Applied Physics I4 SHC			

- A. Technical Core. The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C.** Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from each prefix listed, with the exception of prefixes listed in the core.

Plant Systems: Viticulture and En	ology Technology	AAS	Diploma	Certificate
Minimum Major Hours Required:		49 SHC	30 SHC	12 SHC
A. Technical Core:				
*VEN 133 Intro to Winemaking	3 SHC	25 SHC	13 SHC	
*VEN 135 Intro to Viticulture	4 SHC			
*VEN 138 Vineyard Estab & Dev	3 SHC			
*VEN 238 Grape Pests/Disea/Disorde	3 SHC			
B. Program Major(s): Viticulture and Enology				
VEN 132 Wines of the World	2 SHC			
Select additional courses from the VEN prefix for 12 SHC for the Viticulture and Enology AAS pr	v			
Courses required for the Viticulture and Enolog designated with *	y Diploma are			
C. Other Major Hours.				·

To be selected from the following prefixes:

AGR, BUS, CIS, COE, CSC, ETR, HOR, VEN, and WLD

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

#### **III. Other Required Hours**

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

#### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- A. Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- H. Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or selfemployed business owner.

\*\*The North Carolina Career Clusters Guide was developed by the North Carolina Department of Public Instruction and the North Carolina Community College system to link the academic and Career and Technical Education programs at the secondary and postsecondary levels to increase student achievement. Additional information about Career Clusters is located at: <u>http://www.nc-net.info/NC career clusters quide.php</u> or <u>http://www.careertech.org</u>.

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

# **Curriculum Standard for Air Conditioning, Heating, and Refrigeration Technology Career Cluster:** Architecture and Construction\*\*

**Cluster Description:** Programs that prepare individuals to apply technical knowledge and skills related to the fields of architecture, construction, and associated professions. Includes instruction that can be applied to a variety of careers in the design-construction industry, including employment with architectural and engineering firms, residential and commercial builders/contractors, and other construction related occupations.

# Pathway: ConstructionEffective Term: Fall 2013 (2013\*03)

# **Program Majors Under Pathway:**

Program Major / Classification (CIP) Code	of Instruction Programs	Credential Level(s) Offered	Program Major Code
Air Conditioning, Heating, and Refrigeration Technology	CIP Code 47.0201	AAS/Diploma/Certificate	A35100

# **Pathway Description:**

The Air Conditioning, Heating, and Refrigeration Technology curriculum provides the basic knowledge to develop skills necessary to work with residential and light commercial systems.

Topics include mechanical refrigeration, heating and cooling theory, electricity, controls, and safety. The diploma program covers air conditioning, furnaces, heat pumps, tools and instruments. In addition, the AAS degree covers residential building codes, residential system sizing, and advanced comfort systems.

Diploma graduates should be able to assist in the start up, preventive maintenance, service, repair, and/or installation of residential and light commercial systems. AAS degree graduates should be able to demonstrate an understanding of system selection and balance and advanced systems.

Program Description: Choose one of the following 4<sup>th</sup> paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each **Program Major:** 

N/A

[*Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204(3)*]: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours must be in communications. General education is optional in certificate programs.

Recommended General Education Academic Core		AAS	Diploma	Certificate		
Minimum General Education Hours Required:			15 SHC	6 SHC	0 SHC	
standard. C	Colleg	low are recommended general educa es may choose to include additional o cal curriculum needs.	*			
		ertificate and diploma level curriculi associate degree programs.	um courses. These courses may			
Communica	tion:			6 SHC	3-6 SHC	Optional
		Workplace Communication	3 SHC			- <b>-</b> -
		Introduction to Communications	3 SHC			
COM		Intro Interpersonal Com	3 SHC			
COM		Public Speaking	3 SHC			
*ENG	101	Applied Communications I	3 SHC			
*ENG	102	Applied Communications II	3 SHC			
		Freshman Composition	3 SHC			
	111	Expository Writing	3 SHC			
ENG	114	Prof Research & Reporting	3 SHC			
ENG	116	Technical Report Writing	3 SHC			
				3 SHC	0-3 SHC	Optional
Humanities						
		Values in the Workplace	2 SHC			
		Technology and Society	3 SHC			
		Critical Thinking	3 SHC			
HUM		Leadership Development	3 SHC			
PHI		Introduction to Logic	3 SHC			
PHI	240	Introduction to Ethics	3 SHC			
Social /Beha	aviora	al Sciences:		3 SHC	0-3 SHC	Optional
ECO	151	Survey of Economics	3 SHC			
ECO	251	Prin of Microeconomics	3 SHC			
*PSY	101	Applied Psychology	3 SHC			
*PSY	102	Human Relations	2 SHC			
PSY		Interpersonal Psychology	3 SHC			
PSY	135	Group Processes	3 SHC			
PSY	150		3 SHC			
*SOC	105	Social Relationships	3 SHC			
SOC	210	Introduction to Sociology	3 SHC			
SOC	215	Group Process	3 SHC			
		Mathematics:		3 SHC	0-3 SHC	Optional
*MAT		Applied Mathematics I	3 SHC			
MAT		Mathematical Measurements	3 SHC			
MAT		Mathematical Models	3 SHC			
MAT		Geometry and Trigonometry	3 SHC			
MAT		Algebra/Trigonometry	3 SHC			
PHY PHY		Conceptual Physics	3 SHC			
		Applied Physics I	4 SHC		1	1

- A. Technical Core. The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C.** Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from each prefix listed, with the exception of prefixes listed in the core.

Air Conditioning, Heating, and Refrigeration Technology			AAS	Diploma	Certificat
Minimum Major Hours Required:			49 SHC	30 SHC	12 SHC
A. Technical C		_			
Courses requi	ired for the diploma are designated with	*	32-34 SHC	20-22 SHC	
Required Course	es:				
* AHR 110	Intro to Refrigeration	5 SHC			
* AHR 112		4 SHC			
* AHR 113		4 SHC			
* AHR 114	Heat Pump Technology	4 SHC			
* Electricity.	Select one:				
AHR 111		3 SHC			
ELC 111	Intro to Electricity	3 SHC			
ELC 112	DC/AC Electricity	5 SHC			
Required Subj	ect Areas. Select one.				
	ect Areas. Select one.	al courses from the prefixes			
For AAS degree, s					
For AAS degree, s listing within the s	relect one subject area plus additiond same subject area for a minimum of (				
For AAS degree, s isting within the s Air Conditio	select one subject area plus additiond same subject area for a minimum of ( ning, Heating, & Refrigeration	(12) semester hours of credit:			
For AAS degree, s isting within the s Air Conditio	select one subject area plus additiona same subject area for a minimum of ( ning, Heating, & Refrigeration Residential System Design				
For AAS degree, s isting within the s Air Conditio AHR 211	select one subject area plus additiona same subject area for a minimum of ( ning, Heating, & Refrigeration Residential System Design Advanced Comfort Systems	(12) semester hours of credit: 3 SHC			
For AAS degree, s listing within the s Air Conditio AHR 211 AHR 212 AHR 213	select one subject area plus additiona same subject area for a minimum of ( ning, Heating, & Refrigeration Residential System Design Advanced Comfort Systems HVACR Building Code	(12) semester hours of credit: 3 SHC 4 SHC			
For AAS degree, s listing within the s Air Conditio AHR 211 AHR 212 AHR 213 Solar Therm	select one subject area plus additiona same subject area for a minimum of ( ning, Heating, & Refrigeration Residential System Design Advanced Comfort Systems HVACR Building Code al Systems	(12) semester hours of credit: 3 SHC 4 SHC 2 SHC			
For AAS degree, s listing within the s Air Conditio AHR 211 AHR 212 AHR 213 Solar Therm AHR 240	select one subject area plus additiona same subject area for a minimum of ( ning, Heating, & Refrigeration Residential System Design Advanced Comfort Systems HVACR Building Code al Systems Hydronic Heating	(12) semester hours of credit: 3 SHC 4 SHC 2 SHC 2 SHC			
For AAS degree, s listing within the s Air Conditio AHR 211 AHR 212 AHR 213 Solar Therm	select one subject area plus additiona same subject area for a minimum of ( ning, Heating, & Refrigeration Residential System Design Advanced Comfort Systems HVACR Building Code al Systems Hydronic Heating Thermal Systems	(12) semester hours of credit: 3 SHC 4 SHC 2 SHC			
For AAS degree, s listing within the s Air Conditio AHR 211 AHR 212 AHR 213 Solar Therm AHR 240 ALT 250 PLU 111	select one subject area plus additiona same subject area for a minimum of ( ning, Heating, & Refrigeration Residential System Design Advanced Comfort Systems HVACR Building Code al Systems Hydronic Heating	<ul> <li>(12) semester hours of credit:</li> <li>3 SHC</li> <li>4 SHC</li> <li>2 SHC</li> <li>2 SHC</li> <li>3 SHC</li> </ul>			

AHR and no more than 21 SHC selected from ALT, BPR, BUS, CIS, COE, CSC, CST, EGR, ELC, ELN, EUS, HYD, ISC, MAT, PHY, PLU, REF, SST, WLD and WOL

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

#### **III. Other Required Hours**

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

#### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- **A.** Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- **H.** Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or self-employed business owner.

\*\*The North Carolina Career Clusters Guide was developed by the North Carolina Department of Public Instruction and the North Carolina Community College system to link the academic and Career and Technical Education programs at the secondary and postsecondary levels to increase student achievement. Additional information about Career Clusters is located at: <u>http://www.nc-net.info/NC career clusters quide.php</u> or <u>http://www.careertech.org</u>.

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

# **Curriculum Standard for Construction: Architecture & Construction Technology Career Cluster:** Architecture and Construction\*\*

**Cluster Description:** Programs that prepare individuals to apply technical knowledge and skills related to the fields of architecture, construction, and associated professions. Includes instruction that can be applied to a variety of careers in the design-construction industry, including employment with architectural and engineering firms, residential and commercial builders/contractors, and other construction related occupations.

### Pathway: Construction

# **Effective Term:** Fall 2013 (2013\*03)

Program Majors Under Pathway							
Program Major / Classification of Instruction Programs (CIP)			Credential Level(s)	Program			
Code		Offered	Major Code				
Architectural Technology	CIP Code	15.0101	AAS/Diploma/Certificate	A40100			
Building Construction Technology	CIP Code:	46.0499	AAS/Diploma/Certificate	A35140			
Carpentry	CIP Code:	46.0201	Diploma/Certificate	D35180			
Construction Management Technology	CIP Code	46.0401	AAS/Diploma/Certificate	A35190			
Masonry	CIP Code:	46.0101	Diploma/Certificate	D35280			
Plumbing	CIP Code:	46.0503	Diploma/Certificate	D35300			

# **Pathway Description:**

These curriculums are designed to prepare individuals to apply technical knowledge and skills to the fields of architecture, construction, construction management, and other associated professions.

Course work includes instruction in sustainable building and design, print reading, building codes, estimating, construction materials and methods, and other topics related to design and construction occupations.

Graduates of this pathway should qualify for entry-level jobs in architectural, engineering, construction and trades professions as well as positions in industry and government.

Program Description: Choose one of the following  $4^{th}$  paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each **Program Major:** 

### Architectural Technology:

A program that prepares individuals to assist architects, engineers, and construction professionals in developing plans and related documentation for residential and commercial projects in both the private and public sectors. Includes instruction in architectural drafting, computer-assisted drafting, construction materials and methods, environmental systems, codes and standards, structural principles, cost estimation, planning, graphics, and presentation.

### **Building Construction Technology:**

A program that prepares individuals to apply technical knowledge and skills to residential and commercial building construction and remodeling. Includes instruction in construction equipment and safety; site preparation and layout; construction estimating; print reading; building codes; framing; masonry; heating, ventilation, and air conditioning; electrical and mechanical systems; interior and exterior finishing; and plumbing.

### **Carpentry:**

A program that prepares individuals to apply technical knowledge and skills to lay out, cut, fabricate, erect, install, and repair wooden structures and fixtures, using hand and power tools. Includes instruction in technical mathematics, framing, construction materials and selection, job estimating, print reading, foundations and roughing-in, finish carpentry techniques, and applicable codes and standards.

\*Within the degree program, the institution shall include opportunities for the achievement of competence in reading, writing, oral communication, fundamental mathematical skills, and basic use of computers.

#### **Construction Management Technology:**

A program that prepares individuals to supervise, manage, and inspect construction sites, buildings, and associated facilities. Includes instruction in site safety, personnel supervision, labor relations, diversity training, construction documentation, scheduling, resource and cost control, bid strategies, rework prevention, construction insurance and bonding, accident management and investigation, applicable law and regulations, and communication skills.

#### Masonry:

A program that prepares individuals to apply technical knowledge and skills in the laying and/or setting of exterior brick, concrete block, and related materials, using trowels, levels, hammers, chisels, and other hand tools. Includes instruction in technical mathematics, print reading, structural masonry, decorative masonry, foundations, reinforcement, mortar preparation, cutting and finishing, and applicable codes and standards.

#### **Plumbing:**

A program that prepares individuals to work in the field of plumbing by applying technical knowledge and skills to lay out, assemble, install, and maintain piping fixtures and systems for natural gas, lp gas, hot water, drainage, sprinkling, and plumbing processing systems in residential and commercial environments. Includes instruction in source determination, water service and distribution, waste removal, pressure adjustment, basic physics, technical mathematics, print reading, pipe installation, pumps, soldering, plumbing inspection, and applicable codes and standards.

[*Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204(3)*]: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours must be in communications. General education is optional in certificate programs.

Recommended General Education Academic Core		AAS	Diploma	Certificate	
Minimum General Education Hours Required:			15 SHC	6 SHC	0 SHC
standard. Colle	pelow are recommended general educa eges may choose to include additional local curriculum needs.	*			
	certificate and diploma level curricul in associate degree programs.	lum courses. These courses may			
Communicatio	n:		6 SHC	3-6 SHC	Optional
*COM 10	Workplace Communication	3 SHC			-
COM 11	0 Introduction to Communication	3 SHC			
COM 120		3 SHC			
COM 23	Public Speaking	3 SHC			
* ENG 10		3 SHC			
* ENG 102		3 SHC			
ENG 110	) Freshman Composition	3 SHC			
ENG 11	l Expository Writing	3 SHC			
ENG 114	4 Prof Research & Reporting	3 SHC			
ENG 11	6 Technical Report Writing	3 SHC			
Humanities/Fir	ne Arts:		3 SHC	0-3 SHC	Optional
*HUM 10	1 Values in the Workplace	2 SHC			
	0 Technology and Society	3 SHC			
	5 Critical Thinking	3 SHC			
	0 Leadership Development	3 SHC			
	0 Introduction to Logic	3 SHC			
PHI 24	0 Introduction to Ethics	3 SHC			
Social /Behavio			3 SHC	0-3 SHC	Optional
ECO 15		3 SHC			
	Prin of Microeconomics	3 SHC			
* SOC 103		3 SHC			
SOC 21		3 SHC			
SOC 21:	-	3 SHC			
*PSY 100	Applied Psychology 2 Human Relations	3 SHC			
		2 SHC			
PSY 118 PSY 135	1 5 65	3 SHC 3 SHC			
PSY 13: PSY 150	•	3 SHC 3 SHC			
FS1 150	General Psychology	5 500			
	es/ <b>Mathematics:</b> 1 Applied Mathematics I	3 SHC	3 SHC	0-3 SHC	Optional
	0 Mathematical Measurements	3 SHC	5 5110		
	5 Mathematical Models	3 SHC			
	0 Geometry and Trigonometry	3 SHC			
	1 Algebra/Trigonometry I	3 SHC 3 SHC			
IVIAI 12					
	0 Conceptual Physics	3 SHC			

- A. Technical Core. The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C.** Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from each prefix listed, with the exception of prefixes listed in the core..

<b>Construction: Architecture and Construction Technology</b>			AAS	Diploma	Certificate
Minimum Major Hours Required: A. Technical Core:			49 SHC	30 SHC	12 SHC
			24 SHC		
For AAS Degree pro	ograms, select a minimum of (12) semester	hours of credit from the			
following courses. I	For Diploma programs, choose a minimum	of (3) semester hours of			
credit from the follo	wing courses.				
ARC	112 Constr Matls & Methods	4 SHC			
ARC	131 Building Codes	3 SHC			
ARC	132 Specifications & Contract	2 SHC			
BPR	130 Print Reading – Construction	3 SHC			
CMT	120 Codes and Inspections	3 SHC			
CST	241 Planning/Estimating I	3 SHC			
SST	140 Green Building & Design Concepts	3 SHC			
	<b>or(s).</b> e, select one program major plus additional n the same program major for a minimum o				
For the AAS Degree prefixes listed within of credits.	e, select one program major plus additional n the same program major for a minimum o				
For the AAS Degree prefixes listed within	e, select one program major plus additional n the same program major for a minimum o				
For the AAS Degree prefixes listed within of credits. Architectural	e, select one program major plus additional n the same program major for a minimum o <b>Technology</b>	of (12) semester hours			
For the AAS Degree orefixes listed within of credits. Architectural ARC ARC ARC	e, select one program major plus additional in the same program major for a minimum of <b>Technology</b> 111 Intro to Arch Technology 114 Architectural CAD 113 Res Arch Tech	of (12) semester hours 3 SHC 2 SHC 3 SHC			
For the AAS Degree orefixes listed within of credits. <b>Architectural</b> ARC ARC	e, select one program major plus additional in the same program major for a minimum of <b>Technology</b> 111 Intro to Arch Technology 114 Architectural CAD	of (12) semester hours 3 SHC 2 SHC			
For the AAS Degree orefixes listed within of credits. Architectural ARC ARC ARC	e, select one program major plus additional in the same program major for a minimum of <b>Technology</b> 111 Intro to Arch Technology 114 Architectural CAD 113 Res Arch Tech	of (12) semester hours 3 SHC 2 SHC 3 SHC			
For the AAS Degree orefixes listed within of credits. Architectural ARC ARC ARC or ARC	e, select one program major plus additional in the same program major for a minimum of <b>Technology</b> 111 Intro to Arch Technology 114 Architectural CAD 113 Res Arch Tech 211 Light Const Tech	of (12) semester hours 3 SHC 2 SHC 3 SHC 3 SHC 3 SHC			
For the AAS Degree orefixes listed within of credits. Architectural ARC ARC or ARC ARC ARC ARC ARC	<ul> <li><i>p. select one program major plus additional</i> <i>in the same program major for a minimum of</i></li> <li><b>Technology</b> <ol> <li>Intro to Arch Technology</li> <li>Architectural CAD</li> <li>Res Arch Tech</li> <li>Light Const Tech</li> <li>Design Project</li> <li>Design Project</li> </ol> </li> </ul>	of (12) semester hours 3 SHC 2 SHC 3 SHC 3 SHC 4 SHC			
For the AAS Degree orefixes listed within of credits. Architectural ARC ARC or ARC ARC ARC ARC ARC ARC	e, select one program major plus additional in the same program major for a minimum of <b>Technology</b> 111 Intro to Arch Technology 114 Architectural CAD 113 Res Arch Tech 211 Light Const Tech 213 Design Project	of (12) semester hours 3 SHC 2 SHC 3 SHC 3 SHC 4 SHC			
For the AAS Degree prefixes listed within of credits. Architectural ARC ARC or ARC ARC ARC ARC ARC CAR 1	<ul> <li><i>e, select one program major plus additional</i> <i>in the same program major for a minimum of</i></li> <li><b>Technology</b> <ol> <li>Intro to Arch Technology</li> <li>Architectural CAD</li> <li>Res Arch Tech</li> <li>Light Const Tech</li> <li>Design Project</li> <li>Design Project</li> </ol> </li> <li><b>uction Technology</b></li> </ul>	of (12) semester hours 3 SHC 2 SHC 3 SHC 3 SHC 4 SHC 4 SHC 4 SHC			
For the AAS Degree prefixes listed within of credits. Architectural ARC ARC or ARC ARC ARC Building Constr CAR 1 or CST 1	<ul> <li><i>e, select one program major plus additional</i> <i>in the same program major for a minimum of</i></li> <li><b>Technology</b> <ol> <li>Intro to Arch Technology</li> <li>Architectural CAD</li> </ol> </li> <li>Inses Arch Tech <ol> <li>Light Const Tech</li> <li>Design Project</li> <li>Denvironmental Systems</li> </ol> </li> <li><b>uction Technology</b> <ol> <li>Carpentry I</li> </ol> </li> </ul>	of (12) semester hours 3 SHC 2 SHC 3 SHC 3 SHC 4 SHC 4 SHC 8 SHC			

Constan	nation N	longement Technology			
Constru		<b>fanagement Technology</b> 210 Construction Management Fund	3 SHC		
	CMT	212 Total Safety Performance	3 SHC		
	01111				
	ACC	120 Prin of Financial Acct	4 SHC		
or	BUS	139 Entrepreneurship I	3 SHC		
or	BUS	230 Small Business Management	3 SHC		
Carpon	try Cou	rse(s) required for the Carpentry Diploma are a	designated with *		
		111 Carpentry I	8 SHC		
Masonr	v Cours	e(s) required for the Masonry Diploma are desig	anated with *		
		110 Masonry I	10 SHC		
Dlumbin	G Cours	e(s) required for the Plumbing Diploma are de	signated with *		
	* PLU	110 Modern Plumbing	9 SHC		
	120		, , , , , , , , , , , , , , , , , , , ,		
			L		
		or Hours.			
) be sele	cted fro	m the following prefixes:			
		ARC ART BPR BUS CAB CAR CIS CIN	V CMT COE CSC CST DES	NET ECO ECD EUS	ELC ENV

ACC, AHR, ALT, ARC, ART, BPR, BUS, CAB, CAR, CIS, CIV, CMT, COE, CSC, CST, DES, DFT, ECO, EGR, EHS, ELC, ENV, EUS, GIS, HYD, HOR, HUM, ISC, LAR, LID, MAS, MAT, MEC, PFT, PHY, PLU, REF, SPA, SRV, SST, TRF, WAT, WLD, and WOL.

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

#### **III. Other Required Hours**

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

#### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- **A.** Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- **H.** Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or self-employed business owner.

\*\*The North Carolina Career Clusters Guide was developed by the North Carolina Department of Public Instruction and the North Carolina Community College system to link the academic and Career and Technical Education programs at the secondary and postsecondary levels to increase student achievement. Additional information about Career Clusters is located at: <u>http://www.nc-net.info/NC career clusters guide.php</u> or <u>http://www.careertech.org</u>.

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

# **Curriculum Standard for Construction: Boat Building**

Career Cluster: Architecture and Construction**					
<b>Cluster Description:</b> Programs that prepare fields of architecture, construction, and associate careers in the design-construction industry, incluand commercial builders/contractors, and other c	d professions ding employr	. Includes in nent with a	nstruction that can be applied chitectural and engineering f	d to a variety of	
Pathway: Construction		Effectiv	e Term: Fall 2013 (20	013*03)	
Program	n Majors I	Under Pa	athway		
Program Major / Classification of Instruction Code	n Programs	(CIP)	Credential Level(s) Offered	Program Major Code	
Boat Building	CIP Code	46.0201	Diploma/Certificate	D35120	
Pathway Description:         The Boat Building curriculum prepares individuals for employment in the boat building and boat repair industry.         Today's boat builders are highly skilled craftspeople who can create complex shapes out of wood.         Course work includes reading boat plans, lofting, setting up the building jig, fashioning the structural timbers, and different planking techniques. Interior joinery, exterior joinery, and yacht rigging is also covered.         Graduates may find work with yacht manufacturers, high end furniture shops, architectural millwork shops, and					
companies installing built in furniture in homes. Other opportunities can be found in boat maintenance and repair yards. <i>Program Description: Choose one of the following</i> 4 <sup>th</sup> paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each <b>Program Major:</b> N/A					

[*Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204(3)*]: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours must be in communications. General education is optional in certificate programs.

			uction: Boat Building	1		
<b>Recommended General Education Academic Core</b>		AAS	Diploma	Certificate		
Minimum General Education Hours Required: Courses listed below are recommended general education courses for this curriculum standard. Colleges may choose to include additional or alternative general education courses to meet local curriculum needs.			NA	6 SHC	0 SHC	
Commun	ication:			NA	3-6 SHC	Optional
		Workplace Communication	3 SHC			optional
	M 110	Introduction to Communication	3 SHC			
	M 120		3 SHC			
	M 231	Public Speaking	3 SHC			
EN		Applied Communications I	3 SHC			
EN		Applied Communications II	3 SHC			
EN		Freshman Composition	3 SHC			
EN		Expository Writing	3 SHC			
EN		Prof Research & Reporting	3 SHC			
EN		Technical Report Writing	3 SHC			
Humaniti	es/Fine	Arts:		NA	0-3 SHC	Optional
HU	M 101	Values in the Workplace	2 SHC			- pronin
		Technology and Society	3 SHC			
		Critical Thinking	3 SHC			
	M 230	Leadership Development	3 SHC			
PHI		Introduction to Logic	3 SHC			
PHI	240	Introduction to Ethics	3 SHC			
Social /Be	ehaviora	al Sciences:				
ECO		Survey of Economics	3 SHC	NA	0-3 SHC	Optional
ECO		Prin of Microeconomics	3 SHC			
SOC		Social Relationships	3 SHC			
SOC		Group Processes	3 SHC			
PSY		Applied Psychology	3 SHC			
PSY		Human Relations	2 SHC			
PSY		Interpersonal Psychology	3 SHC			
PSY		Group Processes	3 SHC			
PSY		General Psychology	3 SHC			
Natural S	ciences	/Mathematics:				
MA		Applied Mathematics I	3 SHC	NA	0-3 SHC	Optional
MA		Mathematical Measurement	3 SHC			
MA		Mathematical Models	3 SHC			
MA	T 120	Geometry and Trigonometry	3 SHC			
MA		Algebra/Trigonometry I	3 SHC			
PH		Conceptual Physics	3 SHC			
PH		Applied Physics I	4 SHC			

- A. Technical Core. The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C.** Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from each prefix listed, with the exception of prefixes listed in the core.

Diploma	AAS	Certificate
30 SHC	49 SHC	12 SHC
35 SHC		

#### C. Other Major Hours

To be selected from the following prefixes:

BTB, CIS, COE, DDF, DFT, FBG, and ISC

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

#### **III. Other Required Hours**

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

#### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- **A.** Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- **H.** Entrepreneurship The knowledge the skills necessary to create opportunities and develop as an employee or self-employed business owner.

\*\*The North Carolina Career Clusters Guide was developed by the North Carolina Department of Public Instruction and the North Carolina Community College system to link the academic and Career and Technical Education programs at the secondary and postsecondary levels to increase student achievement. Additional information about Career Clusters is located at: <u>http://www.nc-net.info/NC career clusters guide.php</u> or <u>http://www.careertech.org</u>.

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

# Curriculum Standard for Construction: Historic Preservation Technology Career Cluster: Architecture and Construction\*\*

**Cluster Description:** Programs that prepare individuals to apply technical knowledge and skills related to the fields of architecture, construction, and associated professions. Includes instruction that can be applied to a variety of careers in the design-construction industry, including employment with architectural and engineering firms, residential and commercial builders/contractors, and other construction related occupations.

Pathway: Construction

# **Effective Term:** Fall 2013 (2013\*03)

Program Majors Under Pathway						
Program Major / Classification of Instruction Programs (CIP)			Credential Level(s)	Program		
Code			Offered	Major Code		
Historic Preservation Technology	CIP Code	30.1201	AAS/Diploma/Certificate	A35110		

# **Pathway Description:**

The Historic Preservation Technology curriculum provides courses related to the documentation and preservation of cultural and historic buildings and sites. The program emphasizes technical training in historic site and historic building preservation and restoration.

Course work includes archival research, building design, drafting, conservation techniques, building renovation, field data collection, historic preservation, documentation, sustainable building design, and the application of preservation law.

Graduates of this pathway should qualify for work as building renovation and site specialists, historic preservation consultants or as assistants to professional historic preservationists.

Program Description: Choose one of the following 4<sup>th</sup> paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each **Program Major:** 

N/A

\*Within the degree program, the institution shall include opportunities for the achievement of competence in reading, writing, oral communication, fundamental mathematical skills, and basic use of computers.

[*Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204(3)*]: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours must be in communications. General education is optional in certificate programs.

Recommended	<b>General Education Academic C</b>	Core	AAS	Diploma	Certificate
Minimum Gen	nimum General Education Hours Required: 15 SHC			6 SHC	0 SHC
standard. Colleg	low are recommended general educa ses may choose to include additional pocal curriculum needs.				
	ertificate and diploma level curricul n associate degree programs.	um courses. These courses may			
Communication			6 SHC	3-6 SHC	Optional
*COM 101	Workplace Communication	3 SHC			<b>_</b>
COM 110	Introduction to Communication	3 SHC			
COM 120	Intro Interpersonal Com	3 SHC			
COM 231	Public Speaking	3 SHC			
*ENG 101	Applied Communications I	3 SHC			
*ENG 102	Applied Communications II	3 SHC			
	Freshman Composition	3 SHC			
ENG 111	Expository Writing	3 SHC			
ENG 114		3 SHC			
ENG 116	Technical Report Writing	3 SHC			
Humanities/Fine	Arts:		3 SHC	0-3 SHC	Optional
	Values in the Workplace	2 SHC	5 5110	0 5 SHC	Optional
	Technology and Society	3 SHC			
HUM 115		3 SHC			
	Leadership Development	3 SHC			
PHI 230	Introduction to Logic	3 SHC			
PHI 240	Introduction to Ethics	3 SHC			
Social /Behavior	al Sciences:				
ECO 151	Survey of Economics	3 SHC	3 SHC	0-3 SHC	Optional
	Prin of Microeconomics	3 SHC			•
	Social Relationships	3 SHC			
	Group Processes	3 SHC			
*PSY 101	Applied Psychology	3 SHC			
*PSY 102	Human Relations	2 SHC			
	Interpersonal Psychology	3 SHC			
PSY 135	Group Processes	3 SHC			
PSY 150	General Psychology	3 SHC			
Natural Sciences	/Mathematics:		3 SHC	0-3 SHC	Optional
	Applied Mathematics I	3 SHC			
	Mathematical Measurement	3 SHC			
	Mathematical Models	3 SHC			
	Geometry and Trigonometry	3 SHC			
	Algebra/Trigonometry I	3 SHC			
		3 SHC			
PHY 110	Conceptual Physics	3 SHC			

Curriculum Standard for Construction: Historic Preservation Technology – April 2012 Vote

- **A. Technical Core.** The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C. Other Major Hours.** Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from each prefix listed, with the exception of prefixes listed in the core.

	Const	<b>Construction: Historic Preservation Technology</b>			Diploma	Certificate
Mi	inimum Major Hours Required:			49 SHC	30 SHC	12 SHC
A.	Technical	Core/Program Major:		22-23 SHC	21 SHC	
	Courses requ	uired for the diploma program major are o	designated with an asterisk (*).			
	*CST	244 Sustainable Bldg Design	3 SHC			
	*HPT	116 Historical Drafting	2 SHC			
	*HPT	110 Hist & Cultural Landscape	3 SHC			
	*HPT	111 Prin of Hist Preservation	3 SHC			
	*HPT	133 Historic Bldg Analysis	3 SHC			
	*HPT	233 Hist Construction Methods	4 SHC			
	*HPT	252 Recording Hist Properties	3 SHC			
	<b>Required</b> S	Subject Area:				
	Co-Op Wo	rk Experience. Select One.				
	ĊOE	111 Co-Op Work Experience I	1 SHC			
	COE	122 Co-Op Work Experience II	2 SHC			

#### C. Other Major Hours.

To be selected from the following prefixes:

ARC, BUS, CIS, COE, CSC, CST, DFT, ELC, HIS, HPT, and MAS

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

#### **III. Other Required Hours**

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

#### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- **A.** Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- **H.** Entrepreneurship The knowledge the skills necessary to create opportunities and develop as an employee or self-employed business owner.

\*\*The North Carolina Career Clusters Guide was developed by the North Carolina Department of Public Instruction and the North Carolina Community College system to link the academic and Career and Technical Education programs at the secondary and postsecondary levels to increase student achievement. Additional information about Career Clusters is located at: <u>http://www.nc-net.info/NC career clusters guide.php</u> or <u>http://www.careertech.org</u>.

*Summary of Required Semester Hour Credits (SHC) for each credential:* 

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

Curriculum Standard for Construction: Historic Preservation Technology - April 2012 Vote

## Curriculum Standard for Construction: Landscape Architecture Technology

Career Cluster: Architecture and Construction\*\*

**Cluster Description:** Programs that prepare individuals to apply technical knowledge and skills related to the fields of architecture, construction, and associated professions. Includes instruction that can be applied to a variety of careers in the design-construction industry, including employment with architectural and engineering firms, residential and commercial builders/contractors, and other construction related occupations.

Pathway: Construction	<b>Effective Term:</b> Fall 2013 (2013*03)
D M.'	TL.J., D.4L

I I	ugram ma	jors Under P	alliwa	у
Dw	ogrom Mo	iora Indor D	othuro	<b>N</b> 7

Program Major / Classification of Instructi	on Programs	(CIP)	Credential Level(s)	Program
Code			Offered	Major Code
Landscape Architecture Technology	CIP Code	04.0601	AAS/Diploma/Certificate	A40260

## **Pathway Description:**

The Landscape Architecture Technology curriculum prepares individuals as landscape architecture technicians in landscape design, construction, and architecture fields. The well-trained landscape technician will find excellent prospects for employment and advancement, including large-scale site design and supervision and residential landscape design.

Students receive instruction in landscape construction materials and methods, environmental planning, principles of horticulture, building codes, and computer applications. They develop drafting and computer skills through progressive hands-on courses. Students may choose from a library of courses to suit specific interest areas.

Graduates will demonstrate a working knowledge of landscape architectural practices, including site planning, storm water engineering, road and parking layouts, and grading and plant selection according to zoning/code requirements.

Program Description: Choose one of the following  $4^{th}$  paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each **Program Major:** 

N/A

[*Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204(3)*]: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours must be in communications. General education is optional in certificate programs.

	<b>Construction: La</b>	ndscape Architecture Te	echnology	,	
Recommended	General Education Academic (	Core	AAS	Diploma	Certificate
Minimum Gene	ral Education Hours Required	:	15 SHC	6 SHC	0 SHC
standard. College	ow are recommended general educ es may choose to include additional cal curriculum needs.				
	ertificate and diploma level curricu associate degree programs.	ulum courses. These courses may			
Communications			6 SHC	3-6 SHC	Optional
COM 110	Introduction to Communication	3 SHC			
	Intro Interpersonal Com	3 SHC			
COM 231	Public Speaking	3 SHC			
	Freshman Composition	3 SHC			
	Expository Writing	3 SHC			
	Prof Research & Reporting	3 SHC			
ENG 116	Technical Report Writing	3 SHC			
Humanities/Fine	Arts		3 SHC	0-3 SHC	Optional
	Technology and Society	3 SHC			1
	Critical Thinking	3 SHC			
	Leadership Development	3 SHC			
	Introduction to Logic	3 SHC			
	Introduction to Ethics	3 SHC			
Social/Behavioral	Sciences				
	Survey of Economics	3 SHC	3 SHC	0-3 SHC	Optional
	Prin of Microeconomics	3 SHC			
GEO 111	World Regional Geography	3 SHC			
	Physical Geography I	4 SHC			
	Introduction to Sociology	3 SHC			
	Group Process	3 SHC			
PSY 118		3 SHC			
PSY 118 PSY 135	Interpersonal Psychology Group Processes				
PSY 135 PSY 150	General Psychology	3 SHC 3 SHC			
			3 SHC	0-3 SHC	Optional
Natural Sciences/			2 2110		~ Phone
MAT 120	Geometry and Trigonometry	3 SHC			
MAT 121	Algebra/Trigonometry I	3 SHC			
MAT 161	College Algebra	3 SHC			
MAT 171	Precalculus Algebra	3 SHC			
MAT 175	Precalculus	4 SHC			
MAT 223	Applied Calculus	3 SHC			
MAT 271	Calculus I	4 SHC			

- A. Technical Core. The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C.** Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from each prefix listed, with the exception of prefixes listed in the core or other Major Areas.

Constr	ruction: Landscape Architectu	ire Technology	AAS	Diploma	Certificate
Minimum Ma	ijor Hours Required:	49 SHC	30 SHC	12 SHC	
A diploma offered	<b>Fechnical Core/Program Major:</b> A diploma offered under this AAS degree requires a minimum of 12 SHC extracted from the bequired subject/course core of the AAS degree.				
ARC	114 Architectural CAD	2 SHC			
ARC	240 Site Planning	3 SHC			
LAR	111 Intro to Landscp Arc Tech	3 SHC			
LAR	112 Landscape Materials & Methods	4 SHC			
LAR	113 Res Landscape Design	3 SHC			
LAR	211 Commercial Site Design	3 SHC			
TAD	223 Land Design Project	4 SHC			
LAR			1		
LAR LAR	230 Prin of Exterior Planting	4 SHC			

#### C. Other Major Hours.

To be selected from the following prefixes:

ARC, BIO, BPR, CIS, CIV, COE, CSC, ENV, GIS, HOR, LAR, SRV, and TRF

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

#### **III. Other Required Hours**

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

#### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- **A.** Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- **H.** Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or self-employed business owner.

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Summary of Required Semester Hour Credits (SHC) for each credential:

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

# Curriculum Standard for Construction: Low Impact Development

<b>Career Cluster:</b>	Architecture an	nd Construction**
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**Cluster Description:** Programs that prepare individuals to apply technical knowledge and skills related to the fields of architecture, construction, and associated professions. Includes instruction that can be applied to a variety of careers in the design-construction industry, including employment with architectural and engineering firms, residential and commercial builders/contractors, and other construction related occupations.

Pathway: ConstructionEffective Term: Fall 2013 (2013\*03)

## Program Majors Included Under Pathway

Program Major / Classification of Instructio Code	n Programs	(CIP)	Credential Level(s) Offered	Program Major Code
Low Impact Development	CIP Code	15.0599	AAS/Diploma/Certificate	A40290

## **Pathway Description:**

The Low Impact Development (LID) curriculum is designed to prepare students interested in sustainable development and natural resource management with the technical skills to serve as specialists in the analysis of land and in the preparation of LID recommendations.

The program of study will consist of a multidisciplinary core of coursework including the study of land planning software programs, soils, site analysis, hydrology, geospatial technology, and environmental regulations.

Graduates should qualify for a variety of positions such as LID consultants, technicians, and/or liaisons between landscape architects, engineers, construction contractors and/or related professionals.

Program Description: Choose one of the following  $4^{th}$  paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each **Program Major**:

N/A

[*Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204(3)*]: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours must be in communications. General education is optional in certificate programs.

Docommondod	General Education Academic (	1: Low Impact Developn	AAS	Diploma	Certificate
				-	
Minimum Gen	eral Education Hours Required	:	15 SHC	6 SHC	0 SHC
curriculum stand	ted below are recommended gene ard. Colleges may choose to include s to meet local curriculum needs.				
	certificate and diploma level curricu n associate degree programs.	lum courses. These courses may			
Communication	:		6 SHC	3-6 SHC	Optional
	Workplace Communication	3 SHC			_ <b>^</b>
COM 110	-	3 SHC			
COM 120		3 SHC			
	Public Speaking	3 SHC			
*ENG 101		3 SHC			
*ENG 102		3 SHC			
ENG 110		3 SHC			
ENG 111	•	3 SHC			
ENG 114		3 SHC			
ENG 116		3 SHC			
Humanities/Fine	e Arts:		3 SHC	0-3 SHC	Optional
	Values in the Workplace	2 SHC	5 5110		Optional
	Technology and Society	3 SHC			
	Critical Thinking	3 SHC			
HUM 230		3 SHC			
PHI 230		3 SHC			
PHI 240	Introduction to Ethics	3 SHC			
Social /Behavior	al Sciences:		3 SHC	0-3 SHC	Optional
ECO 151	Survey of Economics	3 SHC			
ECO 251		3 SHC			
*SOC 105	Social Relationships	3 SHC			
SOC 215		3 SHC			
*PSY 101	Applied Psychology	3 SHC			
*PSY 102	Human Relations	2 SHC			
	Interpersonal Psychology	3 SHC			
	Group Processes	3 SHC			
PSY 150		3 SHC			
Natural Science	s/Mathematics:		3 SHC	0-3 SHC	Optional
	Applied Mathematics I	3 SHC			
	Mathematical Measurement	3 SHC			
	Mathematical Models	3 SHC			
	Geometry and Trigonometry	3 SHC			
	Algebra/Trigonometry I	3 SHC			
	Conceptual Physics	3 SHC			
110	Applied Physics I	4 SHC		1	1

Curriculum Standard for Construction: Low Impact Development – April 2012 Vote

- A. Technical Core. The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C.** Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from each prefix listed, with the exception of prefixes listed in the core.

	<b>Construction: Low Impact Development</b>				Diploma	Certificate
Minimu	m Maj	jor Hours Required:	•	49 SHC	30 SHC	12 SHC
A. Tecl	hnical (	Core:		44-51 SHC	15 SHC	
Courses re	equired j	for the diploma program major are designated	d with an asterisk (*).			
	*LAR	120 Sustainable Development	3 SHC			
	*LID	111 LID Design Principles	3 SHC			
	*LID	112 LID Practical Application	3 SHC			
	*LID	230 Impacted Site Remediation	3 SHC			
	*LID	240 Sustain Develop Design	3 SHC			
		Major: Low Impact Development and Design. Select three courses:				
	DFT	151 CAD I	3 SHC			
	DFT	151 CAD I 152 CAD II	3 SHC			
	HOR	112 Landscape Design I	3 SHC			
	LAR	111 Intro to Landscape Arc Tech	3 SHC			
	LAR	114 CAD for Land Development	2 SHC			
	LAR	221 Landscape CAD	3 SHC			
Int	ro to G	IS/GPS. Select one set:				
	GIS	111 Introduction to GIS	3 SHC and			
	GIS	112 Introduction to GPS	3 SHC			
or	FOR	215 Introduction to GIS/GPS	3 SHC			
Geog	graphic	e Analysis. Select two courses:				
	GIS	121 Georeferencing & Mapping	3 SHC			
	GIS	231 Geo Position Sys Methods	3 SHC			
	GIS	245 Intro to Spatial Analysis	3 SHC			
	GIS	246 Prin of Property Mapping	3 SHC			

Curriculum Standard for Construction: Low Impact Development – April 2012 Vote

Plant Materi	als. Select two courses:			
FOR	121 Dendrology	4 SHC		
HOR	160 Plant Materials I	3 SHC		
HOR	161 Plant Materials II (may change to HOR 260)	3 SHC		
LAR	230 Prin of Exterior Planting	4 SHC		
LAR	231 Prin of Interior Planting	3 SHC		
Soil Science.	Select two courses:			
CST	231 Soils and Site Work	4 SHC		
FOR	173 Soils & Hydrology	3 SHC		
HOR	166 Soils & Fertilizers	3 SHC		

## C. Other Major Hours.

To be selected from the following prefixes:

ARC, BIO, BPR, CIS, CIV, COE, CST, DFT, ENV, FOR, GIS, HOR, LAR, LID, and SRV

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

#### **III.** Other Required Hours

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

#### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- **A.** Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- **H.** Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or self-employed business owner.

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Summary of Required Semester Hour Credits (SHC) for each credential:

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

## **Curriculum Standard for Electrical Systems Technology**

Career Cluster: Architecture and Construction\*\*

**Cluster Description:** Programs that prepare individuals to apply technical knowledge and skills related to the fields of architecture, construction, and associated professions. Includes instruction that can be applied to a variety of careers in the design-construction industry, including employment with architectural and engineering firms, residential and commercial builders/contractors, and other construction related occupations.

Pathway: Construction	-	fective Term: Fall 2013 (2013*03)						
Program Majors Under Pathway								
Program Major / Classification of Instruction Programs (CIP) Code			Credential Level(s) Offered	Program Major Code				
Electrical Systems Technology	CIP Code: 46.0302		AAS/Diploma/Certificate	A35220				

Pathway Description:

This curriculum is designed to provide training for persons interested in the installation and maintenance of electrical systems found in residential, commercial, and industrial facilities.

Coursework, most of which is hands-on, will include such topics as AC/DC theory, basic wiring practices, programmable logic controllers, industrial motor controls, applications of the National Electric Code, and other subjects as local needs require.

Graduates should qualify for a variety of jobs in the electrical field as an on-the-job trainee or apprentice assisting in the layout, installation, and maintenance of electrical systems.

Program Description: Choose one of the following 4<sup>th</sup> paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each **Program Major:** 

N/A

[*Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204(3)*]: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours must be in communications. General education is optional in certificate programs.

Electrical Systems Technology							
Recommended General Education Academic Core			AAS	Diploma	Certificate		
Minimum	Gene	eral Education Hours Required:		15 SHC	6 SHC	0 SHC	
standard. C	Colleg	low are recommended general educa es may choose to include additional ocal curriculum needs.	-				
		ertificate and diploma level curricul associate degree programs.	um courses. These courses may				
Communic	ation:			6 SHC	3-6 SHC	Optional	
		Workplace Communication	3 SHC	0.0110			
COM		Introduction to Communications	3 SHC				
COM		Intro Interpersonal Com	3 SHC				
COM		Public Speaking	3 SHC				
	101		3 SHC				
		Applied Communications I					
		Applied Communications II	3 SHC				
		Freshman Composition	3 SHC				
	111	Expository Writing	3 SHC				
		Prof Research & Reporting	3 SHC				
ENG	116	Technical Report Writing	3 SHC				
Humanities	/Fine	Arts:		3 SHC	0-3 SHC	Optional	
		Values in the Workplace	2 SHC	5 SHC	0-5 5110	Optional	
		Technology and Society	3 SHC				
		Critical Thinking	3 SHC				
		Leadership Development	3 SHC				
PHI		Introduction to Logic	3 SHC				
PHI		Introduction to Ethics	3 SHC				
Social /Beh	aviora	al Sciences:		3 SHC	0-3 SHC	Optional	
ECO	151	Survey of Economics	3 SHC				
ECO	251	-	3 SHC				
*PSY	101	Applied Psychology	3 SHC				
*PSY	102	Human Relations	2 SHC				
PSY		Interpersonal Psychology	3 SHC				
		Group Processes	3 SHC				
PSY	150	General Psychology	3 SHC				
*SOC	105	Social Relationships	3 SHC				
SOC	210	Introduction to Sociology	3 SHC				
SOC		Group Process	3 SHC				
		/Mathematics:		3 SHC	0-3 SHC	Optional	
*MAT		Applied Mathematics I	3 SHC				
MAT		Mathematical Measurements	3 SHC				
MAT		Mathematical Models	3 SHC				
MAT	120	Geometry and Trigonometry	3 SHC				
MAT		Algebra/Trigonometry I	3 SHC				
PHY		Conceptual Physics	3 SHC				
PHY		Applied Physics I	4 SHC		1	1	

- A. Technical Core. The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C.** Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from each prefix listed, with the exception of prefixes listed in the core.

	ectrical Systems Techno	logy (A35220)	AAS	Diploma	Certificate
Minimum Major Hours Required:			49 SHC	30 SHC	12 SHC
A. Technical C Courses req	ore: nuired for the diploma are designated wa	th *	27-32 SHC	12-16 SHC	
Required Cours	es:				
* ELC 113	Residential Wiring	4 SHC			
* Motor Con	trols. Select one:				
ELC 117	Motors and Controls	4 SHC			
ELN 231	Industrial Controls	3 SHC			
* DC/AC. Se	elect one:				
ELC 112	DC/AC Electricity	5 SHC			
or ELC 131	Circuit Analysis I	4 SHC and			
ELC 131A	Circuit Analysis I Lab	1 SHC			
or ELC 138	DC Circuit Analysis	4 SHC and			
ELC 139	AC Circuit Analysis	4 SHC			
Automated	Controls. Select one:				
ELC 128	Introduction to PLC	3 SHC			
ELN 260	Prog Logic Controllers	4 SHC			
Required Subjec	et Areas: Select one.				
	select one subject area plus additior same subject area for a minimum of				
Electrical Sys Select 12 SH	<b>tems.</b> IC from any ELC prefix course.				
Photovoltaic S	Systems.				
ALT 120	Renewable Energy Tech	3 SHC			
ELC 118	National Electrical Code	2 SHC			
ELC 220 ELC 221	Photovoltaic Sys Tech	3 SHC 3 SHC			
	Adv PV Sys Design	3 SHC			
Electronics.		4 614 6			
ELN 131	Semiconductor Appli	4 SHC			
or ELN 137	Electr Devices & Circuits	5 SHC			
or ELN 229	Industrial Electronics	4 SHC			

#### C. Other Major Hours: To be selected from the following prefixes:

AHR, ALT, ATR, BIO, BPR, BUS, CET, CHM, CIS, CMT, COE, CSC, CST, DFT, EGR, ELC, ELN, EUS, HEA, HYD, ISC, MAT, MAC, MEC, MNT, NET, OMT, PCI, PHY, PLA, PLU, SST, WLD, and WOL

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

#### **III.** Other Required Hours

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

#### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- **A.** Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- **H.** Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or self-employed business owner.

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	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

## **Curriculum Standard for Education/Training: Outdoor Leadership**

Career Cluster: Education & Training \*\*

**Cluster Description:** Planning, managing and providing education and training services, and related learning support services.

Pathway:Education/Training:Outdoor LeadershipI		ffective Term: Fall 20	013 (2013*03)			
Program Majors Under Pathway						
Program Major / Classification of Instruction	Credential Level(s)	Program				
Code	Offered	Major Code				
Outdoor Leadership	CIP Code 31.0601	AAS/Diploma/Certificate	A55330			

## **Pathway Description:**

This curriculum is designed to prepare individuals to be successful professionals in outdoor adventure, education and leadership.

Course work includes technical training in the areas such as backpacking, canoeing, kayaking, and rock-climbing. These skills are taught through facilitation and experiential learning methodologies. This course of study includes interpersonal skills and leadership skills such as group process, conflict resolution, program planning, and management issues.

Graduates from this program will have a sound background in outdoor leadership blended with a solid foundation of general education, business, and computer skills. Graduates are prepared for employment in the adventure tourism industry, therapeutic wilderness programs, specialized adventure/leadership programs, adventure programs for youth, challenge course industry, city, county, and state outdoor programs, public and private outdoor education centers, and private and public school outdoor programs.

Program Major Description: Choose one of the following  $4^{th}$  paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each **Program Major**:

**Outdoor Leadership:** A program that prepares individuals to work as an educator, instructor or facilitator in parks, recreational facilities, camps and other outdoor settings. Potential course work includes instruction in leadership skills, wilderness survival skills, first aid, group processes, counseling techniques, environmental studies and instruction in recreational activities such as rock climbing, ropes courses, backpacking, kayaking and canoeing.

[Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204(3)]: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours of semester hours must be in communications. General education is optional in certificate programs.

			raining: Outdoor Leader	<b>A</b>		
Recommen	nded	General Education Academic (	Core	AAS	Diploma	Certificate
Minimum	Gene	eral Education Hours Required	:	15 SHC	6 SHC	0 SHC
curriculum s	stande	ed below are recommended gene wd. Colleges may choose o include to meet local curriculum needs.				
		ertificate and diploma level curricu	lum courses. These courses may			
<u>not</u> be includ	ded in	associate degree programs.		( SUC	265110	Ontional
Communica	ation:			6 SHC	3-6 SHC	Optional
*COM	101	Workplace Communication	3 SHC			
COM	110	Introduction to Communication	3 SHC			
COM	120	Intro Interpersonal Com	3 SHC			
COM	231	Public Speaking	3 SHC			
*ENG	101	Applied Communications I	3 SHC			
*ENG	102	Applied Communications II	3 SHC			
ENG	110	Freshman Composition	3 SHC			
	111	Expository Writing	3 SHC			
	112	Argument-Based Research	3 SHC			
	114	Prof Research & Reporting	3 SHC			
ENG	115	Oral Communication	3 SHC			
	116	Technical Report Writing	3 SHC			
Humanities	/Fine	Arts:		3 SHC	0-3 SHC	Optional
		Values in the Workplace	2 SHC			-
		Technology and Society	3 SHC			
		Critical Thinking	3 SHC			
HUM		Leadership Development	3 SHC			
PHI		Introduction to Logic	3 SHC			
PHI		Introduction to Ethics	3 SHC			
Social /Beha	aviors	al Sciences:		3 SHC	0-3 SHC	Optional
	151	Survey of Economics	3 SHC			
ECO		Prin of Microeconomics	3 SHC			
GEO	110	Introduction to Geography	3 SHC			
GEO	111		3 SHC			
*PSY	101	World Regional Geography				
		Applied Psychology	3 SHC			
*PSY	102	Human Relations	2 SHC			
PSY	118	Interpersonal Psychology	3 SHC			
PSY	135	Group Processes	3 SHC			
PSY *COC		General Psychology	3 SHC			
*SOC		Social Relationships	3 SHC			
SOC		Introduction to Sociology	3 SHC			
SOC	215	Group Processes	3 SHC	2 6110		
Natural Scie	ences	Mathematics:		3 SHC	0-3 SHC	Optional
BIO		Environmental Biology	3 SHC			
BIO	160	Introductory Life Science	3 SHC			
*MAT	101	-	3 SHC			
MAT		Mathematical Measurement	3 SHC			
MAT	115		3 SHC			
MAT	120		3 SHC			
MAT	120	5 5 5	3 SHC			
MAT	140		3 SHC			
MAT	140	Statistics I	3 SHC			
MAT	151	Statistical Analysis	3 SHC			
PHY PHY	110	Conceptual Physics	3 SHC			
PHY	171	Applied Physics I	4 SHC			

- A. Technical Core. The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C.** Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from each prefix listed, with the exception of prefixes listed in the core.

	Education/Training: Outdoor Lea	AAS	Diploma	Certificate	
M	inimum Major Hours Required:	_	49 SHC	30 SHC	12 SHC
A.	Technical Core:				
	BUS 137 Principles of Management	3 SHC	37 SHC		
	ODL 110 Introduction to Outd Leadership	3SHC			
	ODL 115 Methods of Experiential Education	3 SHC			
	ODL 120 Challenge Course Facilitation	3 SHC			
	ODL 125 Wilderness First Responder	4 SHC			
	ODL 130 Water Based Activities I	3 SHC			
	ODL 135 Land Based Activities I	3 SHC			
B.	Program Major(s):				
	Outdoor Leadership				
	ODL 210 Water Based Activities II	3 SHC			
	ODL 212 Land Based Activities II	3 SHC			
	ODL 215 Admin & Policy Public Lan	3 SHC			
	ODL 220 Climbing	3 SHC			
	ODL 228 Outdr Ldrship Spec Pop	3 SHC			

#### C. Other Major Hours.

To be selected from the following prefixes:

BUS, CIS, COE, ETR, MED, ODL, PED, REC and SEM

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

#### **III. Other Required Hours**

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

#### **IV. Employability Competencies**

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- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
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- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
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- H. Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or selfemployed business owner.

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Summary of Required Semester Hour Credits (SHC) for each credential:

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

# Curriculum Standard for Industrial Systems Technology Career Cluster: Manufacturing\*\* Cluster Description: Planning, managing and performing the processing of materials into intermediate or final products and related professional and technical support activities such as production planning and control, maintenance and manufacturing/process engineering. Pathway: Maintenance, Installation, & Repair Effective Term: Fall 2013 (2013\*03) Program Majors Under Pathway Program

Program Major / Classification of Instruction Programs (CIP) Code		Credential Level(s) Offered	Program Major Code	
Industrial Systems Technology	CIP Code	15.0499	AAS/Diploma/Certificate	A50240

# **Pathway Description:**

The Industrial Systems Technology curriculum is designed to prepare or upgrade individuals to safely service, maintain, repair, or install equipment. Instruction includes theory and skill training needed for inspecting, testing, troubleshooting, and diagnosing industrial systems.

Students will learn multi-craft technical skills in print reading, mechanical systems maintenance, electricity, hydraulics/pneumatics, welding, machining or fabrication, and includes various diagnostic and repair procedures. Practical application in these industrial systems will be emphasized and additional advanced course work may be offered.

Upon completion of this curriculum, graduates should be able to individually, or with a team, safely install, inspect, diagnose, repair, and maintain industrial process and support equipment. Students will also be encouraged to develop their skills as life-long learners.

Program Description: Choose one of the following 4<sup>th</sup> paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each **Program Major:** 

N/A

[*Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204(3)*]: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours must be in communications. General education is optional in certificate programs.

Industrial Systems Technology           Recommended General Education Academic Core         AAS         Diploma         Certificate									
				AAS	Diploma	Certificate			
Minimum	Gene	eral Education Hours Required:		15 SHC	6 SHC	0 SHC			
standard. C courses to n	Colleg neet lo	low are recommended general educa es may choose to include additional ocal curriculum needs.	or alternative general education						
		ertificate and diploma level curricula associate degree programs.	um courses. These courses may						
Communica	ation:			6 SHC	3-6 SHC	Optional			
*COM	101	Workplace Communication	3 SHC						
COM		Introduction to Communications	3 SHC						
COM	120	Intro Interpersonal Com	3 SHC						
COM	231	Public Speaking	3 SHC						
*ENG	101	Applied Communications I	3 SHC						
*ENG	102	Applied Communications II	3 SHC						
ENG	110	Freshman Composition	3 SHC						
ENG	111	Expository Writing	3 SHC						
ENG	114	Prof Research & Reporting	3 SHC						
ENG	116	Technical Report Writing	3 SHC						
Humanities	/Fine	Arts:		3 SHC	0-3 SHC	Optional			
*HUM	101	Values in the Workplace	2 SHC	U SHC		optional			
HUM	110	Technology and Society	3 SHC						
		Critical Thinking	3 SHC						
		Leadership Development	3 SHC						
PHI		Introduction to Logic	3 SHC						
PHI	240	Introduction to Ethics	3 SHC						
Social /Beh				3 SHC	0-3 SHC	Optional			
ECO		-	3 SHC						
ECO	251		3 SHC						
*PSY	101	Applied Psychology	3 SHC						
*PSY	102	Human Relations	2 SHC						
PSY	118	Interpersonal Psychology	3 SHC						
PSY	135	Group Processes	3 SHC						
PSY		General Psychology	3 SHC						
*SOC	105	Social Relationships	3 SHC						
SOC	210	Introduction to Sociology	3 SHC						
SOC	215	Group Process	3 SHC						
		/Mathematics:		3 SHC	0-3 SHC	Optional			
*MAT		Applied Mathematics I	3 SHC						
MAT		Mathematical Measurements	3 SHC						
MAT		Mathematical Models	3 SHC						
MAT		Geometry and Trigonometry	3 SHC						
MAT		Algebra/Trigonometry I	3 SHC						
PHY		Conceptual Physics	3 SHC						
PHY	121	Applied Physics I	4 SHC						

- A. Technical Core. The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C.** Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from each prefix listed, with the exception of prefixes listed in the core.

Industrial Systems Technology (A50240)			AAS	Diploma	Certificate		
Mir	nimum I	Major	Hours Required:		49 SHC	30 SHC	12 SHC
A.	<b>Techn</b> i Courses		<b>Dre:</b> d for the diploma are designated with *		27-35 SHC	15-23 SHC	
	*MNT	110	Intro to Maint Procedures	2 SHC			
	*WLD	112	Basic Welding Processes	2 SHC			
	*HYD	110	Hydraulics/Pneumatics I	3 SHC			
	* Elect	ricity.	Select one:				
	ELC	111	Intro to Electricity	3 SHC			
	ELC	112	DC/AC Electricity	5 SHC			
	ELC	131	Circuit Analysis I	4 SHC			
	* Print	s and I	Diagrams. Select one:				
	BPR	111	Print Reading	2 SHC			
	BPR	115	Elc/Fluid Power Diagrams	2 SHC			
	BPR	135	Schematics & Diagrams	2 SHC			
	ELC	125	Diagrams and Schematics	2 SHC			
	* Meta	lworki	ng and Fabrication. Select one:				
	MAC	111	Machining Technology I	6 SHC			
	MAC	141	Machining Applications I	4 SHC			
	MEC	111	Machine Processes I	3 SHC			
		131	Metalworking Processes	3 SHC			
	MNT	160	Industrial Fabrication	2 SHC			
	* Safet	y. Sele	ect one:				
	ISC	110	Workplace Safety	1 SHC			
	ISC	112	Industrial Safety	2 SHC			
	ISC	121	Envir Health & Safety	3 SHC			

Degrined	S	Among Soloot and		
-	•	Areas: Select one.		
		ect one subject area plus additional c ne subject area for a minimum of (12		
Industrial S	ystems.			
Selec	t 12 SHO	C from prefixes listed in the technical	core.	
<b>Biofuels</b> Pro	oductior	1.		
ALT	110	Biofuels I	3 SHC	
ALT	210	Biofuels II	4 SHC	
ALT	211	Biofuels Analytics	4 SHC	
Electrical P	ower Pi	roduction.		
EPP	110	Intro to Power Plant Oper	2 SHC	
EPP	112	Fuels and Combustion	3 SHC	
EPP	210	Power Plant Systems	3 SHC	
EPP	212	Steam & Combustion TG	3 SHC	
EPP	214	Power Plant Environ Mgt	2 SHC	
Biogas Syst	ems.			
WAT	161	Solid Waste Management	2 SHC	
ISC	255	Engineering Economy	3 SHC	
WLD		Thermoplastic Welding	2 SHC	
ALT	130	Biogas Operations	2 SHC and	
ALT	130A		1 SHC	
or COE	111	Co-op Work Experience I	1 SHC	
ALT	131	Biogas Processes	2 SHC and	
ALT		Biogas Processes Lab	1 SHC	
or COE	121	Co-op Work Experience II	1 SHC	

#### C. Other Major Hours: To be selected from the following prefixes:

ALT AHR, ATR, BPM, BPR, CIS, CMT, COE, CSC, DFT, EGR, ELC, ELN, EPP, HET, HYD, ISC, MAC, MEC, MNT, NET, OMT, PCI, PFT, PHS, PHY, PKG, PLU, PPT, PTC, SST, WAT, WLD, and WOL

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

#### **III. Other Required Hours**

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

#### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- **A.** Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- **H.** Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or self-employed business owner.

\*\*The North Carolina Career Clusters Guide was developed by the North Carolina Department of Public Instruction and the North Carolina Community College system to link the academic and Career and Technical Education programs at the secondary and postsecondary levels to increase student achievement. Additional information about Career Clusters is located at: <u>http://www.nc-net.info/NC career clusters quide.php</u> or <u>http://www.careertech.org</u>.

Summary of Required Semester Hour Credits (SHC) for each credential:

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

# Curriculum Standard for Manufacturing Production and Process Development: Manufacturing and Industrial Engineering Technology

Career Cluster: Manufacturing\*\*

**Cluster Description:** Planning, managing, and performing the processing of materials into intermediate or final products and related professional and technical support activities such as production planning and control, maintenance and manufacturing/process engineering.

Pathway:Manufacturing Production ProcessEffective Term:Fall 2013 (2013\*03)Development

Program Majors Under Pathway								
Program Major / Classification of Instruction	n Programs (CIP)	Credential Level(s)	Program					
Code		Offered	Major Code					
Industrial Engineering Technology	CIP Code: 15.0612	AAS/Diploma/Certificate	A40240					
Industrial Management Technology	CIP Code: 52.0205	AAS/Diploma/Certificate	A50260					
Manufacturing Technology	CIP Code: 15.0699	AAS/Diploma/Certificate	A50320					
Quality Assurance and Continuous	CIP Code: 15.0702	AAS/Diploma/Certificate	A50XXX					
Improvement								

**Pathway Description:** These curriculums are designed to prepare students through the study and application of the principles for developing, implementing and improving integrated systems involving people, materials, equipment and information as leaders in an industrial or manufacturing setting.

Course work includes mathematics, systems analysis, leadership and management skills, quality and productivity improvement methods, cost analysis, facilities planning, manufacturing materials and processes, and computerized production methods.

Graduates should qualify as quality improvement technicians, quality assurance and control technicians, front-line supervisors, production planners, inventory supervisors, and manufacturing technicians.

Program Description: Choose one of the following  $4^{th}$  paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each Program Major:

**Industrial Engineering Technology:** A course of study that prepares the students to use basic engineering principles and technical skills to develop, implement, and improve industrial and service systems. Includes instruction in systems analysis, quality and productivity improvement techniques for process development, cost analysis, facilities planning, organizational behavior, industrial processes, industrial planning procedures, computer applications, and report and presentation preparation. Graduates should qualify for employment as industrial process technicians, quality assurance and control technicians, and facilities managers. Certification is available through organizations such as ASQC, SME, and APICS.

**Industrial Management Technology**: A course of study that prepares the students to use basic engineering principles and management skills to plan and manage operations of industrial and manufacturing processes. Includes instruction in financial management, industrial and human resources management, industrial psychology, management information systems, quality and productivity improvement, quality control, operations research, safety and health issues, and environmental program management. Graduates should be qualified to enter the workforce as front-line supervisor, engineering assistant, production planner, inventory supervisor, or as a quality control technician. With additional training and experience, graduates could become plant manager or production managers.

**Manufacturing Technology:** A course of study that prepares students to use basic engineering principles and technical skills to identify and resolve production problems in the manufacture of products. Includes instruction in

\*Within the degree program, the institution shall include opportunities for the achievement of competence in reading, writing, oral communication, fundamental mathematical skills, and basic use of computers.

machine operations and CNC principles, production line operations, instrumentation, computer-aided manufacturing (CAM) and other computerized production techniques, manufacturing planning, quality control, quality assurance and informational infrastructure. Graduates should qualify for employment as a manufacturing technician, quality assurance technician, CAD/CAM technician, team leader, or research and development technician.

**Quality Assurance and Continuous Improvement:** A course of study that prepares the students to use basic engineering principles and technical skills in maintaining consistent manufacturing and construction standards. Includes instruction in quality control systems management principles, technical standards applicable to specific engineering and manufacturing projects, testing procedures, inspection procedures, related instrumentation and equipment operation and maintenance, and report preparation. Graduates should qualify for employment as quality control systems technicians and managers, quality control analysts, inspectors, testers, and compliance managers. Certification is available through organizations such as ASQC, SME and APICS.

[Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204(3)]: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours must be in communications. General education is optional in certificate programs.

Manufacturing Production Process Development: Manufacturing and Industrial						
Engineering Technology						

Gene	eral Ed	lucati	on Academic Core		AAS	Diploma	Certificate
Mini	imum (	Gener	al Education Hours Required:		15 SHC	6 SHC	0 SHC
stand	lard. C	olleges	w are recommended general education s may choose to include additional or a cal curriculum needs.	-			
			rtificate and diploma level curriculum	courses. These courses may			
<u>noi</u> D	e inclua	ea in a	associate degree programs.				
Com	munica				6 SHC	3-6 SHC	Optional
	*COM		Workplace Communication	3 SHC			
	COM	110	Introduction to Communication	3 SHC			
	COM	120	Intro Interpersonal Com	3 SHC			
	COM	231	Public Speaking	3 SHC			
	*ENG	101	Applied Communications I	3 SHC			
	*ENG	102	Applied Communications II	3 SHC			
	ENG	110	Freshman Composition	3 SHC			
	ENG	111	Expository Writing	3 SHC			
	ENG	114	Professional Research & Reporting	3 SHC			
	ENG	116	Technical Report Writing	3 SHC			
Hun	nanities	/Fine	Arts:		3 SHC	0-3 SHC	Optional
	*HUM	101	Values in the Workplace	2 SHC	U SHC		optional
	HUM	110	Technology and Society	3 SHC			
	HUM	115	Critical Thinking	3 SHC			
	HUM	230	Leadership Development	3 SHC			
	PHI	230	Introduction to Logic	3 SHC			
	PHI	240	Introduction to Ethics	3 SHC			
Socia	ıl/Behav	vioral	Sciences:		3 SHC	0-3 SHC	Optional
	ECO	151	Survey of Economics	3 SHC			
	ECO	251	Prin of Microeconomics	3 SHC			
	GEO	110	Introduction to Geography	3 SHC			
	GEO	111	World Regional Geography	3 SHC			
	GEO	131	Physical Geography I	4 SHC			
	*PSY	101	Applied Psychology	3 SHC			
	*PSY	102	Human Relations	2 SHC			
	PSY	118	Interpersonal Psychology	3 SHC			
	PSY	135	Group Processes	3 SHC			
	PSY	150	General Psychology	3 SHC			
	*SOC	105	Social Relationships	3 SHC			
	SOC	210	Introduction to Sociology	3 SHC			
	SOC	215	Group Process	3 SHC			
Natu	ral Scie	nces/I	Mathematics:		3 SHC	0-3 SHC	Optional
	MAT	120	Geometry and Trigonometry	3 SHC	5 5110		
	MAT	121	Algebra/Trigonometry I	3 SHC			
	MAT	161	College Algebra	3 SHC			
	MAT	171	Precalculus Algebra	3 SHC			
	MAT	175	Precalculus	4 SHC			
	MAT	223	Applied Calculus	3 SHC			
			Calculus I				1

- A. Technical Core. The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C.** Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from any prefix listed, with the exception of prefixes listed in the core.

Minimum M Courses requir A. Technical *ISC *Cha DFT DFT DFT EGR ISC B. Program For AAS Degree	C 132Mfg Quality Controlcose one:Technical Drafting Ic 111Technical Drafting Ic 119Basic CADc 151CAD Ic 170Engineering Graphicsc 120Eng and Design Graphics112Industrial Safety		y 49 SHC 19-21 SHC	30 SHC 12 SHC	12 SHC
Minimum M Courses requir A. Technical *ISC *Cha DFT DFT DFT DFT EGR ISC 0 ISC B. Program For AAS Degree	ajor Hours Required:         red for a diploma are designated with         I Core:         2 132       Mfg Quality Control         pose one:         2 111       Technical Drafting I         2 119       Basic CAD         2 151       CAD I         2 170       Engineering Graphics         2 120       Eng and Design Graphics         112       Industrial Safety         R       121         2 121       Envir Health & Safety	th * 3 SHC 2 SHC 2 SHC 3 SHC 3 SHC 3 SHC 2 SHC 2 SHC	49 SHC		12 SHC
A. Technical *ISC *Cha DFT DFT DFT EGR ISC B. Program For AAS Degree	I Core:2 132Mfg Quality Controlpose one:111Technical Drafting I119Basic CAD151CAD I151CAD I170Engineering Graphics120Eng and Design Graphics112Industrial Safety <i>R</i> 121121Envir Health & Safety	3 SHC 2 SHC 2 SHC 3 SHC 3 SHC 3 SHC 2 SHC	19-21 SHC	12 SHC	
*ISC *Cha DFT DFT DFT EGR ISC 0 ISC <b>B. Program</b> For AAS Degree	C 132Mfg Quality Controlcose one:Technical Drafting I111Technical Drafting I119Basic CAD151CAD I170Engineering Graphics120Eng and Design Graphics112Industrial SafetyR121121Envir Health & Safety	2 SHC 2 SHC 3 SHC 3 SHC 3 SHC 2 SHC			
*Cha DFT DFT DFT EGR ISC O ISC <b>B. Program</b> For AAS Degree	Dose one:111Technical Drafting I119Basic CAD151CAD I170Engineering Graphics120Eng and Design Graphics112Industrial Safety <i>R</i> 121121Envir Health & Safety	2 SHC 2 SHC 3 SHC 3 SHC 3 SHC 2 SHC			
DFT DFT DFT EGR ISC O ISC <b>3. Program</b> For AAS Degree	111Technical Drafting I119Basic CAD151CAD I151CAD I170Engineering Graphics120Eng and Design Graphics112Industrial Safety <i>R</i> 121121Envir Health & Safety	2 SHC 3 SHC 3 SHC 3 SHC 2 SHC			
DFT DFT EGR ISC O ISC <b>B. Program</b> For AAS Degree	<ul> <li>119 Basic CAD</li> <li>151 CAD I</li> <li>170 Engineering Graphics</li> <li>120 Eng and Design Graphics</li> <li>112 Industrial Safety</li> <li><i>R</i></li> <li>121 Envir Health &amp; Safety</li> </ul>	2 SHC 3 SHC 3 SHC 3 SHC 2 SHC			
DFT DFT EGR ISC O ISC <b>B. Program</b> For AAS Degree	<ul> <li>119 Basic CAD</li> <li>151 CAD I</li> <li>170 Engineering Graphics</li> <li>120 Eng and Design Graphics</li> <li>112 Industrial Safety</li> <li><i>R</i></li> <li>121 Envir Health &amp; Safety</li> </ul>	2 SHC 3 SHC 3 SHC 3 SHC 2 SHC			
DFT DFT EGR ISC O ISC <b>B. Program</b> For AAS Degree	<ul> <li>151 CAD I</li> <li>170 Engineering Graphics</li> <li>120 Eng and Design Graphics</li> <li>112 Industrial Safety</li> <li><i>R</i></li> <li>121 Envir Health &amp; Safety</li> </ul>	3 SHC 3 SHC 3 SHC 2 SHC			
DFT EGR ISC <i>O</i> ISC <b>B. Program</b> For AAS Degree	<ul> <li>170 Engineering Graphics</li> <li>120 Eng and Design Graphics</li> <li>112 Industrial Safety</li> <li><i>R</i></li> <li>121 Envir Health &amp; Safety</li> </ul>	3 SHC 3 SHC 2 SHC			
EGR ISC <i>O</i> ISC <b>B. Program</b> For AAS Degree	<ul> <li>120 Eng and Design Graphics</li> <li>112 Industrial Safety</li> <li><i>R</i></li> <li>121 Envir Health &amp; Safety</li> </ul>	3 SHC 2 SHC			
<i>O</i> ISC <b>B. Program</b> For AAS Degree	R 121 Envir Health & Safety				
<i>O</i> ISC <b>B. Program</b> For AAS Degree	R 121 Envir Health & Safety				
ISC <b>B. Program</b> For AAS Degree	121 Envir Health & Safety	3 SHC			
For AAS Degree	Maior(s).				
	e select one program major plus addition program major for a minimum of (12) s				
Indu	strial Engineering Technology				
ISC		t 3 SHC			
ISC		3 SHC			
ISC		3 SHC			
	noose one:				
MEG	C111 Machine Processes I	3 SHC			
MEG	C145 Mfg Materials I	3 SHC			
MEG	C161 Manufacturing Processes I	3 SHC			
Indu	<u>istrial Management Technology</u>				
			1		
*ISC	C 135 Principles of Industrial Mgm				
*ISC *ISC		t 4 SHC 3 SHC 3 SHC			

*Choose o	ne:			
MEC 145	Mfg_Materials I	3 SHC		
MEC 180	Engineering Materials	3 SHC		
*Choose o	ne:			
ISC 212	Metrology	2 SHC		
MAC114	Intro to Metrology	2 SHC		
MEC151	Mechanical Mfg Systems	2 SHC		
*Choose o	ne:			
ATR 112	Intro to Automation	3 SHC		
BPR 111	Print Reading	2 SHC		
HYD110	Hydraulics/Pneumatics I	3 SHC		
HYD 180	Pneumatics in Automation	3 SHC		
ISC 220	Lean Manufacturing	3 SHC		
Quality Ass	surance and Continuous Improvement			
*ISC 135	Principles of Industrial Management	4 SHC		
ISC 212	Metrology	2 SHC		
ISC 220	Lean Manufacturing	3 SHC		
*ISC 270	Quality Systems Elements	2 SHC		
*ISC 271	Sampling & Reliability	2 SHC		
ISC 272	Quality Mgmt Concepts	2 SHC		
ISC 275	Auditing Quality Systems	3 SHC		
*MAC114	Intro to Metrology	2 SHC		
*MEC145	Mfg Materials I	3 SHC		
OR		A 0110		
*MEC180	Engineering Materials	3 SHC	 	

#### C. Other Major Hours. To be selected from the following prefixes:

ACA, ACC, ALT, ATR, BAT, BIO, BPM, BPR, BTC, BUS, CEG, CET, CIS, CIV, CHM, CMT, COE, CSC, CST, CTS, CTI, DBA, DDF, DFT, ECO, EGR, ELC, ELN, HYD, ISC, MAC, MAT, MEC, NOS, OMT, PHY, PLA, PTC, SRV, SST, WLD

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

#### **III.** Other Required Hours

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

#### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- **A.** Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- H. Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or self-employed business owner.

\*\*The North Carolina Career Clusters Guide was developed by the North Carolina Department of Public Instruction and the North Carolina Community College system to link the academic and Career and Technical Education programs at the secondary and postsecondary levels to increase student achievement. Additional information about Career Clusters is located at: <u>http://www.nc-net.info/NC career clusters guide.php</u> or <u>http://www.careertech.org</u>.

Summary of Required Semester Hour Credits (SHC) for each credential:

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

## **Curriculum Standard for Production: Welding Technology**

**Career Cluster:** *Manufacturing*\*\*

**Cluster Description:** A program that prepares individuals to apply technical knowledge and skills to join or cut metal. Includes instruction in arc welding, resistance welding, cutting, welding processes, safety, and applicable codes and standards.

Pathway: Production

**Effective Term:** Fall 2013 (2013\*03)

Program Majors Inc	luded Un	der the I	Production Pathway	
Program Major / Classification of Instruction Programs (CIP)			Credential Level(s)	Program
Code			Offered	Major Code
Welding Technology	CIP Code	48.0508	AAS/Diploma/Certificate	A50420

## **Pathway Description:**

The Welding Technology curriculum provides students with a sound understanding of the science, technology, and applications essential for successful employment in the welding and metalworking industry.

Instruction includes consumable and non-consumable electrode welding and cutting processes. Courses may include math, print reading, metallurgy, welding inspection, and destructive and non-destructive testing providing the student with industry-standard skills developed through classroom training and practical application.

Graduates of the Welding Technology curriculum may be employed as entry-level technicians in welding and metalworking industries. Career opportunities also exist in construction, manufacturing, fabrication, sales, quality control, supervision, and welding-related self-employment.

Program Description: Choose one of the following  $4^{th}$  paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each **Program Major:** 

N/A

### I. General Education Academic Core

[*Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204(3)*]: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours must be in communications. General education is optional in certificate programs.

Recommended	General Education Academic C	Core	AAS	Diploma	Certificate
Minimum General Education Hours Required:		15 SHC	6 SHC	0 SHC	
standard. Colleg courses to meet lo	low are recommended general educe es may choose to include additional ocal curriculum needs.	or alternative general education			
	ertificate and diploma level curricul associate degree programs.	um courses. These courses may			
Communication:			6 SHC	3-6 SHC	Optional
*COM 101	Workplace Communication	3 SHC			1
COM 110	Introduction to Communication	3 SHC			
COM 120	Intro Interpersonal Com	3 SHC			
COM 231	Public Speaking	3 SHC			
*ENG 101	Applied Communications I	3 SHC			
*ENG 102	Applied Communications II	3 SHC			
	Freshman Composition	3 SHC			
ENG 111	Expository Writing	3 SHC			
	Prof Research & Reporting	3 SHC			
ENG 116	Technical Report Writing	3 SHC			
Humanities/Fine	Arts:		3 SHC	0-3 SHC	Optional
*HUM 101	Values in the Workplace	2 SHC			1
HUM 110	Technology and Society	3 SHC			
HUM 115	Critical Thinking	3 SHC			
HUM 230	Leadership Development	3 SHC			
PHI 230	Introduction to Logic	3 SHC			
PHI 240	Introduction to Ethics	3 SHC			
Social /Behaviora					
ECO 128	Survey of Economics	3 SHC	3 SHC	0-3 SHC	Optional
ECO 251	Prin of Microeconomics	3 SHC			
*SOC 105	Social Relationships	3 SHC			
SOC 215	Group Processes	3 SHC			
*PSY 101	Applied Psychology	3 SHC			
*PSY 102	Human Relations	2 SHC			
	Interpersonal Psychology	3 SHC			
	Group Processes	3 SHC			
PSY 150	General Psychology	3 SHC			
Natural Sciences			2 6110		Ontional
	Applied Mathematics I	3 SHC	3 SHC	0-3 SHC	Optional
	Mathematical Measurement	3 SHC			
	Mathematical Models	3 SHC			
	Geometry and Trigonometry	3 SHC			
	Algebra/Trigonometry I	3 SHC			
	Conceptual Physics	3 SHC			
PHY 121	Applied Physics I	4 SHC			

- A. Technical Core. The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C.** Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from each prefix listed, with the exception of prefixes listed in the core.

Production: Welding Technology			Diploma	Certificate
Minimum Major Hours Required:		49 SHC	30 SHC	12 SHC
Technical Core/Program Major:			18 SHC	
Courses required for the diploma program major are designated	d with an asterisk (*).			
*WLD 110 Cutting Processes	2 SHC			
*WLD 115 SMAW (Stick) Plate	5 SHC			
*WLD 121 GMAW (MIG) FCAW/Plate	4 SHC			
*WLD 131 GTAW (TIG) Plate	4 SHC			
*WLD 141 Symbols & Specifications	3 SHC			

### C. Other Major Hours.

To be selected from the following prefixes:

BPR, BUS, CIS, COE, CSC, DFT, ELC, ISC, MAC, MAT, MEC, OMT, PCJ, PCS, PHY, WLD, and WOL.

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

### **III. Other Required Hours**

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- **A.** Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- **H.** Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or self-employed business owner.

\*\*The North Carolina Career Clusters Guide was developed by the North Carolina Department of Public Instruction and the North Carolina Community College system to link the academic and Career and Technical Education programs at the secondary and postsecondary levels to increase student achievement. Additional information about Career Clusters is located at: <u>http://www.nc-net.info/NC career clusters guide.php</u> or <u>http://www.careertech.org</u>.

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

## Curriculum Standard for Quality Assurance: Nondestructive Examination Technology

Career Cluster: Manufacturing\*\*

Cluster Description:Planning, managing, and performing the processing of materials into<br/>intermediate or final products and related professional and technical support activities such<br/>as production planning and control, maintenance and manufacturing/process engineering.Pathway:Quality AssuranceEffective Term:Fall 2013 (2013\*03)

 Directive Ferriti Full 2013 (2013 03)

 Program Majors Under Pathway

 Program Major / Classification of Instruction Programs (CIP)
 Credential Level(s)
 Program

 Code
 Offered
 Major Code

 Nondestructive Examination Technology
 CIP Code: 41.0204
 AAS/Diploma/Certificate
 A50350

**Pathway Description:** This curriculum is designed to prepare students to use scientific principles and technical skills to the operation of industrial and research testing equipment.

The course work includes mathematics, natural sciences, engineering sciences and technology.

Graduates should qualify to obtain occupations such as technical service providers, materials and technologies testing services, process improvement technicians, engineering technicians, construction technicians and managers, industrial and technology managers, or research technicians.

Program Description: Choose one of the following  $4^{th}$  paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each Program Major:

**Nondestructive Examination Technology:** This course of study prepares the students to apply technical skills in nondestructive testing of materials and component parts for flaws or defects jeopardizing structural integrity. Course work includes ultrasonics, radiography, liquid penetrant, magnetic particle eddy current and visual testing methods. Applied math and physics are an integral part of NDE and the curriculum. The NDE curriculum meets the initial training requirements of ASNT' s SNT-TC-1A, permitting graduates to obtain NDE certification after a few months of on-the-job experience. Career opportunities exist in applied NDE, material sciences, technical sales, and quality control in many industries.

\*Within the degree program, the institution shall include opportunities for the achievement of competence in reading, writing, oral communication, fundamental mathematical skills, and basic use of computers.

### I. General Education Academic Core

[Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204(3)]: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours must be in communications. General education is optional in certificate programs.

		Quality Assurance: Nond	estructive Examinatio	on Techno	ology	
General Education Academic Core		AAS	Diploma	Certificate		
Minimum General Education Hours Required:			15 SHC	6 SHC	0 SHC	
standard. C courses to m *Recomment	College neet loc ded cei	w are recommended general education s may choose to include additional or a cal curriculum needs. rtificate and diploma level curriculum associate degree programs.	lternative general education			
<u>noi</u> de inclue		ussociate degree programs.				
Communica *COM COM COM *ENG *ENG ENG ENG ENG ENG	101	Workplace Communication Introduction to Communication Intro Interpersonal Com Public Speaking Applied Communications I Applied Communications II Freshman Composition Expository Writing Professional Research & Reporting Technical Report Writing	3 SHC 3 SHC	6 SHC	3-6 SHC	Optional
** •.•	(17)					
Humanities *HUM HUM HUM HUM PHI PHI		Values in the Workplace Technology and Society Critical Thinking Leadership Development Introduction to Logic Introduction to Ethics	2 SHC 3 SHC 3 SHC 3 SHC 3 SHC 3 SHC 3 SHC	3 SHC	0-3 SHC	Optional
Social/Beha	vioral	Sciences:		3 SHC	0-3 SHC	Optional
ECO ECO GEO GEO *PSY *PSY PSY PSY PSY *SOC SOC SOC	151 251 110 111 131 101 102 118 135 150 105 210 215	Survey of Economics Prin of Microeconomics Introduction to Geography World Regional Geography Physical Geography I Applied Psychology Human Relations Interpersonal Psychology Group Processes General Psychology Social Relationships Introduction to Sociology Group Process	3 SHC 3 SHC 3 SHC 3 SHC 4 SHC 3 SHC			
Natural Sci	ences/I	Mathematics:		2 5117		Ontional
MAT MAT MAT MAT MAT MAT MAT	120 121 161 171 175 223	Geometry and Trigonometry Algebra/Trigonometry I College Algebra Precalculus Algebra Precalculus Applied Calculus Calculus I	3 SHC 3 SHC 3 SHC 3 SHC 4 SHC 3 SHC 4 SHC 4 SHC	3 SHC	0-3 SHC	Optional

- **A. Technical Core.** The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C.** Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from any prefix listed, with the exception of prefixes listed in the core.

	Quality Assurance: Nondestructive Examination Technology Minimum Major Hours Required: Courses required for a diploma are designated with *			AAS	Diploma	Certificate
Mi				49 SHC	30 SHC	12 SHC
Co				24 SHC	14 SHC	
A.	Technical C	ore:				
*	NDE 110	Intro to Nondestr Exam	3 SHC			
*	NDE 112	Materials and Processes	3 SHC			
*	NDE 121	Prin of Ultrason Exam UT	4 SHC			
*	NDE 122	Angle Beam Examination	4 SHC			
	NDE 131	Rad Safety & Prin of RT	4 SHC			
	NDE 141	Surface Testing (VT/PT)	3 SHC			
	NDE 151	Electromag Test (MT/ET)	3 SHC			
п	D	-torr NT-torrullochla				
В.	Program M	ajor: Not applicable				

### C. Other Major Hours. To be selected from the following prefixes:

CIS, COE, CSC, DFT, EGR, ELC, ISC, MAC, MAT, MEC, NDE, PHY, SST, and WLD

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

### **III.** Other Required Hours

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- **A.** Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- H. Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or self-employed business owner.

\*\*The North Carolina Career Clusters Guide was developed by the North Carolina Department of Public Instruction and the North Carolina Community College system to link the academic and Career and Technical Education programs at the secondary and postsecondary levels to increase student achievement. Additional information about Career Clusters is located at: <u>http://www.nc-net.info/NC career clusters guide.php</u> or <u>http://www.careertech.org</u>.

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

# Curriculum Standard for Engineering and Technology: Applied, Automation, Mechatronics Engineering Technology

Career Cluster: Science, Technology, Engineering, Mathematics\*\*

**Cluster Description:** Planning, managing, and providing scientific research and professional and technical services (e.g., physical science, social science, and engineering) including laboratory and testing services, and research and development services.

Pathway: Engineering and TechnologyEffective Term: Fall 2013 (2013\*03)

Program Majors Under Pathway							
Program Major / Classification of Instruct	Credential Level(s)	Program					
Code		Offered	Major Code				
Applied Engineering Technology	CIP Code: 15.0000	AAS/Diploma/Certificate	A40130				
Automation Engineering Technology	CIP Code: 15.0406	AAS/Diploma/Certificate	A40120				
Mechatronics Engineering Technology	CIP Code: 15.0403	AAS/Diploma/Certificate	A40350				

**Pathway Description:** These curriculums are designed to prepare students through the study and application of principles from mathematics, natural sciences, and technology and applied processes based on these subjects.

Course work includes mathematics, natural sciences, engineering sciences and technology.

Graduates should qualify to obtain occupations such as technical service providers, materials and technologies testing services, process improvement technicians, engineering technicians, industrial and technology managers, or research technicians.

Program Description: Choose one of the following  $4^{th}$  paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each Program Major:

**Applied Engineering Technology:** A course of study that prepares the students to use basic engineering principles and technical skills to solve technical problems in various types of industry. The course work emphasizes analytical and problem-solving skills. The curriculum includes courses in safety, math, physics, electricity, engineering technology, and technology-specific specialty areas. Graduates should qualify for employment in a wide range of positions in research and development, manufacturing, sales, design, inspection, or maintenance. Employment opportunities exist in automation, computer, electrical, industrial, or mechanical engineering fields, where graduates will function as engineering technicians.

**Automation Engineering Technology:** A course of study that prepares the students to use basic engineering principles and technical skills to develop, install, calibrate, modify and maintain automated systems. Includes instruction in computer systems; electronics and instrumentation; programmable logic controllers (PLCs); electric, hydraulic and pneumatic control systems; actuator and sensor systems; process control; robotics; applications to specific industrial tasks. The graduates of this curriculum will be prepared for employment in industries that utilize control systems, computer hardware and software, electrical, mechanical and electromechanical devices in their automation systems.

**Mechatronics Engineering Technology:** A course of study that prepares the students to use basic engineering principles and technical skills in developing and testing automated, servomechanical, and other electromechanical systems. Includes instruction in prototype testing, manufacturing and operational testing, systems analysis and maintenance procedures. Graduates should be qualified for employment in industrial maintenance and manufacturing including assembly, testing, startup, troubleshooting, repair, process improvement, and control systems, and should qualify to sit for Packaging Machinery Manufacturers Institute (PMMI) mechatronics or similar industry examinations.

\*Within the degree program, the institution shall include opportunities for the achievement of competence in reading, writing, oral communication, fundamental mathematical skills, and basic use of computers.

### I. General Education Academic Core

[*Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204(3)*]: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours must be in communications. General education is optional in certificate programs.

## Engineering and Technology: Applied, Automation and Mechatronics Engineering Technology

General Ec	lucati	on Academic Core		AAS	Diploma	Certificate
Minimum General Education Hours Required:			15 SHC	6 SHC	0 SHC	
standard. C	College.	w are recommended general education s may choose to include additional or a cal curriculum needs.				
*Recommend	ded cei	rtificate and diploma level curriculum	courses. These courses may			
		associate degree programs.	, , , , , , , , , , , , , , , , , , ,			
Communica	tions					
*COM		Workplace Communication	3 SHC	6 SHC	3-6 SHC	Optional
COM		Introduction to Communication	3 SHC			
COM		Intro Interpersonal Com	3 SHC			
COM		Public Speaking	3 SHC			
*ENG	101	Applied Communications I	3 SHC			
*ENG	101	Applied Communications I Applied Communications II	3 SHC			
ENG	1102	Freshman Composition	3 SHC			
ENG	111	Expository Writing	3 SHC			
ENG	111	Professional Research & Reporting	3 SHC			
ENG	114	Technical Report Writing	3 SHC			
ENG	110	Technical Report writing	5 500			
Humanities	/Fine			3 SHC	0-3 SHC	Optional
*HUM	101	Values in the Workplace	2 SHC			_ ·
HUM	110	Technology and Society	3 SHC			
HUM	115	Critical Thinking	3 SHC			
HUM	230	Leadership Development	3 SHC			
PHI	230	Introduction to Logic	3 SHC			
PHI	240	Introduction to Ethics	3 SHC			
Social/Beha	vioral	Sciences:				
ECO	151	Survey of Economics	3 SHC	A 6116		
ECO	251	Prin of Microeconomics	3 SHC	3 SHC	0-3 SHC	Optional
GEO	110	Introduction to Geography	3 SHC			
GEO	111	World Regional Geography	3 SHC			
GEO	131	Physical Geography I	4 SHC			
*PSY	101	Applied Psychology	3 SHC			
*PSY	101	Human Relations	2 SHC			
PSY	118	Interpersonal Psychology	3 SHC			
PSY	135	Group Processes	3 SHC			
PSY	150	General Psychology	3 SHC			
*SOC	105	Social Relationships	3 SHC			
SOC	210	Introduction to Sociology	3 SHC			
SOC	215	Group Process	3 SHC			
		-				
		Mathematics:				
MAT	120	Geometry and Trigonometry	3 SHC			
MAT	121	Algebra/Trigonometry I	3 SHC	3 SHC	0-3 SHC	Optional
MAT	161	College Algebra	3 SHC			
MAT	171	Precalculus Algebra	3 SHC			
MAT	175	Precalculus	4 SHC			
MAT	223	Applied Calculus	3 SHC			
MAT	271	Calculus I	4 SHC			

- **A. Technical Core.** The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C.** Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from any prefix listed, with the exception of prefixes listed in the core.

Engineering and Technology: Applied, Automation, Mechatronics Engineering Technology			AAS	Diploma	Certificate	
Minimum Major Hours Required:		49 SHC	30 SHC	12 SHC		
Courses required for a diploma are designated with *		16-44 SHC	16-24 SHC			
A. Technical C	Core:					
*Co	omputer	Applications				
(	Choose of	ne:				
CIS	5 110	Introduction to Computers	3 SHC			
EG	R 111	Eng Comp and Careers	3 SHC			
EG	R 125	Appl Software for Tech	2 SHC			
EL	C 127	Software for Technicians	2 SHC			
*Sa	ıfety					
	Choose d	one:				
ISC	C 112	Industrial Safety	2 SHC			
ISC	C 115	Construction Safety	2 SHC			
-		e program major.				
	-	<u>ering Technology</u>				
	mputers					
*Co	mputers Choose	one:	2,5110			
*Col	<b>mputers</b> <i>Choose</i> T 119	one: Basic CAD	2 SHC			
*Col	mputers Choose	one:	2 SHC 2 SHC			
*Cor DF EL( *El(	mputers Choose T 119 C 127 ectricity	one: Basic CAD Software for Technicians				
*Co DF EL *El	mputers Choose T 119 C 127 ectricity Choose o	one: Basic CAD Software for Technicians ne:	2 SHC			
*Co DF EL *El	mputers Choose of T 119 C 127 ectricity Choose of LC 131	one: Basic CAD Software for Technicians ne: Circuit Analysis I	2 SHC 4 SHC			
*Co DF EL *Ek EL	mputers Choose T 119 C 127 ectricity Choose o C 131 C 138	one: Basic CAD Software for Technicians ne: Circuit Analysis I DC Circuit Analysis	2 SHC 4 SHC 4 SHC			
*Co DF EL *Ek EL EL	mputers Choose of T 119 C 127 ectricity Choose of LC 131	one: Basic CAD Software for Technicians ne: Circuit Analysis I	2 SHC 4 SHC			
*Co DF ELC *EL EL EL EL	mputers Choose T 119 C 127 ectricity Choose o C 131 C 138	one: Basic CAD Software for Technicians ne: Circuit Analysis I DC Circuit Analysis AC Circuit Analysis	2 SHC 4 SHC 4 SHC			
*Co DF ELC *Ek EL EL EL	<b>mputers</b> <i>Choose o</i> T 119 C 127 <b>ectricity</b> <i>Choose o</i> <i>J</i> C 131 <i>J</i> C 138 <i>J</i> C 139	one: Basic CAD Software for Technicians ne: Circuit Analysis I DC Circuit Analysis AC Circuit Analysis <b>g</b> one:	2 SHC 4 SHC 4 SHC			
*Co DF ELC *Ek EL EL EL	mputers Choose of T 119 C 127 ectricity Choose of LC 131 LC 138 LC 139 ngineerin	one: Basic CAD Software for Technicians ne: Circuit Analysis I DC Circuit Analysis AC Circuit Analysis <b>g</b> one: Hydraulics/Pneumatics I	2 SHC 4 SHC 4 SHC			
*Co DF ELC *Ek EL EL EL EL EL	mputers Choose of T 119 C 127 ectricity Choose of C 131 C 138 C 139 ngineerin Choose of	one: Basic CAD Software for Technicians ne: Circuit Analysis I DC Circuit Analysis AC Circuit Analysis <b>g</b> one: Hydraulics/Pneumatics I Hydraulics/Med/Heavy Duty	2 SHC 4 SHC 4 SHC 4 SHC 3 SHC 2 SHC			
*Co DF ELC *Ek EL EL EL EL EL HY HY	mputers Choose of T 119 C 127 ectricity Choose of C 131 C 138 C 139 ngineerin Choose of YD 110	one: Basic CAD Software for Technicians ne: Circuit Analysis I DC Circuit Analysis AC Circuit Analysis <b>g</b> one: Hydraulics/Pneumatics I	2 SHC 4 SHC 4 SHC 4 SHC 3 SHC			
*Co DF ELC *Ek EL EL EL EL EL HY HY HY	mputers Choose of T 119 C 127 ectricity Choose of C 131 C 138 C 139 ngineerin Choose of YD 110 YD 112	one: Basic CAD Software for Technicians ne: Circuit Analysis I DC Circuit Analysis AC Circuit Analysis <b>g</b> one: Hydraulics/Pneumatics I Hydraulics/Med/Heavy Duty	2 SHC 4 SHC 4 SHC 4 SHC 3 SHC 2 SHC			
*Co DF ELC *Ek EL EL EL *En HY HY HY HY MI	<b>mputers</b> <i>Choose o</i> T 119 C 127 <b>ectricity</b> <i>Choose o</i> <i>J</i> C 131 <i>J</i> C 138 <i>J</i> C 138 <i>J</i> C 139 <b>ngineerin</b> <i>Choose o</i> <i>Y</i> D 110 <i>Y</i> D 112 <i>Y</i> D 115 NT 165	one: Basic CAD Software for Technicians ne: Circuit Analysis I DC Circuit Analysis AC Circuit Analysis <b>g</b> one: Hydraulics/Pneumatics I Hydraulics/Med/Heavy Duty Industrial Hydraulics	2 SHC 4 SHC 4 SHC 4 SHC 3 SHC 2 SHC 3 SHC			

ELC 117       Motos and Controls       4 SIIC         ELC 128       Intro to PLC       3 SIIC         *Specially       Choose one:       3 SIIC         CLT 110       Intro to Automation       3 SIIC         ELC 123       Control CLT       1 SIIC         ELC 130       Intro to Automation       3 SIIC         MRC 110       Intro to Automation       3 SIIC         MCC 1130       Process Control Systems       4 SIIC         *ATR 112       Intro to Automation       3 SIIC         *ATR 121       Intro to Automation       3 SIIC         *ATR 121       Intro to Automation       4 SIIC         *Consor exert       Consor exert       SIIC         ELC 131       Circuit Analysis       4 SIIC         *ELC 132       Circuit Analysis       4 SIIC         *ELC 131       Circuit Analysis       4 SIIC         *Close exert       Circuit Analysis       4 SIIC         *ATR 112       Intro to Automation       3 SIIC         ELC 131       Circuit Analysis       <						
ELC 128     Intro to PLC     3 SIC       "Specially Choose ove:     3 SHC       ATR 112     Intro to Automation     3 SHC       CFT 110     Intro to CAT     1 SHC       ELN 131     Analog Electronics 1     4 SHC       MEC 100     Dural Tossing Lish Tech     3 SHC       MEC 110     Intro to CAD/CAM     2 SHC       MEC 110     Intro to CAD/CAM     2 SHC       ATTR 112     Intro to Automation     4 SHC       ATTR 112     Intro to Automation     4 SHC       *ATTR 112     Intro to Automation     4 SHC       *TATR 113     Intro to Matomation     4 SHC       *TATR 113     Intro to Matomation     4 SHC       *Close one set:     2 SHC     5 SHC       PCL 171     Fieldbas Systems     4 SHC       Paster Electricity     5 SHC     6 SHC       PLC 133     DC Circuit Analysis     4 SHC       PLC 134     Inter understandon     5 SHC       PLC 135     DC Circuit Analysis     4 SHC       *ATR 112     Inter understandon     5 SHC       PLC 136     DC Circuit Analysis     4 SHC       *LC 131     Intrumentation     4 SHC       *LC 131     Intrumentation     5 SHC       PLC 134     DC Circuit Analysis <td< td=""><td>ELC 117</td><td>Motors and Controls</td><td>4 SHC</td><td></td><td></td><td></td></td<>	ELC 117	Motors and Controls	4 SHC			
*Specialty       Choose one:         ATR 112       Intro to Automation       3 SHC         CTT 110       Intro to CTT       1 SHC         EN 131       Analge Electronics 1       4 SHC         ISC 129       Qual Testing Lab Tech       3 SHC         MEC 110       Intro to AUDOCMM       2 SHC         MEC 110       Intro to Automation       3 SHC         *ATR 121       Intro to Machine Vision       4 SHC         *ATR 125       Sentor and Transhuers       3 SHC         *ATR 125       Sentor and Transhuers       4 SHC         PC 1 71       Fieldbab Systems       4 SHC         PLC 133       Decirati Analysis       4 SHC         PLC 131       Circuit Analysis       4 SHC         PLC 132       Deciration and system       4 SHC         PLC 133       Deciration and system       4 SHC         PLC 134       Deciration       3 SHC         PLC 135       Deciration analysis       4 SHC         PLC 136       Deciration analysis       4 SHC						
Choose one:       SHC         GRT 110       Intro to CIT       1 SHC         ELN 131       Analog Electronis I       4 SHC         ISC 129       Qual Testing Lab Tech       3 SHC         MC 1101       Intro to CNOCAM       2 SHC         MC 1101       Intro to ADOCAM       3 SHC         Attem III II Intro to Machine Vision       4 SHC         ATR 121       Intro to Automation       3 SHC         ATR 125       School Transbucers       3 SHC         ATR 125       School Transbucers       3 SHC         ATR 125       School Transbucers       3 SHC         *ATR 125       School Transbucers       3 SHC         *Chool Transbucers       3 SHC       SHC         *Constraints Engineering Technology       3 SHC         "Basi Electricity       Choose one care       3 SHC         "BLC 138       DC Circuit Analysis I       4 SHC         "BLC 131       Instrumentation       3 SHC         "ATR 112       Intro to Automation       3 SHC         "ALC 139       OC Circuit Analysis       4 SHC         Decisit       Decisit       SHC         Choose one: are       SHC       Choose one: are         "HC C1112       DC/	ELC 128	Intro to PLC	3 SHC			
Choose one:       SHC         GRT 110       Intro to CIT       1 SHC         ELN 131       Analog Electronis I       4 SHC         ISC 129       Qual Testing Lab Tech       3 SHC         MC 1101       Intro to CNOCAM       2 SHC         MC 1101       Intro to ADOCAM       3 SHC         Attem III II Intro to Machine Vision       4 SHC         ATR 121       Intro to Automation       3 SHC         ATR 125       School Transbucers       3 SHC         ATR 125       School Transbucers       3 SHC         ATR 125       School Transbucers       3 SHC         *ATR 125       School Transbucers       3 SHC         *Chool Transbucers       3 SHC       SHC         *Constraints Engineering Technology       3 SHC         "Basi Electricity       Choose one care       3 SHC         "BLC 138       DC Circuit Analysis I       4 SHC         "BLC 131       Instrumentation       3 SHC         "ATR 112       Intro to Automation       3 SHC         "ALC 139       OC Circuit Analysis       4 SHC         Decisit       Decisit       SHC         Choose one: are       SHC       Choose one: are         "HC C1112       DC/						
Choose one:       SHC         GRT 110       Intro to CIT       1 SHC         ELN 131       Analog Electronis I       4 SHC         ISC 129       Qual Testing Lab Tech       3 SHC         MC 1101       Intro to CNOCAM       2 SHC         MC 1101       Intro to ADOCAM       3 SHC         Attem III II Intro to Machine Vision       4 SHC         ATR 121       Intro to Automation       3 SHC         ATR 125       School Transbucers       3 SHC         ATR 125       School Transbucers       3 SHC         ATR 125       School Transbucers       3 SHC         *ATR 125       School Transbucers       3 SHC         *Chool Transbucers       3 SHC       SHC         *Constraints Engineering Technology       3 SHC         "Basi Electricity       Choose one care       3 SHC         "BLC 138       DC Circuit Analysis I       4 SHC         "BLC 131       Instrumentation       3 SHC         "ATR 112       Intro to Automation       3 SHC         "ALC 139       OC Circuit Analysis       4 SHC         Decisit       Decisit       SHC         Choose one: are       SHC       Choose one: are         "HC C1112       DC/	*Specialty					
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*ATR 215       Sensors and Transducers       3 SHC         *ELC 128       Into to PLC       3 SHC         *ELX 133       Digital Electronics       4 SHC         PCI 171       Fieldbus Systems       4 SHC         *Basic Electricity       Choose one act:       ELC 131         Chrons one act:       4 SHC         ELC 131       Circuit Analysis I       4 SHC         OR       A       ELC 138       DC Circuit Analysis       4 SHC         OR       BLC Circuit Analysis       4 SHC       4 SHC         Michatronics Engineering Technology       *       *       *         *ATR 112       Into to Automation       3 SHC       *         *LC 131       Difference or set:       *       *         ELC 131       Intro to Automation       3 SHC       *         *Basic Electricity       5 SHC       0R       0R         ELC 131       Circuit Analysis I       4 SHC       0R         BLC 138       DC Circuit Analysis       4 SHC       0R         DR       ELC 138       C Circuit Analysis       4 SHC         DR       DC Circuit Analysis       4 SHC       0R         DR       DC Circuit Analysis       5 SHC       0R						
*ATR 215       Sensors and Transducers       3 SHC         *ELC 128       Into to PLC       3 SHC         *ELX 133       Digital Electronics       4 SHC         PCI 171       Fieldbus Systems       4 SHC         *Basic Electricity       Choose one act:       ELC 131         Chrons one act:       4 SHC         ELC 131       Circuit Analysis I       4 SHC         OR       A       ELC 138       DC Circuit Analysis       4 SHC         OR       BLC Circuit Analysis       4 SHC       4 SHC         Michatronics Engineering Technology       *       *       *         *ATR 112       Into to Automation       3 SHC       *         *LC 131       Difference or set:       *       *         ELC 131       Intro to Automation       3 SHC       *         *Basic Electricity       5 SHC       0R       0R         ELC 131       Circuit Analysis I       4 SHC       0R         BLC 138       DC Circuit Analysis       4 SHC       0R         DR       ELC 138       C Circuit Analysis       4 SHC         DR       DC Circuit Analysis       4 SHC       0R         DR       DC Circuit Analysis       5 SHC       0R	ATR 121	Intro to Machine Vision	4 SHC			
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PCI 171       Fieldbus Systems       4 SHC         "Basic Electricity       Choose one set:         ELC 131       Circuit Analysis I       4 SHC         BL       Class Circuit Analysis II       4 SHC         OR       SHC       4 SHC         ELC 130       Circuit Analysis       4 SHC         Webatronics Engineering Technology       *ATR 112       Intro to Automation         *ATR 112       Intro to Automation       3 SHC         "Basic Electricity       3 SHC         "Basic Electricity       5 SHC         OR       BLC 131       Circuit Analysis I         ELC 111       Intro to Electricity       5 SHC         OR       BLC 131       Circuit Analysis I         ELC 131       Circuit Analysis I       4 SHC         OR       BLC 131       Circuit Analysis I         ELC 131       Circuit Analysis I       4 SHC         OR       BLC Circuit Analysis I       4 SHC         OR       BLC Circuit Analysis I       4 SHC         OR       ELC 131       Circuit Analysis I       4 SHC         DR       ELC 131       Circuit Analysis I       4 SHC         DR       ELC 132       SHC Circuit Analysis I       3 SHC </td <td>*ELC 128</td> <td>Intro to PLC</td> <td>3 SHC</td> <td></td> <td></td> <td></td>	*ELC 128	Intro to PLC	3 SHC			
PCI 171       Fieldbus Systems       4 SHC         "Basic Electricity       Choose one set:         ELC 131       Circuit Analysis I       4 SHC         BL       Class Circuit Analysis II       4 SHC         OR       SHC       4 SHC         ELC 130       Circuit Analysis       4 SHC         Webatronics Engineering Technology       *ATR 112       Intro to Automation         *ATR 112       Intro to Automation       3 SHC         "Basic Electricity       3 SHC         "Basic Electricity       5 SHC         OR       BLC 131       Circuit Analysis I         ELC 111       Intro to Electricity       5 SHC         OR       BLC 131       Circuit Analysis I         ELC 131       Circuit Analysis I       4 SHC         OR       BLC 131       Circuit Analysis I         ELC 131       Circuit Analysis I       4 SHC         OR       BLC Circuit Analysis I       4 SHC         OR       BLC Circuit Analysis I       4 SHC         OR       ELC 131       Circuit Analysis I       4 SHC         DR       ELC 131       Circuit Analysis I       4 SHC         DR       ELC 132       SHC Circuit Analysis I       3 SHC </td <td>FI N 133</td> <td>Digital Electronics</td> <td>4 SHC</td> <td></td> <td></td> <td></td>	FI N 133	Digital Electronics	4 SHC			
*Basic Electricity         ELC 131       Circuit Analysis I       4 SHC         ELC 133       Circuit Analysis II       4 SHC         OR       BLC 133       Circuit Analysis II       4 SHC         OR       BLC 138       DC Circuit Analysis       4 SHC         ELC 139       AC Circuit Analysis       4 SHC         Mechatronics Engineering Technology       **         **TATI 12       Into to Automation       3 SHC         *ELC 131       Instrumentation       4 SHC         *Basic Electricity       Choose one course or set:       ELC 111         Clobes one course or set:       ELC 112       DC/AC Electricity       5 SHC         OR       ELC 131       Circuit Analysis I       4 SHC         OR       ELC 131       Circuit Analysis I       4 SHC         OR       ELC 131       Circuit Analysis I       4 SHC         OR       ELC 132       DC/AC Electricity       5 SHC         OR       ELC 133       DC Circuit Analysis I       4 SHC         DFT 119       Basic CAD       2 SHC       DFT         DFT 151       CAD I       3 SHC       ELC 132         DFT 154       Intro Solid Modeling       3 SHC       ELC 132       Electri						
Choose ones set:         ELC 131       Circuit Analysis I         4       SHC         OR         ELC 138       DC Circuit Analysis         4       SHC         OR         *AC Circuit Analysis       4 SHC         OR       *         ***       SHC         **       AC Circuit Analysis         4       SHC         **       SHC         OR       SHC         DFT 119       Basic CAD       SHC         DFT 119       Basic CAD       SHC         DFT 119 <t< td=""><td>PC1 171</td><td>Fieldbus Systems</td><td>4 SHC</td><td></td><td></td><td></td></t<>	PC1 171	Fieldbus Systems	4 SHC			
Choose ones set:         ELC 131       Circuit Analysis I         4       SHC         OR         ELC 138       DC Circuit Analysis         4       SHC         OR         *AC Circuit Analysis       4 SHC         OR       *         ***       SHC         **       AC Circuit Analysis         4       SHC         **       SHC         OR       SHC         DFT 119       Basic CAD       SHC         DFT 119       Basic CAD       SHC         DFT 119 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td></t<>						
Choose ones set:         ELC 131       Circuit Analysis I         4       SHC         OR         ELC 138       DC Circuit Analysis         4       SHC         OR         *AC Circuit Analysis       4 SHC         OR       *         ***       SHC         **       AC Circuit Analysis         4       SHC         **       SHC         OR       SHC         DFT 119       Basic CAD       SHC         DFT 119       Basic CAD       SHC         DFT 119 <t< td=""><td>*Desia Floor</td><td>wight</td><td></td><td></td><td></td><td></td></t<>	*Desia Floor	wight				
FLC 131       Circuit Analysis I       4 SHC <i>OR</i>						
LC 133       Circuit Analysis II       4 SHC         OR       B       4 SHC         ELC 138       D.C Circuit Analysis       4 SHC         ELC 139       A.C Circuit Analysis       4 SHC         Mechatronics Engineering Technology       *         *ATR 112       Intro to Automation       3 SHC         *ELC 213       Instrumentation       4 SHC         *Basic Electricity       Choose one course or set:       ELC 11         ELC 11       Intro to Electricity       5 SHC         OR       Clinear Analysis I       4 SHC         OR       ELC 130       DC Circuit Analysis       4 SHC         OR       ELC 130       DC Circuit Analysis       4 SHC         OR       OR       OR       OR         ELC 139       AC Circuit Analysis       4 SHC         Darwing       Choose one:       OR       OR         DFT 119       Basic CAD       2 SHC       DFT         DFT 119       Basic CAD       2 SHC       DFT         DFT 151       CAD I       3 SHC       ELC 132         Elc T132       Elcertical Drawings       2 SHC       ELC 132         DFT 164       Intro Solid Modeling       3 SHC       HYD 100 </td <td>Choose of</td> <td>ne set:</td> <td></td> <td></td> <td></td> <td></td>	Choose of	ne set:				
LC 133       Circuit Analysis II       4 SHC         OR       B       4 SHC         ELC 138       D.C Circuit Analysis       4 SHC         ELC 139       A.C Circuit Analysis       4 SHC         Mechatronics Engineering Technology       *         *ATR 112       Intro to Automation       3 SHC         *ELC 213       Instrumentation       4 SHC         *Basic Electricity       Choose one course or set:       ELC 11         ELC 11       Intro to Electricity       5 SHC         OR       Clinear Analysis I       4 SHC         OR       ELC 130       DC Circuit Analysis       4 SHC         OR       ELC 130       DC Circuit Analysis       4 SHC         OR       OR       OR       OR         ELC 139       AC Circuit Analysis       4 SHC         Darwing       Choose one:       OR       OR         DFT 119       Basic CAD       2 SHC       DFT         DFT 119       Basic CAD       2 SHC       DFT         DFT 151       CAD I       3 SHC       ELC 132         Elc T132       Elcertical Drawings       2 SHC       ELC 132         DFT 164       Intro Solid Modeling       3 SHC       HYD 100 </td <td>ELC 131</td> <td>Circuit Analysis I</td> <td>4 SHC</td> <td></td> <td></td> <td></td>	ELC 131	Circuit Analysis I	4 SHC			
OR         ELC 138       DC Circuit Analysis       4 SHC         ELC 139       AC Circuit Analysis       4 SHC         Mechatronics Engineering Technology       *         *ATR 112       Intro to Automation       3 SHC         *ELC 213       Instrumentation       4 SHC         *Basic Electricity       5 SHC         OR       *         ELC 111       Intro to Electricity       5 SHC         OR       *         ELC 12       DC/AC Electricity       5 SHC         OR       *       *         ELC 131       Circuit Analysis       4 SHC         OR       *       *       *         ELC 138       DC Circuit Analysis       4 SHC         OR       *       *       *         Choose one:       DC Circuit Analysis       4 SHC         DFT       Basic CAD       2 SHC       *         DFT 151       CAD I       3 SHC       *         DFT 151       CAD I       3 SHC       *         DFT 154       Intro Solid Modeling       3 SHC       *         Choose one:       *       SHC       *         HYD 10       Hydraulics/Pneumatics 1       * <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>						
ELC 138       DC Circuit Analysis       4 SHC         ELC 139       AC Circuit Analysis       4 SHC         Mechatronics Engineering Technology       *         *ATR 112       Into to Automation       3 SHC         *ELC 213       Instrumentation       4 SHC         *Basic Electricity       Choose one course or set:       ELC 111         ELC 112       DC/AC Electricity       5 SHC         OR       OR       OR         ELC 138       DC Circuit Analysis       4 SHC         OR       OR       OR         ELC 138       DC Circuit Analysis       4 SHC         OR       OR       OR         ELC 138       DC Circuit Analysis       4 SHC         OR       Choose one:       OR         DFT 149       Basic CAD       2 SHC         DFT 151       CAD 1       3 SHC         DFT 154       Intro Solid Modeling       3 SHC         DFT 151       CAD 2 SHC       ELC 132         DFT 151       CAD 3 SHC       ELC 132         DFT 151       Choose one:       SHC         HYD 100       Hydraulics/Pneumatics 1       3 SHC         HYD 110       Hydraulics/Pneumatics 3 SHC         MEC 1	ELC 133	Circuit Analysis II	4 SHC			
ELC 138       DC Circuit Analysis       4 SHC         ELC 139       AC Circuit Analysis       4 SHC         Mechatronics Engineering Technology       *         *ATR 112       Into to Automation       3 SHC         *ELC 213       Instrumentation       4 SHC         *Basic Electricity       Choose one course or set:       ELC 111         ELC 112       DC/AC Electricity       5 SHC         OR       OR       OR         ELC 138       DC Circuit Analysis       4 SHC         OR       OR       OR         ELC 138       DC Circuit Analysis       4 SHC         OR       OR       OR         ELC 138       DC Circuit Analysis       4 SHC         OR       Choose one:       OR         DFT 149       Basic CAD       2 SHC         DFT 151       CAD 1       3 SHC         DFT 154       Intro Solid Modeling       3 SHC         DFT 151       CAD 2 SHC       ELC 132         DFT 151       CAD 3 SHC       ELC 132         DFT 151       Choose one:       SHC         HYD 100       Hydraulics/Pneumatics 1       3 SHC         HYD 110       Hydraulics/Pneumatics 3 SHC         MEC 1	OR					
ELC 139       AC Circuit Analysis       4 SHC         Mechatronics Engineering Technology       *         *ATR 112       Intro to Automation       3 SHC         *ELC 213       Instrumentation       4 SHC         *Basic Electricity       Choose one course or set:       ELC 111         ELC 112       DC/AC Electricity       5 SHC         OR       ELC 131       Circuit Analysis I         ELC 131       Circuit Analysis       4 SHC         OR       ELC 131       Circuit Analysis         ELC 138       DC Circuit Analysis       4 SHC         OR       ELC 139       AC Circuit Analysis       4 SHC         DR       ELC 130       Circuit Analysis       4 SHC         DR       ELC 130       Circuit Analysis       4 SHC         DR       DC Circuit Analysis       4 SHC       111         DFT 151       Choose one:       2 SHC       111         DFT 151       CAD I       3 SHC       13 SHC         DFT 151       CAD I       3 SHC       13 SHC         DFT 154       Intro Solid Modeling       3 SHC       14 SHC         DFT 151       CAD I       3 SHC       14 SHC         HYD 101       Hydraulics/Pneumati		DC Cincrit Analasia	4 6110			
Mechatronics Engineering Technology.         *ATR 112       Intro to Automation       3 SHC         *ELC 213       Instrumentation       4 SHC         *Basic Electricity       0 SHC         Choose one course or set:       ELC 111       Intro to Electricity         PELC 112       DC/AC Electricity       5 SHC         OR       ELC 131       Circuit Analysis       4 SHC         OR       ELC 139       AC Circuit Analysis       4 SHC         OR       ELC 139       AC Circuit Analysis       4 SHC         Drawing       Choose one:       DTT 119       Basic CAD       2 SHC         DFT 151       CAD 1       3 SHC       DFT 151       CAD 1       3 SHC         DFT 151       CAD 1       3 SHC       EC 132       Electrical Drawings       3 SHC         DFT 151       CAD 1       3 SHC       ELC 132       Electrical Drawings       3 SHC         DFT 150       Engineering Graphics       3 SHC       EC 132       Electrical Drawings       2 SHC         HYD 100       Hydraulics/Pneumatics 1       3 SHC       HYD 110       Hydraulics/Pneumatics 1       3 SHC         MEC 255       Fluid Mechanics       3 SHC       SHC       MEC 275       Engineering Mechanisms </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>						
Mechatronics Engineering Technology.         *ATR 112       Intro to Automation       3 SHC         *ELC 213       Instrumentation       4 SHC         *Basic Electricity       0 SHC         Choose one course or set:       ELC 111       Intro to Electricity         PELC 112       DC/AC Electricity       5 SHC         OR       ELC 131       Circuit Analysis       4 SHC         OR       ELC 139       AC Circuit Analysis       4 SHC         OR       ELC 139       AC Circuit Analysis       4 SHC         Drawing       Choose one:       DTT 119       Basic CAD       2 SHC         DFT 151       CAD 1       3 SHC       DFT 151       CAD 1       3 SHC         DFT 151       CAD 1       3 SHC       EC 132       Electrical Drawings       3 SHC         DFT 151       CAD 1       3 SHC       ELC 132       Electrical Drawings       3 SHC         DFT 150       Engineering Graphics       3 SHC       EC 132       Electrical Drawings       2 SHC         HYD 100       Hydraulics/Pneumatics 1       3 SHC       HYD 110       Hydraulics/Pneumatics 1       3 SHC         MEC 255       Fluid Mechanics       3 SHC       SHC       MEC 275       Engineering Mechanisms </td <td>ELC 139</td> <td>AC Circuit Analysis</td> <td>4 SHC</td> <td></td> <td></td> <td></td>	ELC 139	AC Circuit Analysis	4 SHC			
*ATR 112 Intro to Automation 3 SHC *ELC 213 Instrumentation 4 SHC *Basic Electricity Choose one course or set: ELC 111 Intro to Electricity 3 SHC OR ELC 122 DC/AC Electricity 5 SHC OR ELC 131 Circuit Analysis 1 4 SHC OR ELC 138 DC Circuit Analysis 4 SHC ELC 139 AC Circuit Analysis 4 SHC Drawing Choose one: DTT 119 Basic CAD 2 SHC DTT 151 CAD 1 3 SHC DFT 154 Intro Solid Modeling 3 SHC DFT 154 Intro Solid Modeling 3 SHC DFT 154 Core on a SHC DFT 170 Engineering Graphics 3 SHC ELC 132 Electrical Drawings 2 SHC Fluid Mechanics Choose one: HYD 110 Hydraulics/Pneumatics 1 3 SHC HYD 180 Pneumatics in Automation 3 SHC MEC 265 Fluid Mechanics 3 SHC MEC 275 Engineering Mechanisms 3 SHC MEC 130 Mechanics 3 SHC MEC 275 Engineering Mechanisms 3 SHC MEC 170 Mechanism 3 SHC MEC 275 Engineering Mechanisms		2				
*ATR 112 Intro to Automation 3 SHC *ELC 213 Instrumentation 4 SHC *Basic Electricity Choose one course or set: ELC 111 Intro to Electricity 3 SHC OR ELC 122 DC/AC Electricity 5 SHC OR ELC 131 Circuit Analysis 1 4 SHC OR ELC 138 DC Circuit Analysis 4 SHC ELC 139 AC Circuit Analysis 4 SHC Drawing Choose one: DTT 119 Basic CAD 2 SHC DTT 151 CAD 1 3 SHC DFT 154 Intro Solid Modeling 3 SHC DFT 154 Intro Solid Modeling 3 SHC DFT 154 Core on a SHC DFT 170 Engineering Graphics 3 SHC ELC 132 Electrical Drawings 2 SHC Fluid Mechanics Choose one: HYD 110 Hydraulics/Pneumatics 1 3 SHC HYD 180 Pneumatics in Automation 3 SHC MEC 265 Fluid Mechanics 3 SHC MEC 275 Engineering Mechanisms 3 SHC MEC 130 Mechanics 3 SHC MEC 275 Engineering Mechanisms 3 SHC MEC 170 Mechanism 3 SHC MEC 275 Engineering Mechanisms						
*ELC 213       Instrumentation       4 SHC         *Basic Electricity       3 SHC         Choose one course or set:       3 SHC         ELC 111       Intro to Electricity       3 SHC         OR	<u>Mechatronics E</u>	<u>ngineering Technology</u>				
*ELC 213       Instrumentation       4 SHC         *Basic Electricity       3 SHC         Choose one course or set:       3 SHC         ELC 111       Intro to Electricity       3 SHC         OR	*ATR 112	Intro to Automation	3 SHC			
*Basic Electricity       3 SHC         Choose one course or set:       ELC 111         ELC 112       DC/AC Electricity       5 SHC         OR       0R         ELC 131       Circuit Analysis I       4 SHC         OR       0R         ELC 138       DC Circuit Analysis       4 SHC         OR       0R       0R         ELC 139       AC Circuit Analysis       4 SHC         Drawing       0R       0R         Choose one:       0R       0R         DTT 151       CAD J       2 SHC         DTT 151       CAD J       3 SHC         DTT 151       CAD J       3 SHC         DTT 151       CAD J       3 SHC         DTT 151       Choose one:       0R         Choose one:       0R       0R         HYD 110       Hydraulies/Pneumatics I       3 SHC         MEC 265       Fluid Mechanies       3 SHC         MEC 265       Fluid Mechanies       3 SHC         MEC 275       Engineering Mechanisms       3 SHC         MEC 275       Engineering Mechanisms       3 SHC         MEC 275       Engineering Mechanisms       3 SHC         MEC 275       Engin						
Choose one course or set:         ELC 111       Intro to Electricity       3 SHC         OR         ELC 112       DC/AC Electricity       5 SHC         OR       Intro to Electricity       5 SHC         OR       Intro to Electricity       5 SHC         OR       Intro to Electricity       5 SHC         OR       Intro State       Intro State         ELC 131       Circuit Analysis       4 SHC         OR       Intro State       Intro State         Drawing       Choose one:       Intro Solid Modeling       3 SHC         DFT 151       CAD       2 SHC       Intro Solid Modeling       3 SHC         DFT 151       CAD       2 SHC       Intro Solid Modeling       3 SHC         DFT 170       Engineering Graphics       3 SHC       Intro Solid Modeling       3 SHC         DFT 170       Engineering Graphics       3 SHC       Intro Solid Modeling       SHC         Fluid Mechanics       Choose one:       Intro Solid Modeling       3 SHC         HYD 110       Hydraulics/Pneumatics I       3 SHC       Intro Solid Modeling       3 SHC         MEC 255       Fluid Mechanics       3 SHC       Intro Solid Modeling       3 SHC         MEC 13	*ELC 213	Instrumentation	4 SHC			
Choose one course or set:         ELC 111       Intro to Electricity       3 SHC         OR         ELC 112       DC/AC Electricity       5 SHC         OR       Intro to Electricity       5 SHC         OR       Intro to Electricity       5 SHC         OR       Intro to Electricity       5 SHC         OR       Intro State       Intro State         ELC 131       Circuit Analysis       4 SHC         OR       Intro State       Intro State         Drawing       Choose one:       Intro Solid Modeling       3 SHC         DFT 151       CAD       2 SHC       Intro Solid Modeling       3 SHC         DFT 151       CAD       2 SHC       Intro Solid Modeling       3 SHC         DFT 170       Engineering Graphics       3 SHC       Intro Solid Modeling       3 SHC         DFT 170       Engineering Graphics       3 SHC       Intro Solid Modeling       SHC         Fluid Mechanics       Choose one:       Intro Solid Modeling       3 SHC         HYD 110       Hydraulics/Pneumatics I       3 SHC       Intro Solid Modeling       3 SHC         MEC 255       Fluid Mechanics       3 SHC       Intro Solid Modeling       3 SHC         MEC 13						
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OR       FILC 112       DC/AC Electricity       5 SHC         OR       ELC 131       Circuit Analysis I       4 SHC         OR       ELC 138       DC Circuit Analysis       4 SHC         ELC 139       AC Circuit Analysis       4 SHC         Drawing       Choose one:       D         DFT 119       Basic CAD       2 SHC         DFT 151       CAD I       3 SHC         DFT 170       Engineering Graphics       3 SHC         EGR 120       Eng and Design Graphics       3 SHC         Fluid Mechanics       Choose one:       SHC         HYD 110       Hydraulics/Pneumatics I       3 SHC         MEC 265       Fluid Mechanics       3 SHC         MEC 265       Fluid Mechanics       3 SHC         MEC 275       Engineering Mechanisms       3 SHC         Mechanise	Choose o	ne course or set:				
OR       FILC 112       DC/AC Electricity       5 SHC         OR       ELC 131       Circuit Analysis I       4 SHC         OR       ELC 138       DC Circuit Analysis       4 SHC         ELC 139       AC Circuit Analysis       4 SHC         Drawing       Choose one:       D         DFT 119       Basic CAD       2 SHC         DFT 151       CAD I       3 SHC         DFT 170       Engineering Graphics       3 SHC         EGR 120       Eng and Design Graphics       3 SHC         Fluid Mechanics       Choose one:       SHC         HYD 110       Hydraulics/Pneumatics I       3 SHC         MEC 265       Fluid Mechanics       3 SHC         MEC 265       Fluid Mechanics       3 SHC         MEC 275       Engineering Mechanisms       3 SHC         Mechanise	ELC 111	Intro to Electricity	3 SHC			
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OR       4 SHC         OR       4 SHC         ELC 138       DC Circuit Analysis       4 SHC         ELC 139       AC Circuit Analysis       4 SHC         Draving       4 SHC       5 SHC         DFT 119       Basic CAD       2 SHC         DFT 151       CAD I       3 SHC         DFT 154       Intro Solid Modeling       3 SHC         DFT 154       Intro Solid Modeling       3 SHC         DFT 170       Engineering Graphics       3 SHC         EGR 120       Eng and Design Graphics       3 SHC         ELC 132       Electrical Drawings       2 SHC         Fluid Mechanics       3 SHC         Choose one:       HYD 110       Hydraulics/Pneumatics I         HYD 110       Hydraulics/Pneumatics I       3 SHC         MEC 265       Fluid Mechanics       3 SHC         MEC 265       Fluid Mechanics       3 SHC         MEC 275       Engineering Mechanisms       3 SHC         MEC 130       Mechanisms       3 SHC <tr< td=""><td>OR</td><td></td><td></td><td></td><td></td><td></td></tr<>	OR					
OR         ELC 131       Circuit Analysis I       4 SHC         OR         ELC 138       DC Circuit Analysis       4 SHC         ELC 139       AC Circuit Analysis       4 SHC         Draving       6       6         Choose one:       2 SHC         DFT 119       Basic CAD       2 SHC         DFT 151       CAD I       3 SHC         DFT 154       Intro Solid Modeling       3 SHC         DFT 170       Engineering Graphics       3 SHC         DFT 170       Engineering Graphics       3 SHC         EGR 120       Eng and Design Graphics       3 SHC         ELC 132       Electrical Drawings       2 SHC         Fluid Mechanics       3 SHC         HYD 110       Hydraulics/Pneumatics I       3 SHC         HYD 180       Pneumatics in Automation       3 SHC         MEC 265       Fluid Mechanics       3 SHC         MEC 275       Engineering Mechanisms       3	ELC 112	DC/AC Electricity	5 SHC			
ELC 131       Circuit Analysis I       4 SHC         OR       ELC 138       DC Circuit Analysis       4 SHC         ELC 139       AC Circuit Analysis       4 SHC         Drawing         Choose one:         DFT 19       Basic CAD       2 SHC         DFT 151       CAD I       3 SHC         DFT 154       Intro Solid Modeling       3 SHC         DFT 170       Engineering Graphics       3 SHC         DFT 170       Engineering Graphics       3 SHC         ELC 132       Electrical Drawings       2 SHC         Fluid Mechanics         Choose one:       SHC         PTUD 110       Hydraulics/Pneumatics I       3 SHC         HYD 180       Pneumatics in Automation       3 SHC         MEC 265       Fluid Mechanics       3 SHC         MEC 265       Fluid Mechanics       3 SHC         MEC 130       Mechanisms       3 SHC         MEC 275       Engineering Mechanisms       3 SHC         Mechines		5				
OR         ELC 138       DC Circuit Analysis       4 SHC         ELC 139       AC Circuit Analysis       4 SHC         Drawing       Choose one:       DFT 119         DFT 119       Basic CAD       2 SHC         DFT 151       CAD I       3 SHC         DFT 154       Intro Solid Modeling       3 SHC         DFT 170       Engineering Graphics       3 SHC         EGR 120       Eng and Design Graphics       3 SHC         ELC 132       Electrical Drawings       2 SHC         Fluid Mechanics       Choose one:       3 SHC         HYD 110       Hydraulics/Pneumatics I       3 SHC         MEC 265       Fluid Mechanics       3 SHC         MEC 130       Mechanisms       3 SHC         MEC 130       Mechanisms       3 SHC         MEC 275       Engineering Mechanisms       3 SHC         MEC 275       Engineering Mechanisms       3 SHC         MEC 130       Mechanisms       3 SHC						
OR         ELC 138       DC Circuit Analysis       4 SHC         ELC 139       AC Circuit Analysis       4 SHC         Drawing       Choose one:       Choose one:         DFT 119       Basic CAD       2 SHC         DFT 151       CAD I       3 SHC         DFT 154       Intro Solid Modeling       3 SHC         DFT 154       Engineering Graphics       3 SHC         EGR 120       Eng and Design Graphics       3 SHC         ELC 132       Electrical Drawings       2 SHC         Fluid Mechanics         Choose one:       3 SHC         HYD 110       Hydraulics/Pneumatics I       3 SHC         HYD 180       Pneumatics in Automation       3 SHC         MEC 265       Fluid Mechanics       3 SHC         MEC 265       Fluid Mechanics       3 SHC         MEC 275       Engineering Mechanisms       3 SHC <tr< td=""><td>ELC 131</td><td>Circuit Analysis I</td><td>4 SHC</td><td></td><td></td><td></td></tr<>	ELC 131	Circuit Analysis I	4 SHC			
ELC 138DC Circuit Analysis4 SHCELC 139AC Circuit Analysis4 SHCDrawing Choose one:2DFT 119Basic CAD2 SHCDFT 151CAD I3 SHCDFT 154Intro Solid Modeling3 SHCDFT 170Engineering Graphics3 SHCEGR 120Eng and Design Graphics3 SHCELC 132Electrical Drawings2 SHCFluid Mechanics Choose one:3 SHCMEC 265Fluid Mechanics3 SHCMEC 265Fluid Mechanics3 SHCMEC 265Fluid Mechanics3 SHCMEC 275Engineering Mechanisms3 SHCMachines Choose one:3 SHCMachines Choose one course or set:4 SHC	OR					
ELC 139       AC Circuit Analysis       4 SHC         Drawing       Choose one:       Choose one:         DFT 119       Basic CAD       2 SHC         DFT 151       CAD I       3 SHC         DFT 154       Intro Solid Modeling       3 SHC         DFT 170       Engineering Graphics       3 SHC         EGR 120       Eng and Design Graphics       3 SHC         ELC 132       Electrical Drawings       2 SHC         Fluid Mechanics         Choose one:			4 011 0			
Drawing         Choose one:         DFT 119       Basic CAD       2 SHC         DFT 151       CAD I       3 SHC         DFT 154       Intro Solid Modeling       3 SHC         DFT 170       Engineering Graphics       3 SHC         EGR 120       Eng and Design Graphics       3 SHC         ELC 132       Electrical Drawings       2 SHC         Fluid Mechanics       2 SHC         Fluid Mechanics       2 SHC         Fluid Mechanics       3 SHC         Choose one:       HYD 110         Hydraulics/Pneumatics I       3 SHC         MEC 265       Fluid Mechanics         Choose one:       SHC         MEC 130       Mechanicss         Choose one:       SHC         MEC 130       Mechanisms         MEC 275       Engineering Mechanisms         Machines       SHC         Choose one course or set:       ELC 117         ELC 117       Motors and Controls         4 SHC       SHC	ELC 138	DC Circuit Analysis	4 SHC			
Drawing         Choose one:         DFT 119       Basic CAD       2 SHC         DFT 151       CAD I       3 SHC         DFT 154       Intro Solid Modeling       3 SHC         DFT 170       Engineering Graphics       3 SHC         EGR 120       Eng and Design Graphics       3 SHC         ELC 132       Electrical Drawings       2 SHC         Fluid Mechanics       2 SHC         Fluid Mechanics       2 SHC         Fluid Mechanics       3 SHC         Choose one:       HYD 110         Hydraulics/Pneumatics I       3 SHC         MEC 265       Fluid Mechanics         Choose one:       SHC         MEC 130       Mechanicss         Choose one:       SHC         MEC 130       Mechanisms         MEC 275       Engineering Mechanisms         Machines       SHC         Choose one course or set:       ELC 117         ELC 117       Motors and Controls         4 SHC       SHC	ELC 139	AC Circuit Analysis	4 SHC			
Choose one:         DFT 119       Basic CAD       2 SHC         DFT 151       CAD I       3 SHC         DFT 154       Intro Solid Modeling       3 SHC         DFT 170       Engineering Graphics       3 SHC         EGR 120       Eng and Design Graphics       3 SHC         ELC 132       Electrical Drawings       2 SHC         Fluid Mechanics         Choose one:       Thyp 110         HYD 110       Hydraulics/Pneumatics I       3 SHC         MEC 265       Fluid Mechanics       3 SHC         MEC 265       Fluid Mechanics       3 SHC         MEC 130       Mechanisms       3 SHC         MEC 275       Engineering Mechanisms       3 SHC         Machines       SHC       SHC         Choose one:       SHC       SHC         MEC 130       Mechanisms       3 SHC         MEC 275       Engineering Mechanisms       3 SHC         Machines       SHC       SHC         Choose one course or set:       ELC 117       Motors and Controls         ELC 117       Motors and Controls       4 SHC			1 5110			
Choose one:         DFT 119       Basic CAD       2 SHC         DFT 151       CAD I       3 SHC         DFT 154       Intro Solid Modeling       3 SHC         DFT 170       Engineering Graphics       3 SHC         EGR 120       Eng and Design Graphics       3 SHC         ELC 132       Electrical Drawings       2 SHC         Fluid Mechanics         Choose one:       Thyp 110         HYD 110       Hydraulics/Pneumatics I       3 SHC         MEC 265       Fluid Mechanics       3 SHC         MEC 265       Fluid Mechanics       3 SHC         MEC 130       Mechanisms       3 SHC         MEC 275       Engineering Mechanisms       3 SHC         MEC 275       Engineering Mechanisms       3 SHC         Machines       Choose one course or set:       ELC 117         Motors and Controls       4 SHC       4 SHC						
Choose one:         DFT 119       Basic CAD       2 SHC         DFT 151       CAD I       3 SHC         DFT 154       Intro Solid Modeling       3 SHC         DFT 170       Engineering Graphics       3 SHC         EGR 120       Eng and Design Graphics       3 SHC         ELC 132       Electrical Drawings       2 SHC         Fluid Mechanics         Choose one:	Drawing					
DFT 119 Basic CAD 2 SHC DFT 151 CAD I 3 SHC DFT 154 Intro Solid Modeling 3 SHC DFT 170 Engineering Graphics 3 SHC EGR 120 Eng and Design Graphics 3 SHC ELC 132 Electrical Drawings 2 SHC Fluid Mechanics Choose one: HYD 110 Hydraulics/Pneumatics I 3 SHC HYD 180 Pneumatics in Automation 3 SHC MEC 265 Fluid Mechanics 3 SHC MEC 265 Fluid Mechanics 3 SHC MEC 130 Mechanisms 3 SHC MEC 130 Mechanisms 3 SHC MEC 275 Engineering Mechanisms 3 SHC MEC 275 Engineering Mechanisms 3 SHC MEC 275 Engineering Mechanisms 3 SHC Machines Choose one course or set: ELC 117 Motors and Controls 4 SHC		<i>no</i> :				
DFT 151 CAD I 3 SHC DFT 154 Intro Solid Modeling 3 SHC DFT 170 Engineering Graphics 3 SHC EGR 120 Eng and Design Graphics 3 SHC ELC 132 Electrical Drawings 2 SHC Fluid Mechanics Choose one: HYD 110 Hydraulics/Pneumatics I 3 SHC HYD 110 Hydraulics/Pneumatics I 3 SHC MEC 265 Fluid Mechanics 3 SHC Mechanical Drives Choose one: MEC 130 Mechanisms 3 SHC MEC 275 Engineering Mechanisms 3 SHC MEC 275 Engineering Mechanisms 3 SHC MEC 275 Engineering Mechanisms 3 SHC						
DFT 154 Intro Solid Modeling 3 SHC DFT 170 Engineering Graphics 3 SHC EGR 120 Eng and Design Graphics 3 SHC ELC 132 Electrical Drawings 2 SHC Fluid Mechanics <i>Choose one:</i> HYD 110 Hydraulics/Pneumatics I 3 SHC HYD 180 Pneumatics in Automation 3 SHC MEC 265 Fluid Mechanics 3 SHC MEC 130 Mechanisms 3 SHC MEC 130 Mechanisms 3 SHC MEC 275 Engineering Mechanisms 3 SHC MEC 275 Engineering Mechanisms 3 SHC MEC 275 Engineering Mechanisms 3 SHC	DFT 119	Basic CAD	2 SHC			
DFT 154 Intro Solid Modeling 3 SHC DFT 170 Engineering Graphics 3 SHC EGR 120 Eng and Design Graphics 3 SHC ELC 132 Electrical Drawings 2 SHC Fluid Mechanics <i>Choose one:</i> HYD 110 Hydraulics/Pneumatics I 3 SHC HYD 180 Pneumatics in Automation 3 SHC MEC 265 Fluid Mechanics 3 SHC MEC 130 Mechanisms 3 SHC MEC 130 Mechanisms 3 SHC MEC 275 Engineering Mechanisms 3 SHC MEC 275 Engineering Mechanisms 3 SHC MEC 275 Engineering Mechanisms 3 SHC	DFT 151	CADI	3 SHC			
DFT 170 Engineering Graphics 3 SHC EGR 120 Eng and Design Graphics 3 SHC ELC 132 Electrical Drawings 2 SHC Fluid Mechanics Choose one: HYD 110 Hydraulics/Pneumatics I 3 SHC HYD 180 Pneumatics in Automation 3 SHC MEC 265 Fluid Mechanics 3 SHC MEC 265 Fluid Mechanics 3 SHC MEC 130 Mechanisms 3 SHC MEC 275 Engineering Mechanisms 3 SHC MEC 275 Engineering Mechanisms 3 SHC MEC 275 Engineering Mechanisms 3 SHC						
EGR 120 Eng and Design Graphics 3 SHC   ELC 132 Electrical Drawings 2 SHC     Fluid Mechanics   Choose one:   HYD 110 Hydraulics/Pneumatics I   HYD 180 Pneumatics in Automation   3 SHC   MEC 265 Fluid Mechanics   SHC   MEC 265   Fluid Mechanisms   SHC   MEC 130   Mechanisms   SHC   MEC 275   Engineering Mechanisms   SHC   Machines   Choose one course or set:   ELC 117   Motors and Controls   4 SHC						
EGR 120 Eng and Design Graphics 3 SHC   ELC 132 Electrical Drawings 2 SHC     Fluid Mechanics   Choose one:   HYD 110 Hydraulics/Pneumatics I   HYD 180 Pneumatics in Automation   3 SHC   MEC 265 Fluid Mechanics   SHC   MEC 265   Fluid Mechanisms   SHC   MEC 130   Mechanisms   SHC   MEC 275   Engineering Mechanisms   SHC   Machines   Choose one course or set:   ELC 117   Motors and Controls   4 SHC	DFT 170	Engineering Graphics	3 SHC			
ELC 132 Electrical Drawings 2 SHC   Fluid Mechanics   Choose one:   HYD 110 Hydraulics/Pneumatics I 3 SHC   HYD 180 Pneumatics in Automation 3 SHC   MEC 265 Fluid Mechanics 3 SHC   Mechanical Drives 3 SHC   Choose one: 3 SHC   MEC 130 Mechanisms 3 SHC   MEC 275 Engineering Mechanisms 3 SHC   Machines 3 SHC   Choose one course or set: 4 SHC						
Fluid Mechanics         Choose one:         HYD 110       Hydraulics/Pneumatics I       3 SHC         HYD 180       Pneumatics in Automation       3 SHC         MEC 265       Fluid Mechanics       3 SHC         Mechanical Drives       3 SHC         Choose one:       3 SHC         MEC 130       Mechanisms       3 SHC         MEC 275       Engineering Mechanisms       3 SHC         Machines       3 SHC         Choose one course or set:       ELC 117         Motors and Controls       4 SHC						
Choose one:   HYD 110 Hydraulics/Pneumatics I   HYD 180 Pneumatics in Automation   J MEC 265 Fluid Mechanics   MEC 265 Fluid Mechanics   Mechanical Drives   Choose one:   MEC 130 Mechanisms   MEC 275 Engineering Mechanisms   J Machines   Choose one course or set:   ELC 117 Motors and Controls	ELC 132	Electrical Drawings	2 SHC			
Choose one:   HYD 110 Hydraulics/Pneumatics I   HYD 180 Pneumatics in Automation   J MEC 265 Fluid Mechanics   MEC 265 Fluid Mechanics   Mechanical Drives   Choose one:   MEC 130 Mechanisms   MEC 275 Engineering Mechanisms   J Machines   Choose one course or set:   ELC 117 Motors and Controls						
Choose one:   HYD 110 Hydraulics/Pneumatics I   HYD 180 Pneumatics in Automation   J MEC 265 Fluid Mechanics   MEC 265 Fluid Mechanics   Mechanical Drives   Choose one:   MEC 130 Mechanisms   MEC 275 Engineering Mechanisms   J Machines   Choose one course or set:   ELC 117 Motors and Controls	T	· •				
HYD 110       Hydraulics/Pneumatics I       3 SHC         HYD 180       Pneumatics in Automation       3 SHC         MEC 265       Fluid Mechanics       3 SHC         Mechanical Drives       3 SHC         Choose one:       Mechanisms         MEC 130       Mechanisms         MEC 275       Engineering Mechanisms         Machines       3 SHC         Choose one course or set:       5 SHC         ELC 117       Motors and Controls         4 SHC       5 SHC						
HYD 110       Hydraulics/Pneumatics I       3 SHC         HYD 180       Pneumatics in Automation       3 SHC         MEC 265       Fluid Mechanics       3 SHC         Mechanical Drives       3 SHC         Choose one:       Mechanisms         MEC 130       Mechanisms         MEC 275       Engineering Mechanisms         Machines       3 SHC         Choose one course or set:       5 SHC         ELC 117       Motors and Controls       4 SHC	Choose o	ne:				
HYD 180       Pneumatics in Automation       3 SHC         MEC 265       Fluid Mechanics       3 SHC         Mechanical Drives       3 SHC         Choose one:       Mechanisms         MEC 130       Mechanisms         MEC 275       Engineering Mechanisms         Machines       3 SHC         Choose one course or set:       4 SHC	HVD 110	Hydraulics/Pneumatics I	3 SHC			
MEC 265 Fluid Mechanics 3 SHC Mechanical Drives Choose one: MEC 130 Mechanisms 3 SHC MEC 275 Engineering Mechanisms 3 SHC Machines Choose one course or set: ELC 117 Motors and Controls 4 SHC						
Mechanical Drives         Choose one:         MEC 130       Mechanisms         MEC 275       Engineering Mechanisms         Machines         Choose one course or set:         ELC 117       Motors and Controls         4 SHC	HYD 180	Pneumatics in Automation	3 SHC			
Mechanical Drives         Choose one:         MEC 130       Mechanisms         MEC 275       Engineering Mechanisms         Machines         Choose one course or set:         ELC 117       Motors and Controls         4 SHC	MEC 265	Fluid Mechanics	3 SHC			
Choose one:       3 SHC         MEC 130       Mechanisms       3 SHC         MEC 275       Engineering Mechanisms       3 SHC         Machines       5 SHC         Choose one course or set:       5 SHC         ELC 117       Motors and Controls       4 SHC	1,120 200	1.1001001100	- 5110			
Choose one:       3 SHC         MEC 130       Mechanisms       3 SHC         MEC 275       Engineering Mechanisms       3 SHC         Machines       5 SHC         Choose one course or set:       5 SHC         ELC 117       Motors and Controls       4 SHC						
Choose one:       3 SHC         MEC 130       Mechanisms       3 SHC         MEC 275       Engineering Mechanisms       3 SHC         Machines       5 SHC         Choose one course or set:       5 SHC         ELC 117       Motors and Controls       4 SHC	Mechanica	l Drives				
MEC 130 Mechanisms 3 SHC MEC 275 Engineering Mechanisms 3 SHC Machines Choose one course or set: ELC 117 Motors and Controls 4 SHC						
MEC 275 Engineering Mechanisms 3 SHC Machines Choose one course or set: ELC 117 Motors and Controls 4 SHC			2 277 2			
Machines       Image: Choose one course or set:         ELC 117       Motors and Controls       4 SHC	MEC 130		3 SHC			
Machines       Choose one course or set:       ELC 117     Motors and Controls       4 SHC	MEC 275	Engineering Mechanisms	3 SHC			
Choose one course or set:ELC 117Motors and Controls4 SHC	11120 215		- 5110			
Choose one course or set:ELC 117Motors and Controls4 SHC						
Choose one course or set:ELC 117Motors and Controls4 SHC	Machines					
ELC 117 Motors and Controls 4 SHC		one course or set.				
			4 0110			
ELC 130 Advanced Motors/Controls 3 SHC						
	ELC 130	Advanced Motors/Controls	3 SHC			
				I I	I	

ELC 135	Electrical Machines I	3 SHC		
AND				L
ELC 136	Electrical Machines II	4 SHC		
Programm	able Logic Controllers			
Choose of	one:			L
ELC 128	Intro to PLC	3 SHC		L
ELN 260	Prog Logic Controllers	4 SHC		
451				
*Physics				
Choose o	one:			L
PHY 131	Physics-Mechanics	4 SHC		
PHY 151	College Physics I	4 SHC		

#### C. Other Major Hours. To be selected from the following prefixes:

AHR, ALT, ATR, BAT, BPM, BPR, BTB, BTC, BUS, CET, CEG, CHM, CIS, CIV, COE, CSC, CTI, CTS, DBA, DDF, DEA, DFT, EGR, ELC, ELN, FBG, GRA, HET, HYD, ISC, LOG, MAC, MAT, MCM, MEC, MKT, MNT, MPS, MLG, MSM, NET, NOS, OMT, PCI, PHY, PKG, RCT, RVM, SEC, SEL, SST, TRN, WEB and WLD

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

### III. Other Required Hours

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- A. Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- **H.** Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or self-employed business owner.

\*\*The North Carolina Career Clusters Guide was developed by the North Carolina Department of Public Instruction and the North Carolina Community College system to link the academic and Career and Technical Education programs at the secondary and postsecondary levels to increase student achievement. Additional information about Career Clusters is located at: <u>http://www.nc-net.info/NC career clusters guide.php</u> or <u>http://www.careertech.org</u>.

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

# Curriculum Standard for Engineering and Technology: Civil Engineering and Geomatics Technologies

**Career Cluster:** Science, Technology, Engineering, Mathematics\*\* **Cluster Description:** Planning, managing, and providing scientific research and professional and technical services (e.g., physical science, social science, and engineering) including laboratory and testing services, and research and development services.

Pathway: Engineering and TechnologyEffective Term: Fall 2013 (2013\*03)

Program Majors Under Pathway						
Program Major / Classification of Instructio	n Programs (CIP)	Credential Level(s)	Program			
Code		Offered	Major Code			
Civil Engineering Technology	CIP Code: 15.0201	AAS/Diploma/Certificate	A40140			
Geomatics Technology	CIP Code: 15.1102	AAS/Diploma/Certificate	A40380			
Geospatial Mapping Technology	CIP Code: 45.0702	AAS/Diploma/Certificate	A40XXX			
Environmental Engineering Technology	CIP Code: 15.0507	AAS/Diploma/Certificate	A40XXX			

**Pathway Description:** These curriculums are designed to prepare students through the study and application of principles from mathematics, natural sciences, and technology and applied processes based on these subjects.

Course work includes mathematics, natural sciences, engineering sciences and technology.

Graduates should qualify to obtain occupations such as technical service providers, materials and technologies testing services, engineering technicians, construction technicians and managers, industrial and technology managers, or research technicians.

*Program Description: Choose one of the following* 4<sup>th</sup> *paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each Program Major:* 

**Civil Engineering Technology:** A course of study that prepares students to use basic engineering principles and technical skills to carry out planning, documenting and supervising tasks in sustainable land development and public works and facilities projects. Includes instruction in the communication and computational skills required for materials testing, structural testing, field and laboratory testing, site analysis, estimating, project management, plan preparation, hydraulics, environmental technology, and surveying. Graduates should qualify for technician-level jobs with both public and private engineering, construction, and surveying agencies.

**Geomatics Technology:** A course of study that prepares students to use mathematical and scientific principles for the delineation, determination, planning and positioning of land tracts, boundaries, contours and features applying principles of route surveying, construction surveying, photogrammetry, mapping, global positioning systems, geographical information systems, and other kinds of property description and measurement to create related maps, charts and reports. Includes instruction in applied geodesy, computer graphics, photointerpretation, plane and geodetic surveying, mensuration, traversing, survey equipment operation and maintenance, instrument calibration, and basic cartography. Graduates should qualify for jobs as survey party chief, instrument person, surveying technician, highway surveyor, mapper, GPS technician, and CAD operator. Graduates will be prepared to pursue the requirements necessary to become a Registered Land Surveyor in North Carolina.

**Geospatial Mapping Technology:** A course of study that prepares students to use mathematical and scientific principles for calculating, drawing, and verifying accuracy of mapmaking parameters which includes analysis of large amounts of geographic data through map making software. Includes instruction in cartographic theory and map projections, computer-assisted cartography, geographic information systems, map design and layout,

\*Within the degree program, the institution shall include opportunities for the achievement of competence in reading, writing, oral communication, fundamental mathematical skills, and basic use of computers.

photogrammetry, air photo interpretation, remote sensing, spatial analysis, geodesy, cartographic editing, and applications to specific industrial, commercial, research, and governmental mapping problems. Graduates should find employment as mapping assistants, cartography assistants, field technicians and remote sensing assistants in engineering firms, local, state and federal government.

**Environmental Engineering Technology:** A course of study that prepares students to use mathematical and scientific principles to modify, test, and operate equipment and devices used in the prevention, control and remediation of environmental problems and development of environmental remediation devices. Includes instruction in environmental safety principles, environmental standards, testing and sampling procedures, laboratory techniques, instrumentation calibration, safety and protection procedures, equipment maintenance, and report preparation.

#### I. General Education Academic Core

[Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204(3)]: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours must be in communications. General education is optional in certificate programs.

Er	ıgine	eering and Technology: Civil Er	ngineering and G	eomatics	Technolog	gies
General Ec	lucati	on Academic Core		AAS	Diploma	Certificate
Minimum	Genei	ral Education Hours Required:		15 SHC	6 SHC	0 SHC
standard. C courses to m	'ollege eet loc	w are recommended general education cour s may choose to include additional or alterno cal curriculum needs.	ative general education			
		rtificate and diploma level curriculum cours associate degree programs.	es. These courses may			
		ussociale degree programs.				
Communica *COM COM COM ENG ENG ENG ENG ENG ENG Humanities *HUM HUM	101 110 120 231 101 102 110 111 114 116 /Fine	Workplace Communication Introduction to Communication Intro Interpersonal Com Public Speaking Applied Communications I Applied Communications II Freshman Composition Expository Writing Professional Research & Reporting Technical Report Writing <b>Arts:</b> Values in the Workplace Technology and Society	3 SHC 3 SHC 3 SHC 3 SHC 3 SHC 3 SHC 3 SHC 3 SHC 3 SHC 2 SHC 3 SHC 3 SHC	6 SHC 3 SHC	3-6 SHC 0-3 SHC	Optional
HUM HUM PHI PHI Social/Beha ECO	115 230 230 240	Critical Thinking Leadership Development Introduction to Logic Introduction to Ethics	3 SHC 3 SHC 3 SHC 3 SHC 3 SHC			
ECO ECO GEO GEO *PSY *PSY PSY PSY PSY *SOC SOC SOC	131 251 110 111 131 101 102 118 135 150 105 210 215	Prin of Microeconomics Prin of Microeconomics Introduction to Geography World Regional Geography Physical Geography I Applied Psychology Human Relations Interpersonal Psychology Group Processes General Psychology Social Relationships Introduction to Sociology Group Process	3 SHC 3 SHC	3 SHC	0-3 SHC	Optional

Natural Scie	ences/I	Mathematics:				
MAT	120	Geometry and Trigonometry	3 SHC	3 SHC	0-3 SHC	Optional
MAT	121	Algebra/Trigonometry I	3 SHC			-
MAT	161	College Algebra	3 SHC			
MAT	171	Precalculus Algebra	3 SHC			
MAT	175	Precalculus	4 SHC			
MAT	223	Applied Calculus	3 SHC			
MAT	271	Calculus I	4 SHC			

- **A. Technical Core.** The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C. Other Major Hours.** Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from any prefix listed, with the exception of prefixes listed in the core.

	Engineering and Technology: Civil Engineering and Geomatics Technologies		AAS	Diploma	Certificate	
Mi	nimum Major H	Hours Required:		49 SHC	30 SHC	12 SHC
А.	Technical Core	:		29-31 SHC		
	CEG 211	Hydrology & Erosion Control	3 SHC			
	SRV 110	Surveying I	4 SHC			
	<b>Introductio</b> <i>Choose o</i>	n to Engineering Technology				
	CEG 115	Intro to Tech & Sustainability	3 SHC			
	EGR 115	Intro to Technology	3 SHC			
	<b>Computer</b> A Choose o	Aided Drafting ne:				
	CEG 151	CAD for Engineering Technology	3 SHC			
	DFT 151	CAD I	3 SHC			
	EGR 120	Eng and Design Graphics	3 SHC			
	Spatial Data Choose on	a Collection and Mapping				
	CEG 111 OR	Intro to GIS and GNSS	4 SHC			
	GIS 111 AND	Introduction to GIS	3 SHC			
	GIS 112	Introduction to GPS	3 SHC			

D Dree	anam Maian				
	gram Major				
		ne program major plus additional courses			
within the	same program	major for a minimum of (12) semester hou	irs of credits.		
	<u>Civil Engine</u>	ering Technology			
	CEG 212	Introduction to Environmental Tech	3 SHC		
	CEG 210	Construction Mtls & Methods	3 SHC		
	CIV 111	Soils and Foundations	4 SHC		
	SRV 111	Surveying II	4 SHC		
		, ,			
	Choose on	е:			
	EGR 250	Statics & Strength of Materials	5 SHC		
	EGR 251	Statics	3 SHC		
	MEC 210	Applied Mechanics	3 SHC		
	MEC 210	Applied Meenanies	5 5110		
	Choose on	a sat ·			
	CEG 235	Project Management & Estimating	3 SHC		
	CEG 235 CIV 230		3 SHC 3 SHC		
		Construction Estimating	3 SHC		
	AND				
	CIV 240	Project Management	3 SHC		
	CST 242	Planning/Estimating II	4 SHC		
	<u>Geomatics T</u>				
	CEG 230	Subdivision Planning & Design	3 SHC		
	SRV 111	Surveying II	4 SHC		
	SRV 210	Surveying III	4 SHC		
	SRV 220	Surveying Law	3 SHC		
	SRV 240	Topo/Site Surveying	4 SHC		
	Geospatial N	<u> Iapping Technology</u>			
	GIS 121	Georeferencing & Mapping	3 SHC		
	GIS 231	Geo Position Sys Methods	3 SHC		
	GIS 246	Prin of Property Mapping	3 SHC		
	015 240	Third Troperty Mapping	5 5110		
	Choose one				
	DBA 110		3 SHC		
		Database Concepts			
	GIS 232	Spatial Databases	3 SHC		
	Choose on				
	CIS 115	Intro to Prog & Logic	3 SHC		
	GIS 161	Intro to Comp/BASIC & C+ +	3 SHC		
	GIS 261	Programming in GIS	3 SHC		
	CSC 133	C Programming	3 SHC		
	CSC 134	C++ Programming	3 SHC		
	CSC 153	C# Programming	3 SHC		
	Environment	<u>tal Engineering Technology</u>			
	CEG 212	Intro to Environmental Tech	3 SHC		
	CEG 230	Subdivision Planning & Design	3 SHC		
	CIV 111	Soils and Foundations	3 SHC		
	ENV 226	Environmental Law	3 SHC		
	CHM 151	General Chemistry I	4 SHC		
	CIIIVI 131	Seneral Chemistry I			
	Choose one:				
		Station & Strongth of Matanials	5 8110		
	EGR 250	Statics & Strength of Materials	5 SHC		
	EGR 251	Statics	3 SHC		
	MEC 210	Applied Mechanics	3 SHC		
I					

### C. Other Major Hours. To be selected from the following prefixes:

ALT, BIO, CEG, CHM, CIS, CIV, COE, CSC, CST, CTI, DBA, DFT, EGR, ENV, FOR, GIS, LID, MAT, MEC, PHY, SRV, SST

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

### **III.** Other Required Hours

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- **A.** Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- H. Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or selfemployed business owner.

\*\*The North Carolina Career Clusters Guide was developed by the North Carolina Department of Public Instruction and the North Carolina Community College system to link the academic and Career and Technical Education programs at the secondary and postsecondary levels to increase student achievement. Additional information about Career Clusters is located at: <u>http://www.nc-net.info/NC career clusters guide.php</u> or http://www.careertech.org.

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

## Curriculum Standard for Engineering and Technology: Drafting Technology

	0	0	U			
Career Cluster: Science, Technolog	Career Cluster: Science, Technology, Engineering and Mathematics**					
<b>Cluster Description:</b> Planning, mana	iging, and	providin	g scientific research an	ıd		
professional and technical services (e	.g., physi	cal scienc	e, social science, and	engineering)		
including laboratory and testing services, and research and development services.						
Pathway: Engineering and TechnologyEffective Term: Fall 2013 (2013*03)						
Program	n Majors	Under P	athway			
Program Major / Classification of Instruction	on Programs	s (CIP)	Credential Level(s)	Program		
Code			Offered	Major Code		
Mechanical Drafting Technology	CIP Code	15.1306	AAS/Diploma/Certificate	A50340		
Computer-Aided Drafting Technology	CIP Code	15.1302	AAS/Diploma/Certificate	A50150		

**Pathway Description:** These curriculums are designed to prepare students through the study and application of principles from mathematics, natural sciences, and technology and applied processes based on these subjects. Course work includes mathematics, natural sciences, engineering sciences and technology. Graduates should qualify to obtain occupations such as technical service providers, engineering technicians, CAD systems managers, industrial and technology managers, research technicians and graphic technicians.

Program Description: Choose one of the following  $4^{th}$  paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each Program Major:

**Mechanical Drafting Technology:** A course of study that prepares the students to apply technical skills and advanced computer software and hardware to create working drawings, graphic representations and computer simulations for mechanical and industrial designs. Includes instruction in engineering graphics, specification interpretation, geometric dimensioning and tolerancing, drafting calculations, two dimensional and three dimensional engineering design, solids modeling, engineering animation, computer-aided drafting (CAD), computer-aided design (CADD)and manufacturing materials and processes. Graduates should qualify for employment in mechanical areas such as manufacturing, fabrication, research and development, and service industries.

**Computer-Aided Drafting Technology:** A course of study that prepares the students to apply technical skills and advanced computer software and hardware to develop plans and related documentation, and manage the hardware and software of a CAD system. Includes instruction in architectural drafting, computer-assisted drafting and design (CADD), creating and managing two and three-dimensional models, linking CAD documents to other software applications, and operating systems. Graduates should qualify for CAD jobs in architectural and engineering consulting firms and industrial design businesses.

\*Within the degree program, the institution shall include opportunities for the achievement of competence in reading, writing, oral communication, fundamental mathematical skills, and basic use of computers.

### I. General Education Academic Core

[Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204(3)]: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours must be in communications. General education is optional in certificate programs.

		Engineering and Tec.	hnology: Drafting Te	chnology		
General E	ducati	on Academic Core		AAS	Diploma	Certificate
Minimum	Gener	ral Education Hours Required:		15 SHC	6 SHC	0 SHC
standard. C	College.	w are recommended general education s may choose to include additional or a cal curriculum needs.	-			
		rtificate and diploma level curriculum	courses. These courses may			
<u>noi</u> be includ	aea in i	associate degree programs.		6 SHC	3-6 SHC	Optional
Communica	ations:			0 SHC	<b>5-0 SHC</b>	Optional
*COM		Workplace Communication	3 SHC			
COM		Introduction to Communication	3 SHC			
COM		Intro Interpersonal Com	3 SHC			
COM	231	Public Speaking	3 SHC			
*ENG	101	Applied Communications I	3 SHC			
*ENG	102	Applied Communications II	3 SHC			
ENG	1102	Freshman Composition	3 SHC			
ENG	111	Expository Writing	3 SHC			
ENG			3 SHC			
	114	Professional Research & Reporting				
ENG	116	Technical Report Writing	3 SHC			
<b>TT</b>	· / <b>E</b> * · · ·			3 SHC	0-3 SHC	Optional
Humanities						
*HUM	101	Values in the Workplace	2 SHC			
HUM	110	Technology and Society	3 SHC			
HUM	115	Critical Thinking	3 SHC			
HUM	230	Leadership Development	3 SHC			
PHI	230	Introduction to Logic	3 SHC			
PHI	240	Introduction to Ethics	3 SHC			
Social/Beha				3 SHC	0-3 SHC	Optional
ECO	151	Survey of Economics	3 SHC			
ECO	251	Prin of Microeconomics	3 SHC			
GEO	110	Introduction to Geography	3 SHC			
GEO	111	World Regional Geography	3 SHC			
GEO	131	Physical Geography I	4 SHC			
*PSY	101	Applied Psychology	3 SHC			
*PSY	102	Human Relations	2 SHC			
PSY	118	Interpersonal Psychology	3 SHC			
PSY	135	Group Processes	3 SHC			
PSY	150	General Psychology	3 SHC			
*SOC	105	Social Relationships	3 SHC			
SOC	210	Introduction to Sociology	3 SHC			
SOC	215	Group Process	3 SHC			
	_10			3 SHC	0-3 SHC	Optional
Natural Sci	ences/I	Mathematics:		ээпс	U-3 SHC	
*MAT		Applied Mathematics I	3 SHC			
MAT	110	Mathematical Measurement	3 SHC			
MAT	115	Mathematical Models	3 SHC			
MAT	120	Geometry and Trigonometry I	3 SHC			
MAT	121	Algebra/Trigonometry	3 SHC			
PHY	110	Conceptual Physics	3 SHC			
PHY	121	Applied Physics I	4 SHC			

- A. Technical Core. The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C.** Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from any prefix listed, with the exception of prefixes listed in the core.

Minimum Major Hours Required:       49 SHC       30 SHC       1         Courses required for a diploma are designated with *       24 SHC       14-16 SHC         A. Technical Core:       *DFT 151       CAD I       3 SHC       14-16 SHC         *DFT 151       CAD I       3 SHC       3 SHC       14-16 SHC         *DFT 151       CAD II       3 SHC       3 SHC       14-16 SHC         DFT 152       CAD III       3 SHC       3 SHC       14-16 SHC         ØR       *DFT 154       Intro Solid Modeling       3 SHC       14-16 SHC         ØR       *DDF 252       Advanced Solid Modeling       3 SHC       14-16 SHC         B. Program Major(s).       For AAS Degree select one program major plus additional courses from the prefixes listed within the same program major for a minimum of (12) semester hours of credits.       14-16 SHC         Mechanical Drafting Technology       *       *       SHC         *DFT 111       Technical Drafting I       2 SHC       *         *DFT 112       Technical Drafting I       2 SHC       *         *DFT 111       Mechanisms       3 SHC       MEC 110       Machine Processes I       3 SHC         MEC 110       Intro to CAD/CAM       2 SHC       MEC 180       Engineering Materials       3 SHC <th>Engineerin</th> <th>g and Technology: D</th> <th>rafting Technology</th> <th>AAS</th> <th>Diploma</th> <th>Certificate</th>	Engineerin	g and Technology: D	rafting Technology	AAS	Diploma	Certificate
A. Technical Core: *DFT 151 CAD I 3 SHC *DFT 152 CAD II 3 SHC DFT 153 CAD III 3 SHC *DFT 154 Intro Solid Modeling 3 SHC <i>OR</i> *DDF 252 Advanced Solid Modeling 3 SHC <b>B. Program Major(s).</b> For AAS Degree select one program major plus additional courses from the prefixes listed within the same program major for a minimum of (12) semester hours of credits. <u>Mechanical Drafting Technology</u> *DFT 111 Technical Drafting I 2 SHC *DFT 112 Technical Drafting II 2 SHC *Choose one: MEC 110 Intro to CAD/CAM 2 SHC MEC 110 Machine Processes I 3 SHC MEC 110 Machine Processes I 3 SHC MEC 180 Engineering Materials 3 SHC <u>Computer Aided Drafting Technology</u> *DFT 253 CAD Data Management 3 SHC <i>OR</i> *DFT 254 Interm Solid Model/Render 3 SHC <i>Choose one:</i> MEC 110 Technical Drafting I 2 SHC *Choose one: DFT 111 Technical Drafting I 2 SHC ARC 111 Interto Arch Technology 3 SHC	0			49 SHC	30 SHC	12 SHC
*DFT 151 CAD I 3 SHC *DFT 152 CAD II 3 SHC DFT 153 CAD II 3 SHC *DFT 154 Intro Solid Modeling 3 SHC *DDF 252 Advanced Solid Modeling 3 SHC <b>B. Program Major(s).</b> For AAS Degree select one program major plus additional courses from the prefixes listed within the same program major for a minimum of (12) semester hours of credits. <u>Mechanical Drafting Technology</u> *DFT 111 Technical Drafting I 2 SHC *DFT 112 Technical Drafting II 2 SHC *DFT 112 Technical Drafting II 2 SHC *DFT 111 Machine Processes I 3 SHC MEC 110 Intro to CAD/CAM 2 SHC MEC 110 Machine Processes I 3 SHC MEC 130 Mechanisms 3 SHC MEC 180 Engineering Materials 3 SHC MEC 180 Engineering Materials 3 SHC *DFT 253 CAD Data Management 3 SHC <i>OR</i> *DFT 254 Interm Solid Model/Render 3 SHC <i>Computer Aided Drafting I</i> 2 SHC *Choose one: DFT 111 Technical Drafting I 2 SHC ARC 111 Technical Drafting I 2 SHC ARC 111 Technical Drafting I 2 SHC *Choose one: DFT 115 SHC *Choose one: DFT 117 Technical Drafting I 2 SHC ARC 111 Technical Drafting I 2 SHC ARC 111 Intro to Arch Technology 3 SHC	urses required for a	diploma are designated with '	*	24 SHC	14-16 SHC	
*DFT 151 CAD I 3 SHC *DFT 152 CAD II 3 SHC DFT 153 CAD III 3 SHC *DFT 154 Intro Solid Modeling 3 SHC *DDF 252 Advanced Solid Modeling 3 SHC <b>B. Program Major(s).</b> For AAS Degree select one program major plus additional courses from the prefixes listed within the same program major for a minimum of (12) semester hours of credits. <u>Mechanical Drafting Technology</u> *DFT 111 Technical Drafting I 2 SHC *DFT 112 Technical Drafting II 2 SHC *Choose one: MEC 110 Intro to CAD/CAM 2 SHC MEC 110 Intro to CAD/CAM 2 SHC MEC 130 Mechanisms 3 SHC MEC 180 Engineering Materials 3 SHC <u>Computer Aided Drafting Technology</u> *DFT 253 CAD Data Management 3 SHC <i>OR</i> *DFT 254 Interm Solid Model/Render 3 SHC <i>OR</i> *DFT 254 Interm Solid Model/Render 3 SHC <i>Choose one:</i> DFT 111 Technical Drafting I 2 SHC *Choose one: DFT 111 Technical Drafting I 2 SHC ARC 111 Intro to Arch Technology 3 SHC	Technical Core:					
*DFT 152 CAD II 3 SHC DFT 153 CAD III 3 SHC *DFT 154 Intro Solid Modeling 3 SHC <i>OR</i> *DDF 252 Advanced Solid Modeling 3 SHC <b>B. Program Major(s).</b> For AAS Degree select one program major plus additional courses from the prefixes listed within the same program major for a minimum of (12) semester hours of credits. <u>Mechanical Drafting Technology</u> *DFT 111 Technical Drafting I 2 SHC *DFT 112 Technical Drafting II 2 SHC *Choose one: MEC 110 Intro to CAD/CAM 2 SHC MEC 110 Machine Processes I 3 SHC MEC 130 Mechanisms 3 SHC MEC 180 Engineering Materials 3 SHC *DFT 253 CAD Data Management 3 SHC <i>OR</i> *DFT 254 Interm Solid Model/Render 3 SHC *Choose one: DFT 111 Technical Drafting I 2 SHC *Choose one: DFT 111 Technical Drafting I 2 SHC ARC 111 Intro to Arch Technology 3 SHC		CAD I	3 SHC			
DFT 153       CAD III       3 SHC         *DFT 154       Intro Solid Modeling       3 SHC         OR       *DDF 252       Advanced Solid Modeling       3 SHC         B. Program Major(s).       .       .         For AAS Degree select one program major plus additional courses from the prefixes listed within the same program major for a minimum of (12) semester hours of credits.         Mechanical Drafting Technology       .         *DFT 111       Technical Drafting I       2 SHC         *DFT 112       Technical Drafting II       2 SHC         *Choose one:       .       .         MEC 110       Intro to CAD/CAM       2 SHC         *Choose one:       .       .         MEC 180       Engineering Materials       3 SHC         MEC 180       Engineering Materials       3 SHC         .       .       .       .         .       .       .       .         .       .       .       .       .         .       .       .       .       .         .       .       .       .       .       .         .       .       .       .       .       .         .       .       .       .<						
*DFT 154 Intro Solid Modeling 3 SHC OR *DDF 252 Advanced Solid Modeling 3 SHC B. Program Major(s). For AAS Degree select one program major plus additional courses from the prefixes listed within the same program major for a minimum of (12) semester hours of credits. Mechanical Drafting Technology *DFT 111 Technical Drafting I 2 SHC *DFT 112 Technical Drafting II 2 SHC *Choose one: MEC 110 Intro to CAD/CAM 2 SHC MEC 110 Machine Processes I 3 SHC MEC 130 Mechanisms 3 SHC MEC 180 Engineering Materials 3 SHC *DFT 253 CAD Data Management 3 SHC OR *DFT 254 Interm Solid Model/Render 3 SHC *Choose one: DFT 111 Technical Drafting I 2 SHC *Choose one: DFT 111 Technical Drafting I 2 SHC ARC 111 Intro to Arch Technology 3 SHC						
OR *DDF 252       Advanced Solid Modeling       3 SHC         B. Program Major(s).       For AAS Degree select one program major plus additional courses from the prefixes listed within the same program major for a minimum of (12) semester hours of credits.         Mechanical Drafting Technology       *DFT 111       Technical Drafting I       2 SHC         *DFT 112       Technical Drafting II       2 SHC         *Choose one:       MEC 110       Intro to CAD/CAM       2 SHC         MEC 110       Intro to CAD/CAM       2 SHC         MEC 130       Meterials       3 SHC         MEC 180       Engineering Materials       3 SHC         OR       *DFT 253       CAD Data Management       3 SHC         *Choose one:       Computer Aided Drafting Technology       *         *DFT 253       CAD Data Management       3 SHC         OR       *DFT 254       Interm Solid Model/Render       3 SHC         *Choose one:       DFT 111       Technical Drafting I       2 SHC         PT 111       Technical Drafting I       2 SHC         *DFT 254       Interm Solid Model/Render       3 SHC         *Choose one:       DFT 111       Technical Drafting I       2 SHC         PT 111       Technical Drafting I       2 SHC         *Choose on						
B. Program Major(s).         For AAS Degree select one program major plus additional courses from the prefixes listed within the same program major for a minimum of (12) semester hours of credits.         Mechanical Drafting Technology         *DFT 111       Technical Drafting I         2 SHC         *DFT 112       Technical Drafting II         2 SHC         *Choose one:         MEC 110       Intro to CAD/CAM         MEC 111       Machine Processes I         3 SHC         MEC 180       Engineering Materials         3 SHC         OR         *DFT 253       CAD Data Management         3 SHC         *Choose one:         DR         MEC 180       Engineering Materials         3 SHC         OR         *DFT 254       Interm Solid Model/Render         3 SHC         *Choose one:         DFT 111       Technical Drafting I         2 SHC         *Choose one:         DFT 111       Technical Drafting I         2 SHC         *Choose one:         DFT 111       Technical Drafting I         2 SHC         MEC 110       Interm Solid Model/Render	OR	e				
For AAS Degree select one program major plus additional courses from the prefixes listed within the same program major for a minimum of (12) semester hours of credits.         Mechanical Drafting Technology         *DFT 111       Technical Drafting I         2 SHC         *Choose one:         MEC 130       Mechanisms         3 SHC         MEC 180       Engineering Materials         3 SHC         *DFT 253       CAD Data Management         3 SHC         OR         *DFT 254       Interm Solid Model/Render         3 SHC         *Choose one:         DFT 111         Technical Drafting Technology         *DFT 254         Interm Solid Model/Render       3 SHC         *Choose one:         DFT 111       Technical Drafting I         2 SHC	*DDF 252	Advanced Solid Modeling	3 SHC			
For AAS Degree select one program major plus additional courses from the prefixes listed within the same program major for a minimum of (12) semester hours of credits.         Mechanical Drafting Technology         *DFT 111       Technical Drafting I         2 SHC         *Choose one:         MEC 110       Intro to CAD/CAM         MEC 110       Intro to CAD/CAM         2 SHC         *Choose one:         MEC 110       Intro to CAD/CAM         2 SHC         *Choose one:         MEC 130       Mechanisms         3 SHC         MEC 180       Engineering Materials         3 SHC         OR         *DFT 253       CAD Data Management         3 SHC         OR         *DFT 254       Interm Solid Model/Render         3 SHC         *Choose one:         DFT 111       Technical Drafting I         2 SHC         *Choose one:         DFT 111       Technical Drafting I         2 SHC         *Choose one:         DFT 111       Technical Drafting I         2 SHC         *Choose one:         DFT 170       Engineering Graphics         3 SHC	B. Program Ma	ijor(s).				
within the same program major for a minimum of (12) semester hours of credits.         Mechanical Drafting Technology         *DFT 111       Technical Drafting I         2 SHC         *DFT 112       Technical Drafting II         2 SHC         *Choose one:         MEC 110       Intro to CAD/CAM         2 SHC         *Choose one:         MEC 110       Intro to CAD/CAM         2 SHC         MEC 111       Machine Processes I         3 SHC         MEC 180       Engineering Materials         3 SHC         MEC 180       Engineering Materials         0R         *DFT 253       CAD Data Management         3 SHC         OR         *DFT 254       Interm Solid Model/Render         3 SHC         *Choose one:         DFT 111       Technical Drafting I         2 SHC         DFT 170       Engineering Graphics         ARC 111       Intro to Arch Technology         3 SHC			courses from the prefixes listed			
*DFT 111       Technical Drafting I       2 SHC         *DFT 112       Technical Drafting II       2 SHC         *Choose one:						
*DFT 111 Technical Drafting I 2 SHC *DFT 112 Technical Drafting II 2 SHC *Choose one: MEC 110 Intro to CAD/CAM 2 SHC MEC 111 Machine Processes I 3 SHC MEC 130 Mechanisms 3 SHC MEC 180 Engineering Materials 3 SHC Computer Aided Drafting Technology *DFT 253 CAD Data Management 3 SHC Conserved a structure of the struc	Mechanical Draft	ing Technology				
*DFT 112 Technical Drafting II 2 SHC *Choose one: MEC 110 Intro to CAD/CAM 2 SHC MEC 111 Machine Processes I 3 SHC MEC 130 Mechanisms 3 SHC MEC 180 Engineering Materials 3 SHC 			2 SHC			
MEC 110Intro to CAD/CAM2 SHCMEC 111Machine Processes I3 SHCMEC 130Mechanisms3 SHCMEC 180Engineering Materials3 SHCComputer Aided Drafting Technology*DFT 253CAD Data ManagementoR*DFT 254Interm Solid Model/Render3 SHC*Choose one:DFT 111Technical Drafting I2 SHCDFT 170Engineering GraphicsARC 111Intro to Arch Technology3 SHC	*DFT 112		2 SHC			
MEC 111       Machine Processes I       3 SHC         MEC 130       Mechanisms       3 SHC         MEC 180       Engineering Materials       3 SHC         Computer Aided Drafting Technology         *DFT 253       CAD Data Management         OR       *       3 SHC         *Choose one:         DFT 111       Technical Drafting I       2 SHC         DFT 170       Engineering Graphics       3 SHC         ARC 111       Intro to Arch Technology       3 SHC	*Choose one:					
MEC 130       Mechanisms       3 SHC         MEC 180       Engineering Materials       3 SHC         Computer Aided Drafting Technology	MEC 110	Intro to CAD/CAM	2 SHC			
MEC 180       Engineering Materials       3 SHC         Computer Aided Drafting Technology	MEC 111	Machine Processes I	3 SHC			
Computer Aided Drafting Technology         *DFT 253       CAD Data Management       3 SHC         OR       *         *DFT 254       Interm Solid Model/Render       3 SHC         *Choose one:          DFT 111       Technical Drafting I       2 SHC         DFT 170       Engineering Graphics       3 SHC         ARC 111       Intro to Arch Technology       3 SHC	MEC 130	Mechanisms	3 SHC			
*DFT 253       CAD Data Management       3 SHC         OR       *         *DFT 254       Interm Solid Model/Render       3 SHC         *Choose one:          DFT 111       Technical Drafting I       2 SHC         DFT 170       Engineering Graphics       3 SHC         ARC 111       Intro to Arch Technology       3 SHC	MEC 180	Engineering Materials	3 SHC			
*DFT 253       CAD Data Management       3 SHC         OR       *         *DFT 254       Interm Solid Model/Render       3 SHC         *Choose one:          DFT 111       Technical Drafting I       2 SHC         DFT 170       Engineering Graphics       3 SHC         ARC 111       Intro to Arch Technology       3 SHC	~					
OR         *DFT 254       Interm Solid Model/Render       3 SHC         *Choose one:			2 0110			
*DFT 254 Interm Solid Model/Render 3 SHC *Choose one: DFT 111 Technical Drafting I 2 SHC DFT 170 Engineering Graphics 3 SHC ARC 111 Intro to Arch Technology 3 SHC		CAD Data Management	3 SHC			
*Choose one: DFT 111 Technical Drafting I 2 SHC DFT 170 Engineering Graphics 3 SHC ARC 111 Intro to Arch Technology 3 SHC		Intome Colid Mad-1/D d	2 8110			
DFT 111Technical Drafting I2 SHCDFT 170Engineering Graphics3 SHCARC 111Intro to Arch Technology3 SHC	*DF1 254	Interm Solid Model/Render	3 SHC			
DFT 170Engineering Graphics3 SHCARC 111Intro to Arch Technology3 SHC	*Choose one:					
DFT 170Engineering Graphics3 SHCARC 111Intro to Arch Technology3 SHC	DFT 111					
	DFT 170		3 SHC			
DDF 221 Design Drafting Project 2 SHC	ARC 111	Intro to Arch Technology	3 SHC			
	DDF 221	Design Drafting Project	2 SHC			

C. Other Major Hours. To be selected from the following prefixes:

ALT, ARC, ART, ATR, BAT, BPR, BUS, CEG, CET, CIS, CIV, COE, CSC, CST, CTI, CTS, DBA, DDF, DFT, EGR, GIS, HYD, INT, ISC, LAR, MAC, MEC, MNT, OMT, SRV and SST

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

### **III. Other Required Hours**

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- **A.** Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- **H.** Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or self-employed business owner.

\*\*The North Carolina Career Clusters Guide was developed by the North Carolina Department of Public Instruction and the North Carolina Community College system to link the academic and Career and Technical Education programs at the secondary and postsecondary levels to increase student achievement. Additional information about Career Clusters is located at: <u>http://www.nc-net.info/NC career clusters quide.php</u> or <u>http://www.careertech.org</u>.

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

# Curriculum Standard for Engineering and Technology: Electrical Engineering Technology

Career Cluster: Science, Technology, Engineering, Mathematics\*\*

**Cluster Description**: Planning, managing, and providing scientific research and professional and technical services (e.g., physical science, social science, and engineering) including laboratory and testing services, and research and development services.

Pathway: Engineering and TechnologyEffective Term: Fall 2013 (2013\*03)

Program Majors Under Pathway						
Program Major / Classification of Instructio	n Programs (CIP)	Credential Level(s)	Program			
Code		Offered	Major Code			
Biomedical Equipment Technology	CIP Code: 15.0401	AAS/Diploma/Certificate	A50100			
Computer Engineering Technology	CIP Code: 15.1201	AAS/Diploma/Certificate	A40160			
Electrical Engineering Technology	CIP Code: 15.0399	AAS/Diploma/Certificate	A40180			
Electronics Engineering Technology	CIP Code: 15.0303	AAS/Diploma/Certificate	A40200			
Laser and Photonics Technology	CIP Code: 15.0304	AAS/Diploma/Certificate	A40280			
Telecommunications and Network	CIP Code: 15.0305	AAS/Diploma/Certificate	A40400			
Engineering Technology						

**Pathway Description:** These curriculums are designed to prepare students through the study and application of principles from mathematics, natural sciences, and technology and applied processes based on these subjects.

Course work includes mathematics, natural sciences, engineering sciences and technology.

Graduates should qualify to obtain occupations such as technical service providers, materials and technologies testing services, process improvement technicians, engineering technicians, construction technicians and managers, industrial and technology managers, or research technicians.

Program Description: Choose one of the following  $4^{th}$  paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each Program Major:

**Biomedical Equipment Technology:** A course of study that prepares the students to use basic engineering principles and technical skills to install, operate, troubleshoot, and repair sophisticated devices and instrumentation used in the health care delivery system. Includes instruction in instrument calibration, design and installation testing, system safety and maintenance procedures, procurement and installation procedures, and report preparation. With an AAS degree and two years' experience, an individual should be able to become a certified Biomedical Equipment Technician.

**Computer Engineering Technology:** A course of study that prepares the students to use basic engineering principles and technical skills for installing, servicing, and maintaining computers, peripherals, networks, and microprocessor and computer controlled equipment. Includes instruction in mathematics, computer electronics and programming, prototype development and testing, systems installation and testing, solid state and microminiature circuitry, peripheral equipment, and report preparation. Graduates should qualify for employment opportunities in electronics technology, computer service, computer networks, server maintenance, programming, and other areas requiring knowledge of electronic and computer systems. Graduates may also qualify for certification in electronics, computers, or networks.

**Electrical Engineering Technology:** A course of study that prepares the students to apply basic engineering principles and technical skills in electrical maintenance and management or in the design, planning, construction, development, and installation of electrical systems, machines, and power generating equipment. Includes instruction in electrical circuitry, prototype development and testing, systems analysis and testing, systems maintenance, instrument calibration, and report preparation. Graduates may seek employment as technicians, engineering assistants, technical managers, or salespersons in electrical generation/distribution, industrial maintenance, electronic repair, or other fields requiring a broad-based knowledge of electrical and electronic concepts.

\*Within the degree program, the institution shall include opportunities for the achievement of competence in reading, writing, oral communication, fundamental mathematical skills, and basic use of computers.

**Electronics Engineering Technology:** A course of study that prepares the students to apply basic engineering principles and technical skills to become technicians who design, build, install, test, troubleshoot, repair, and modify developmental and production electronic components, equipment, and systems such as industrial/computer controls, manufacturing systems, communication systems, and power electronic systems. Includes instruction in mathematics, basic electricity, solid-state fundamentals, digital concepts, and microprocessors or programmable logic controllers. Graduates should qualify for employment as electronics engineering technician, field service technician, instrumentation technician, maintenance technician, electronic tester, electronic systems integrator, bench technician, and production control technician.

Laser and Photonics Technology: A course of study that prepares the students to apply basic engineering principles and technical skills for specifying, operating, and maintaining laser-based systems. Includes instruction in mathematics, science, communications, electronics, and optics courses emphasizing laboratory learning experiences that develops the hands-on skills needed. Graduates of the curriculum qualify for current and emerging employment opportunities in fiber optic communications, materials processing, laser surgery, research, and a variety of related fields.

**Telecommunications and Network Engineering Technology:** A course of study that prepares the students to apply basic engineering principles and technical skills for positions in the telecommunication networking industry. Includes instruction in mathematics, basic electricity, solid-state fundamentals, digital concepts, microprocessors, telecommunications and network systems with an emphasis on analyzing and troubleshooting telecommunications and network systems. Graduates should qualify for employment as electronic engineering technician, field service technician, maintenance technician, network system technician, network specialist, network systems integrator, and network administrator.

### I. General Education Academic Core

[Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204(3)]: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours must be in communications. General education is optional in certificate programs.

	AAS	Diploma	
			Certificate
T TAIMING AND	5 SHC	6 SHC	0 SHC
Courses listed below are recommended general education courses for this curriculum standard. Colleges may choose to include additional or alternative general education courses to meet local curriculum needs.			
* <i>Recommended certificate and diploma level curriculum courses. These courses may</i> <u>not</u> be included in associate degree programs.			
Communications:	6 SHC	3-6 SHC	Optional
*COM 101 Workplace Communication 3 SHC	0 SHC	<b>5-0 SIIC</b>	Optional
COM101Workplace communication3 SiteCOM110Introduction to Communication3 SHC			
COM 120 Intro Interpersonal Com 3 SHC			
COM 231 Public Speaking 3 SHC			
*ENG 101 Applied Communications I 3 SHC			
*ENG 102 Applied Communications II 3 SHC			
ENG 110 Freshman Composition 3 SHC			
ENG 111 Expository Writing 3 SHC			
ENG 114 Professional Research & Reporting 3 SHC			
ENG 116 Technical Report Writing 3 SHC			
	3 SHC	0-3 SHC	Optional
*HUM 101 Values in the Workplace 2 SHC			
HUM110Technology and Society3 SHC			
HUM 115 Critical Thinking 3 SHC			
HUM230Leadership Development3 SHC			
PHI 230 Introduction to Logic 3 SHC			
PHI 240 Introduction to Ethics 3 SHC			
Social/Behavioral Sciences:	3 SHC	0-3 SHC	Optional
ECO 151 Survey of Economics 3 SHC			· ·
ECO 251 Prin of Microeconomics 3 SHC			
GEO 110 Introduction to Geography 3 SHC			
GEO 111 World Regional Geography 3 SHC			
GEO 131 Physical Geography I 4 SHC			
*PSY 101 Applied Psychology 3 SHC			
*PSY 102 Human Relations 2 SHC			
PSY 118 Interpersonal Psychology 3 SHC			
PSY 135 Group Processes 3 SHC			
PSY 150 General Psychology 3 SHC			
*SOC 105 Social Relationships 3 SHC			
SOC 210 Introduction to Sociology 3 SHC			
SOC 215 Group Process 3 SHC			
	3 SHC	0-3 SHC	Optional
Natural Sciences/Mathematics:			
MAT 120 Geometry and Trigonometry 3 SHC			
MAT 121 Algebra/Trigonometry I 3 SHC			
MAT 161 College Algebra 3 SHC			
MAT 171 Precalculus Algebra 3 SHC			
MAT 175 Precalculus 4 SHC			
MAT 223 Applied Calculus 3 SHC			
MAT 271 Calculus I 4 SHC			

- A. Technical Core. The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hour's credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C. Other Major Hours.** Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from any prefix listed, with the exception of prefixes listed in the core.

Engineering and Technology: Electrical Engineering Technology Minimum Major Hours Required:			AAS	Diploma	Certificate	
			49 SHC	30 SHC	12 SHC	
						А. Т
	Analog					
	ELN 131	Analog Electronics I	4 SHC			
	Circuits					
	ELC 131 OR	Circuit Analysis I	4 SHC			
	ELC 138 AND	DC Circuit Analysis	4 SHC			
	ELC 139	AC Circuit Analysis	4 SHC			
	Digital					
			4 0110			
For AA		ne program major plus additional cour				
For AA	Program Major( 1S Degree select o the same program I. <u>Electr</u>	<b>s).</b> <i>ne program major plus additional cour</i> <i>major for a minimum of (12) semester</i> <b>ical Engineering Technology</b>	ses from the prefixes listed			
For AA	<b>Program Major(</b> 4S Degree select o the same program	<b>s).</b> ne program major plus additional cour major for a minimum of (12) semester	ses from the prefixes listed			
For AA	Program Major( 4S Degree select of the same program I. <u>Electr</u> ELC 128 OR ELN 260	<b>s).</b> ne program major plus additional coun major for a minimum of (12) semester <u>ical Engineering Technology</u> Intro to PLC Prog Logic Controllers	rses from the prefixes listed • hours of credits. 3 SHC 4 SHC			
For AA	Program Major( 4S Degree select of the same program ELC 128 OR ELN 260 ELC 135	s). ne program major plus additional cour major for a minimum of (12) semester <u>ical Engineering Technology</u> Intro to PLC Prog Logic Controllers Electrical Machines I	rses from the prefixes listed • hours of credits. 3 SHC 4 SHC 3 SHC 3 SHC			
For AA	Program Major( 4S Degree select of the same program I. <u>Electr</u> ELC 128 OR ELN 260	<b>s).</b> ne program major plus additional coun major for a minimum of (12) semester <u>ical Engineering Technology</u> Intro to PLC Prog Logic Controllers	rses from the prefixes listed • hours of credits. 3 SHC 4 SHC			
For AA	Program Major( 4S Degree select of the same program I. <u>Electr</u> ELC 128 OR ELN 260 ELC 135 ELC 231	s). ne program major plus additional cour major for a minimum of (12) semester <u>ical Engineering Technology</u> Intro to PLC Prog Logic Controllers Electrical Machines I	rses from the prefixes listed • hours of credits. 3 SHC 4 SHC 3 SHC 3 SHC			
For AA	Program Major( 4S Degree select of the same program I. <u>Electr</u> ELC 128 OR ELN 260 ELC 135 ELC 231	s). ne program major plus additional coun major for a minimum of (12) semester ical Engineering Technology Intro to PLC Prog Logic Controllers Electrical Machines I Electric Power Systems Engineering Technology	rses from the prefixes listed • hours of credits. 3 SHC 4 SHC 3 SHC 3 SHC			
For AA	Program Major( 4S Degree select of the same program I. <u>Electr</u> ELC 128 OR ELN 260 ELC 135 ELC 231 <u>Electronics E</u>	s). ne program major plus additional coun major for a minimum of (12) semester ical Engineering Technology Intro to PLC Prog Logic Controllers Electrical Machines I Electric Power Systems Engineering Technology	rses from the prefixes listed • hours of credits. 3 SHC 4 SHC 3 SHC 3 SHC			
For AA	Program Major( 4S Degree select of the same program ELC 128 OR ELN 260 ELC 135 ELC 231 Electronics E Choose at lea ATR 214 ELC 128	s). ne program major plus additional count major for a minimum of (12) semester ical Engineering Technology Intro to PLC Prog Logic Controllers Electrical Machines I Electric Power Systems Cngineering Technology ist 2 courses: Advanced PLCs Intro to PLC	rses from the prefixes listed • hours of credits. 3 SHC 4 SHC 3 SHC 4 SHC 4 SHC 3 SHC 3 SHC 3 SHC 3 SHC			
For AA	Program Major( 4S Degree select of the same program ELC 128 OR ELN 260 ELC 135 ELC 231 Electronics E Choose at lea ATR 214 ELC 128 ELC 228	s). ne program major plus additional count major for a minimum of (12) semester ical Engineering Technology Intro to PLC Prog Logic Controllers Electrical Machines I Electric Power Systems Engineering Technology ist 2 courses: Advanced PLCs Intro to PLC PLC Applications	ses from the prefixes listed hours of credits. 3 SHC 4 SHC 3 SHC 4 SHC 4 SHC 3 SHC 4 SHC 4 SHC 3 SHC 4 SHC 4 SHC			
For AA	Program Major( 4S Degree select of the same program ELC 128 OR ELN 260 ELC 135 ELC 231 Electronics E Choose at lea ATR 214 ELC 128 ELC 228 ELC 228 ELN 232	s). ne program major plus additional count major for a minimum of (12) semester ical Engineering Technology Intro to PLC Prog Logic Controllers Electrical Machines I Electric Power Systems Engineering Technology ist 2 courses: Advanced PLCs Intro to PLC PLC Applications Intro to Microprocessors	rses from the prefixes listed hours of credits. 3 SHC 4 SHC 3 SHC 4 SHC 4 SHC 3 SHC 4 SHC 3 SHC 4 SHC 4 SHC 3 SHC 4 SHC 3 SHC 4 SHC 3 SHC 4 SHC 4 SHC 3 SHC 4 SHC 4 SHC 3 SHC 4 SHC 4 SHC 4 SHC 4 SHC 3 SHC 4 SHC			
For AA	Program Major( 4S Degree select of the same program ELC 128 OR ELN 260 ELC 135 ELC 231 Electronics E Choose at lea ATR 214 ELC 128 ELC 228	s). ne program major plus additional count major for a minimum of (12) semester ical Engineering Technology Intro to PLC Prog Logic Controllers Electrical Machines I Electric Power Systems Engineering Technology ist 2 courses: Advanced PLCs Intro to PLC PLC Applications	ses from the prefixes listed hours of credits. 3 SHC 4 SHC 3 SHC 4 SHC 4 SHC 3 SHC 4 SHC 4 SHC 3 SHC 4 SHC 4 SHC			

<i>Choose one c</i> CET 111	Computer Upgrade/Repair I	3 SHC	
CTI 130	OS and Device Foundation	6 SHC	
CTS 120	Hardware/Software Support	3 SHC	
C13 120	Hardware/Software Support	5 5110	
Choose at lea	ast one:		
CSC 133	C Programming	3 SHC	
CSC 134	C + + Programming	3 SHC	
CSC 139	Visual BASIC Prog	3 SHC	
CSC 151	JAVA Programming	3 SHC	
ELN 232	Intro to Microprocessors	4 SHC	
NOS 110	Operating Systems Concepts	3 SHC	
Telecommur	nications and Networking Engineering T	<b>Fechnology</b>	
CET 130	Operating System Prin	3 SHC	
Choose one p	pair of courses:		
TNE 111	Campus Networks I	3 SHC	
AND			
TNE 121	Campus Networks II	3 SHC	
	OR		
NET 125	Networking Basics	3 SHC	
AND			
NET 126	Routing Basics	3 SHC	
Laser and P	hotonics Engineering Technology		
LEO 211	Photonics Technology	7 SHC	
LEO 212	Photonics Applications	4 SHC	
Biomedical	Equipment Technology		
BMT 111	Intro to Biomed Field	2 SHC	
BMT 212	BMET Instrumentation I	6 SHC	
Choose at le	ast one:		
CET 111	Computer Upgrade/Repair I	3 SHC	
NET 110	Networking Concepts	3 SHC	
NET 125	Networking Basics	3 SHC	
SEC 110	Security Concepts	3 SHC	
	ours. To be selected from the follo		 I

EPP, HYD, ISC, LEO, MAT, MEC ,MNT, NET, NOS, OMT, PCI, PHY, SEC, SGD, SST, TNE, WEB, WLD Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all

programs up to a maximum of 3 semester hours of credit.

### **III. Other Required Hours**

C.

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- **A.** Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- **H.** Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or self-employed business owner.

\*\*The North Carolina Career Clusters Guide was developed by the North Carolina Department of Public Instruction and the North Carolina Community College system to link the academic and Career and Technical Education programs at the secondary and postsecondary levels to increase student achievement. Additional information about Career Clusters is located at: <u>http://www.nc-net.info/NC career clusters guide.php</u> or <u>http://www.careertech.org</u>.

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

# Curriculum Standard for Engineering and Technology: Geospatial Technology

Career Cluster: Science, Technology, Engineering, Mathematics\*\*

**Cluster Description:** Planning, managing, and providing scientific research and professional and technical services (e.g., physical science, social science, and engineering) including laboratory and testing services, and research and development services.

Pathway: Engineering and TechnologyEffective Term: Fall 2013 (2013\*03)

Program Majors Under Pathway							
Program Major / Classification of Instruct	Credential Level(s)	Program					
Code		Offered	Major Code				
Geospatial Technology	CIP Code: 45.0702	AAS/Diploma/Certificate	A40220				

**Pathway Description:** These curriculums are designed to prepare students through the study and application of principles from mathematics, natural sciences, and technology and applied processes based on these subjects.

Course work includes mathematics, natural sciences, engineering sciences and technology.

Graduates should qualify to obtain occupations such as technical service providers, process improvement technicians, engineering technicians, construction technicians, industrial and technology managers, or research technicians.

*Program Description: Choose one of the following* 4<sup>th</sup> paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each Program Major:

**Geospatial Technology:** A course of study that prepares students to use technical skills and advanced computer hardware and software for programming, database management and internet applications using geographic data and geographic information systems. Includes instruction in mathematics, computer-assisted cartography, geographic information systems, map design and layout, photogrammetry, air photo interpretation, remote sensing, spatial analysis, geodesy, cartographic editing, global navigation satellite system technology and applications to specific industrial, commercial, research, and governmental mapping problems. Graduates should find employment as field technicians or as database and mapping assistants.

\*Within the degree program, the institution shall include opportunities for the achievement of competence in reading, writing, oral communication, fundamental mathematical skills, and basic use of computers.

[Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204(3)]: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours must be in communications. General education is optional in certificate programs.

			Engineering and Tech	nology: Geospatial T	echnolog	<i>y</i>	
Gene	eral Ed	lucati	on Academic Core		AAS	Diploma	Certificate
Mini	Ainimum General Education Hours Required:			15 SHC	6 SHC	0 SHC	
stand educa *Reco	lard. ution con ommena	Colleg urses t led cer	w are recommended general education ges may choose to include addition to meet local curriculum needs. tificate and diploma level curriculum c	al or alternative general			
<u>not</u> be	e includ	ed in d	associate degree programs.				
Com	munica	tions:			6 SHC	3-6 SHC	Optional
	*COM	101	Workplace Communication	3 SHC			•
	COM	110	Introduction to Communication	3 SHC			
	COM	120	Intro Interpersonal Com	3 SHC			
	COM	231	Public Speaking	3 SHC			
	*ENG	101	Applied Communications I	3 SHC			
	*ENG	102	Applied Communications II	3 SHC			
	ENG	110	Freshman Composition	3 SHC			
	ENG	111	Expository Writing	3 SHC			
	ENG	114	Professional Research & Reporting	3 SHC			
	ENG	116	Technical Report Writing	3 SHC			
	• . •	/ <b>F</b> *	<b>A</b> 4 -				
Hum	nanities,				3 SHC	0-3 SHC	Optional
	*HUM	101	Values in the Workplace	2 SHC			
	HUM	110	Technology and Society	3 SHC			
	HUM	115	Critical Thinking	3 SHC			
	HUM	230	Leadership Development	3 SHC			
	PHI	230	Introduction to Logic	3 SHC			
	PHI	240	Introduction to Ethics	3 SHC			
Socia	l/Behav	vioral	Sciences:		3 SHC	0-3 SHC	Optional
	ECO	151	Survey of Economics	3 SHC			
	ECO	251	Prin of Microeconomics	3 SHC			
	GEO	110	Introduction to Geography	3 SHC			
	GEO	111	World Regional Geography	3 SHC			
	GEO	131	Physical Geography I	4 SHC			
	*PSY	101	Applied Psychology	3 SHC			
	*PSY	102	Human Relations	2 SHC			
	PSY	118	Interpersonal Psychology	3 SHC			
	PSY	135	Group Processes	3 SHC			
	PSY	150	General Psychology	3 SHC			
	*SOC	105	Social Relationships	3 SHC			
	SOC	210	Introduction to Sociology	3 SHC			
	SOC	215	Group Process	3 SHC			
			-				
Natu	ral Scie MAT	nces/N 120	Mathematics: Geometry and Trigonometry	3 SHC	3 SHC	0-3 SHC	Optional
				3 SHC 3 SHC			
	MAT MAT	121	Algebra/Trigonometry I	3 SHC 3 SHC			
		161 171	College Algebra				
	MAT	171	Precalculus Algebra	3 SHC			
	MAT	175	Precalculus Applied Calculus	4 SHC			
	MAT	223	Applied Calculus	3 SHC			
	MAT	271	Calculus I	4 SHC			

- **A. Technical Core.** The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C. Other Major Hours.** Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from any prefix listed, with the exception of prefixes listed in the core.

	Engineeri	ing and Technology: Geo	spatial Technology	AAS	Diploma	Certificate
Mi	nimum Majo	r Hours Required:		49 SHC	30 SHC	12 SHC
Coi	urses required f	or a diploma are designated with *		15 SHC	15 SHC	
A.	Technical Co	re:				
	*GIS111	Introduction to GIS	3 SHC			
	*GIS121	Georeferencing & Mapping	3 SHC			
	*Choose one	of the groups:				
	GIS 112	Introduction to GPS	3 SHC			
	GIS 245	Intro to Spatial Analysis	3 SHC			
	GIS 255	Advanced Spatial Analysis OR	3 SHC			
	GIS 120	Introduction to Geodesy	3 SHC			
	GIS 125	CAD for GIS	3 SHC			
	GIS 240	Air Photo Interpretation	3 SHC			
B.	Program Majo	r(s): Not Applicable				

C. Other Major Hours. To be selected from the following prefixes:

BUS, CEG, CET, CIS, CIV, COE, CSC, CTI, CTS, DBA, DEA, DFT, EGR, ENV, FOR, GEO, GIS, MAT, NET, NOS, PHY, SEC, SGD, SST, SRV, and WEB

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

### **III. Other Required Hours**

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

#### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- **A.** Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- **H.** Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or self-employed business owner.

\*\*The North Carolina Career Clusters Guide was developed by the North Carolina Department of Public Instruction and the North Carolina Community College system to link the academic and Career and Technical Education programs at the secondary and postsecondary levels to increase student achievement. Additional information about Career Clusters is located at: <u>http://www.nc-net.info/NC career clusters quide.php</u> or <u>http://www.careertech.org</u>.

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

# Curriculum Standard for Engineering and Technology: Mechanical Engineering Technology

Career Cluster: Science, Technology, Engineering, Mathematics\*\*

**Cluster Description:** Planning, managing, and providing scientific research and professional and technical services (e.g., physical science, social science, and engineering) including laboratory and testing services, and research and development services.

Pathway: Engineering and TechnologyEffective Term: Fall 2013 (2013\*03)

Progra	m Majors Under P	athway	
<b>Program Major / Classification of Instruct</b>	Credential Level(s)	Program	
Code		Offered	Major Code
Mechanical Engineering Technology	CIP Code: 15.0805	AAS/Diploma/Certificate	A40320

**Pathway Description:** These curriculums are designed to prepare students through the study and application of principles from mathematics, natural sciences, and technology and applied processes based on these subjects.

Course work includes mathematics, natural sciences, engineering sciences and technology.

Graduates should qualify to obtain occupations such as technical service providers, materials and technologies testing services, process improvement technicians, engineering technicians, industrial and technology managers, or research technicians.

*Program Description: Choose one of the following* 4<sup>th</sup> paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each Program Major:

**Mechanical Engineering Technology**: A course of study that prepares the students to use basic engineering principles and technical skills to design, develop, test, and troubleshoot projects involving mechanical systems. Includes instruction in principles of mechanics, applications to specific engineering systems, design testing procedures, prototype and operational testing and inspection procedures, manufacturing system-testing procedures, test equipment operation and maintenance, computer applications, critical thinking, planning and problem solving, and oral and written communications. Graduates of the curriculum will find employment opportunities in the manufacturing or service sectors of engineering technology. Engineering technicians may obtain professional certification by application to organizations such as ASQC, SME, and NICET.

\*Within the degree program, the institution shall include opportunities for the achievement of competence in reading, writing, oral communication, fundamental mathematical skills, and basic use of computers.

[Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204(3)]: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours must be in communications. General education is optional in certificate programs.

	E	ngineering and Technology.	: Mechanical Engine	ering Tec	hnology	
ral Ed	ucati	on Academic Core		AAS	Diploma	Certificate
Minimum General Education Hours Required:			15 SHC 6 SHC		0 SHC	
urd. Co es to mo mmend	olleges eet loc led cer	s may choose to include additional or a al curriculum needs. rtificate and diploma level curriculum o	lternative general education			
		Washeller Communication	2 8110	6 SHC	3-6 SHC	Optional
LING	110	reennear report writing	5 5110			
		Arts:		3 SHC	0-3 SHC	Optional
*HUM	101	Values in the Workplace	2 SHC			
HUM	110		3 SHC			
HUM	115		3 SHC			
HUM						
PHI	240	Introduction to Ethics	3 SHC			
/Behav	vioral	Sciences:		3 SHC	0-3 SHC	Optional
			3 SHC			-
GEO						
*PSY	101	Applied Psychology	3 SHC			
*PSY	102	Human Relations	2 SHC			
PSY	118	Interpersonal Psychology	3 SHC			
PSY	135	Group Processes	3 SHC			
PSY	150	General Psychology	3 SHC			
*SOC	105	Social Relationships	3 SHC			
SOC	210	Introduction to Sociology	3 SHC			
SOC	215	Group Process	3 SHC			
al Scie	nces/N	Mathematics <sup>.</sup>		1 0110		
			3 SHC	3 SHC	U-3 SHC	Optional
MAT	175	Precalculus				
MAT	223	Applied Calculus	3 SHC			
	-	<b>1 1 1 1 1 1 1 1 1 1</b>			1	1
	num ( es liste ard. Ca es to ma mmend includ nunicat *COM COM COM *ENG ENG ENG ENG ENG ENG ENG ENG ENG ENG	ral Education         mum Gener         es listed belower         colleges         es listed belower         colleges         es to meet loce         mmended cerre         included in a         munications:         *COM 101         COM 120         COM 120         COM 110         COM 120         COM 110         COM 110         ENG 101         *ENG 101         *ENG 101         eng 111         ENG 114         ENG 116         anities/Fine         *HUM 101         HUM 115         HUM 230         PHI 230         PHI 230         PHI 230         PHI 240         /Behavioral         ECO 151         ECO 251         GEO 110         GEO 111         GEO 131         *PSY 102         PSY 135         PSY 150         *SOC 105         SOC 210         SOC 210         SOC 210         SOC 215         al Sciences/N         MAT 120	ral Education Academic Core         num General Education Hours Required:         es listed below are recommended general education ard. Colleges may choose to include additional or a ses to meet local curriculum needs.         mmended certificate and diploma level curriculum a included in associate degree programs.         munications:         *COM 101       Workplace Communication         COM 120       Intro Interpersonal Com         COM 231       Public Speaking         *ENG 101       Applied Communications I         ENG 102       Applied Communications II         ENG 103       Applied Communications II         ENG 110       Freshman Composition         ENG 111       Expository Writing         ENG 116       Technical Report Writing         antites/Fine Arts:       *         *HUM 101       Values in the Workplace         HUM 115       Critical Thinking         HUM 230       Leadership Development         PHI       240       Introduction to Logic         PHI       240       Introduction to Geography         GEO 111       World Regional Geography         GEO 111       World Regional Geography         GEO 111       World Regional Geography         GEO 111       Morld Regional Geography	ral Education Academic Core         num General Education Hours Required:         es listed below are recommended general education courses for this curriculum rd. Colleges may choose to include additional or alternative general education so to meel local curriculum needs.         mmended certificate and diploma level curriculum courses. These courses may included in associate degree programs.         nunications:         *COM 101       Workplace Communication       3 SHC         COM 101       Intro Interpersonal Com       3 SHC         COM 101       Intro Interpersonal Com       3 SHC         COM 231       Public Speaking       3 SHC         ENG 101       Applied Communications I       3 SHC         ENG 102       Applied Communications II       3 SHC         ENG 110       Freshman Composition       3 SHC         ENG 111       Expository Writing       3 SHC         ENG 111       Expository Writing       3 SHC         ENG 111       Technical Report Writing       3 SHC         ENG 111       Technical Report Writing       3 SHC         HUM 101       Values in the Workplace       2 SHC         HUM 101       Technology and Society       3 SHC         PHI 230       Introduction to Logic       3 SHC         PHI       240       Introductio	ral Education Academic Core       AAS         num General Education Hours Required:       15 SHC         es listed below are recommended general education courses for this curriculum needs.       15 SHC         and Colleges may choose to include additional or alternative general education so to meet local curriculum needs.       6 SHC         mmended certificate and diploma level curriculum courses. These courses may included in associate degree programs.       6 SHC         nunications:       6 SHC         COM 101       Morepage Communication       3 SHC         COM 110       Introduction to Communication       3 SHC         COM 120       Introduction to Communication SI       3 SHC         ENG 102       Applied Communications I       3 SHC         ENG 111       Expository Writing       3 SHC         ENG 111       Expository Writing       3 SHC         ENG 112       Professional Research & Reporting       3 SHC         ENG 114       Professional Research & Reporting       3 SHC         PHU 101       Values in the Workplace       2 SHC         HUM 101       Values in the Workplace       3 SHC         PHU 230       Leadership Development       3 SHC         PHI       240       Introduction to Eduics       3 SHC         GEO 151       Surycy	AASDiplomaAASDiplomanum General Education Hours Required:15 SHC6 SHCstome are recommended general education courses for this curriculumrecommended general education courses for this curriculumrecommended general education courses for this curriculumrecommended general education courses. These courses mayincluded in associate degree programs.nunications:6 SHCCOM 101Workplace CommunicationSHCCOM 101Workplace CommunicationSHCCOM 101Workplace CommunicationSHCCOM 101Workplace Communication 3SHCCOM 101Workplace Communications 1SHCCOM 102Applied Communications 13 SHCCOM 102Applied Communications 13 SHCCOM 102Applied Communications 1SHCCOM 102Applied Communications 13 SHCCommunication SISHCCOM 101Value Report WritingSHCCommunication SISHCCOM 101Triduction to Consest & SHCCommunication SISHCP

- **A. Technical Core.** The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C.** Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from any prefix listed, with the exception of prefixes listed in the core.

	Engineering	and Technology: Mecha	nical Engineering	AAS	Diploma	Certificate
		Technology				
Mi	nimum Major H			49 SHC	30 SHC	12 SHC
4.	<b>Technical Core:</b>			21-24 SHC		
		Fundamentals				
		(5) hours minimum:				
	EGR 250	Statics and Strength of Mat	5 SHC			
	EGR 251 AND	Statics	3 SHC			
	EGR 252	Strength of Materials	3 SHC			
	Two-Dimens	sional Drawing				
	Choose one:					
	DFT 151	CAD I	3 SHC			
	DFT 170	Engineering Graphics	3 SHC			
	EGR 120	Eng and Design Graphics	3 SHC			
	Three-Dime	nsional Drawing				
	Choose one:					
	DFT 153	CAD III	3 SHC			
	DFT 154	Intro Solid Modeling	3 SHC			
	Fluid Mecha	nics				
	Choose one:					
	HYD 110	Hydraulics/Pneumatics I	3 SHC			
	HYD 180	Pneumatics in Automation	3 SHC			
	MEC 265	Fluid Mechanics	3 SHC			
	Manufactur	ing				
	Choose three	e (3) hours minimum:				
	MEC 145	Mfg Materials I	3 SHC			
	MEC 161	Manufacturing Processes I	3 SHC			
	AND					
	MEC 180	Engineering Materials	3 SHC			
	Physics					
	Choose one:					
	PHY 131	Physics – Mechanics	4 SHC			
	PHY 151	College Physics I	4 SHC			
B.	Program Major	(s): Not applicable				
	- <b>-</b>	··· ••				

### C. Other Major Hours. To be selected from the following prefixes:

ALT, ARC, ATR, BAT, BMT, BPR, BTC, BUS, CEG, CET, CIS, CMT, CTI, CTS, COE, CHM, CIV, CSC, DBA, DDF, DEA, DFT, EGR, ELC, ENV, ELN, EPP, FBG, FMW, GIS, HYD, IMS, ISC, ITN, LEO, LOG, MAC, MAT, MEC, MLG, MNT, NAN, NDE, NET, NOS, NUC, OMT, OSS, PCI, PHY, PLA, PMT, PPT, RCT, SST, TCT, TNE, WLD

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

### **III.** Other Required Hours

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

#### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- **A.** Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- **H.** Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or self-employed business owner.

\*\*The North Carolina Career Clusters Guide was developed by the North Carolina Department of Public Instruction and the North Carolina Community College system to link the academic and Career and Technical Education programs at the secondary and postsecondary levels to increase student achievement. Additional information about Career Clusters is located at: <u>http://www.nc-net.info/NC career clusters guide.php</u> or <u>http://www.careertech.org</u>.

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

## **Curriculum Standard for Science and Math: Biotechnology**

Career Cluster: Science, Technology, Engineering, and Math \*\*

**Cluster Description:** Planning, managing, and providing scientific research and professional and technical services (e.g., physical science, social science, engineering) including laboratory and testing services, and research and development services.

**Pathway:** Science and Mathematics

## **Effective Term:** Fall 2013 (2013\*03)

Program Majors Under Pathway							
Program Major / Classification of Instruction	n Programs (CIP)	Credential Level(s)	Program				
Code	-	Offered	Major Code				
Agricultural Biotechnology	CIP Code 26.0308	AAS/Diploma/Certificate	A20110				
Biotechnology	CIP Code: 26.1201	AAS/Diploma/Certificate	A20100				
Environmental Biotechnology	CIP Code: 40.0509	AAS/Diploma/Certificate	A201XX				
Laboratory Technology	CIP Code: 41.0101	AAS/Diploma/Certificate	A20160				
Marine Biotechnology	CIP Code: 26.1304	AAS/Diploma/Certificate	A201XX				

### **Pathway Description:**

The Biotechnology curriculum, which has emerged from molecular biology and chemical engineering, is designed to meet the increasing demands for skilled laboratory technicians in various fields of biological and chemical technology.

Course work emphasizes biology, chemistry, mathematics, and technical communications. The curriculum objectives are designed to prepare graduates to serve in three distinct capacities: research assistant to a biologist or chemist, laboratory technician/instrumentation technician, and quality control/quality assurance technician.

Graduates should be qualified for employment in various areas of industry and government, including research and development, manufacturing, sales, and customer service.

Program Major Description: Choose one of the following  $4^{th}$  paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each **Program Major**:

**Agricultural Biotechnology:** A program that focuses on the application of molecular biology, biochemistry, and biophysics to the study of biomolecular structures, functions, and processes specific to plants and plant substances. Potential course work includes instruction in the biochemistry of plant cells, nuclear-cytoplasmic interactions, molecular cytostructures, photosynthesis, plant molecular genetics, and the molecular biology of plant diseases.

**Biotechnology:** A program that focuses on the application of the biological sciences, biochemistry, and genetics to the preparation of new and enhanced agricultural, environmental, clinical, and industrial products, including the commercial exploitation of microbes, plants, and animals. Potential course work includes instruction in general biology, general and organic chemistry, physics, biochemistry, molecular biology, immunology, microbiology, genetics, and cellular biology.

**Environmental Biotechnology:** A program that focuses on the scientific study of natural systems (air, water, and soil) through the use of chemical techniques and instrumentation, with an emphasis on the movement and fate of pollutants and chemical aspects of contaminant remediation. Potential course work includes instruction in analytical, inorganic, organic, and physical chemistry; aquatic, soil, and atmospheric chemistry; environmental engineering; environmental toxicology; and analytical methods.

**Laboratory Technology:** A program that prepares individuals to apply scientific principles and technical skills in support of biologists and biotechnologists in research, industrial, and government settings. Potential course work includes instruction in fermentation technology, cell culturing, protein purification, biologic synthesis, assaying and testing, quality control, industrial microbiology, bioprocessing, chromatography and bioseparation, genetic technology, laboratory and hazardous materials safety, and computer applications.

**Marine Biotechnology:** A program that focuses on the scientific study of the ecology and behavior of microbes, plants, and animals inhabiting aquatic environments. Potential course work includes instruction in geology and hydrology; aquatic ecosystems; microbiology; mycology; botany; ichthyology; mammalogy; population biology and biodiversity; studies of specific species, phyla, and habitats; and applications to fields such as natural resources conservation, fisheries science, and biotechnology.

\*Within the degree program, the institution shall include opportunities for the achievement of competence in reading, writing, oral communication, fundamental mathematical skills, and basic use of computers.

[Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204(3)]: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours must be in communications. General education is optional in certificate programs.

	Science a	nd Math: Biotechnology	7		
<b>Recommended G</b>	eneral Education Academic C	Core	AAS	Diploma	Certificate
Minimum General Education Hours Required:			15 SHC	6 SHC	0 SHC
	may choose to include additional	ation courses for this curriculum or alternative general education			
	tificate and diploma level curricu ssociate degree programs.	lum courses. These courses may			
<b>Communication:</b>			6 SHC	3-6 SHC	Optional
	orkplace Communication	3 SHC			-
COM 110 Ir	ntroduction to Communication	3 SHC			
COM 120 Ir	ntro Interpersonal Com	3 SHC			
	ublic Speaking	3 SHC			
*ENG 101 A	pplied Communications I	3 SHC			
	pplied Communications II	3 SHC			
	reshman Composition	3 SHC			
	xpository Writing	3 SHC			
	rgument-Based Research	3 SHC			
	rof Research & Reporting	3 SHC			
	Oral Communication	3 SHC			
ENG 116 T	echnical Report Writing	3 SHC			
II	-4		3 SHC	0-3 SHC	Optional
Humanities/Fine A					_
	alues in the Workplace	2 SHC			
	echnology and Society	3 SHC			
	critical Thinking	3 SHC			
	eadership Development	3 SHC			
	ntroduction to Logic	3 SHC			
ГПІ 240 II	ntroduction to Ethics	3 SHC	3 SHC	0-3 SHC	Ontional
Social /Behavioral S	Sciences:		3 SHC	0-3 500	Optional
	urvey of Economics	3 SHC			
	rin of Microeconomics	3 SHC			
	ntroduction to Geography	3 SHC			
	Vorld Regional Geography	3 SHC			
	pplied Psychology	3 SHC			
	luman Relations	2 SHC			
	nterpersonal Psychology	3 SHC			
	roup Processes	3 SHC			
	eneral Psychology	3 SHC			
	ocial Relationships	3 SHC			
SOC 210 In	troduction to Sociology	3 SHC			
SOC 215 G	roup Processes	3 SHC			
			2 SHC		Ontional
Natural Sciences/M			3 SHC	0-3 SHC	Optional
	nvironmental Biology	3 SHC			
	ntroductory Life Science	3 SHC			
	eneral Microbiology	3 SHC			
	ficrobiology	4 SHC			
	ntroduction to Chemistry	3 SHC			
	ntro to Chemistry Lab	1 SHC			
	eneral Chemistry I	4 SHC			
	pplied Mathematics I	3 SHC			
	Inthematical Measurement	3 SHC			
MAT 115 N	Iathematical Models	3 SHC			

MAT	120	Geometry and Trigonometry	3 SHC		
MAT	121	Algebra/Trigonometry I	3 SHC		
MAT	140	Survey of Mathematics	3 SHC		
MAT	151	Statistics I	3 SHC		
MAT	155	Statistical Analysis	3 SHC		
PHY	110	Conceptual Physics	3 SHC		
PHY	121	Applied Physics I	4 SHC		

- A. Technical Core. The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C.** Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from each prefix listed, with the exception of prefixes listed in the core.

	Science and Math: Biote	chnology	AAS	Diploma	Certificate
Mi	Minimum Major Hours Required:		49 SHC	30 SHC	12 SHC
Α.	Technical Core:				
	BIO 111 General Biology I	4 SHC	24-35	12-23	
	BIO 112 General Biology II	4 SHC	SHC	SHC	
	CHM 132 Organic and Biochemistry	4 SHC			
B.	Program Major(s).				
Ag	ricultural Biotechnology				
	*BIO 280 Biotechnology	3 SHC			
	*BTC 150 Bioethics	3 SHC			
	*BTC 285 Cell Culture	3 SHC			
	*Agriculture. Select 6 SHC:				
	AGR 160 Plant Science	3 SHC			
	AGR 261 Agronomy	3 SHC			
	ANS 110 Animal Science	3 SHC			
	ANS 150 Animal Health Management	3 SHC			
	HOR 134 Greenhouse Operations	3 SHC			
	HOR 168 Plant Propagation	3 SHC			
	AGR 170 Soil Science	3 SHC			
Co	urses required for the Agricultural Biotechnology	diploma are designated with *			

B. Program Major(s) (Continued)		
Biotechnology		
+ Biotechnology Lab. Choose one.		
BTC 181 Basic LabTechniques	4 SHC	
BTC 288 Biotech Lab Experience	2 SHC	
+ Microbiology. Choose one.		
BIO 175 General Microbiology	3 SHC	
BIO 275 Microbiology	4 SHC	
BTC 275 Industrial Microbiology	4 SHC	
+ Chemistry. Choose one: CHM 131 Introduction to Chemistry	3 SHC and	
CHM 131A Introduction to Chemistry Lab	1 SHC	
CHM 151 General Chemistry I	4 SHC	
·		
+ Genetics. Choose one: BIO 250 Genetics	4 SHC	
BTC 250 Principles of Genetics	4 SHC 3 SHC	
BTC 250 Trinciples of Genetics	5 5110	
Courses required for the Biotechnology diploma are	e designated with +	
Environmental Biotechnology		
# Biotechnology Lab. Choose one.		
BTC 181 Basic LabTechniques	4 SHC	
BTC 288 Biotech Lab Experience	2 SHC	
# Microbiology. Choose one.	2 0110	
BIO 175 General Microbiology	3 SHC	
BIO 275 Microbiology BTC 275 Industrial Microbiology	4 SHC 4 SHC	
BTC 275 Industrial Microbiology	4 500	
# Chemistry. Choose one:		
CHM 131 Introduction to Chemistry	3 SHC and	
CHM 131A Introduction to Chemistry Lab	1 SHC	
CHM 151 General Chemistry I	4 SHC	
# Environment. Choose one:		
ENV 214 Water Quality	4 SHC	
ENV 218 Environmental Health	3 SHC	
# Science. Choose one:		
ENV 110 Environmental Science	3 SHC	
BIO 140 Environmental Biology	3 SHC	
# Waste Management. Choose one:		
ENV 210 Management of Waste	4 SHC	
BIO 240 Waste Management	3 SHC	
<i>Courses required for the Environmental Biotechnologe designated with #</i>	gy diploma are	

LBT110 Laboratory Methods I5 SHCLBT125 Lab Instrumentation2 SHCLBT210 Laboratory Methods II5 SHCLBT250 Laboratory Methods III5 SHCA Laboratory Technology diploma requires a minimum of 12 SHC selectedfrom the Laboratory Technology program majorMarine BiotechnologySelect a minimum of 12 SHC from the following courses for the MarineBiotechnology AAS program:AQU215 Algae Culture3 SHCAQU230 Fish Genetics & Breeding3 SHCAQU255 Invert Culture3 SHCBTC260 Marine Biotechnology4 SHCBTC181 Basic LabTechniques4 SHC	Laboratory Technology		
LBT 125 Lab Instrumentation2 SHCLBT 210 Laboratory Methods II5 SHCLBT 250 Laboratory Methods III5 SHCA Laboratory Technology diploma requires a minimum of 12 SHC selectedfrom the Laboratory Technology program majorMarine BiotechnologySelect a minimum of 12 SHC from the following courses for the MarineBiotechnology AAS program:AQU 215 Algae Culture3 SHCAQU 230 Fish Genetics & Breeding3 SHCAQU 255 Invert Culture3 SHCBTC 260 Marine Biotechnology4 SHC	•	5 SHC	
LBT 250 Laboratory Methods III 5 SHC A Laboratory Technology diploma requires a minimum of 12 SHC selected from the Laboratory Technology program major Marine Biotechnology Select a minimum of 12 SHC from the following courses for the Marine Biotechnology AAS program: AQU 215 Algae Culture 3 SHC AQU 230 Fish Genetics & Breeding 3 SHC AQU 255 Invert Culture 3 SHC BTC 260 Marine Biotechnology 4 SHC		2 SHC	
LBT 250 Laboratory Methods III 5 SHC A Laboratory Technology diploma requires a minimum of 12 SHC selected from the Laboratory Technology program major Marine Biotechnology Select a minimum of 12 SHC from the following courses for the Marine Biotechnology AAS program: AQU 215 Algae Culture 3 SHC AQU 230 Fish Genetics & Breeding 3 SHC AQU 255 Invert Culture 3 SHC BTC 260 Marine Biotechnology 4 SHC	LBT 210 Laboratory Methods II	5 SHC	
from the Laboratory Technology program major          Marine Biotechnology         Select a minimum of 12 SHC from the following courses for the Marine         Biotechnology AAS program:         AQU 215 Algae Culture       3 SHC         AQU 230 Fish Genetics & Breeding       3 SHC         AQU 255 Invert Culture       3 SHC         BTC 260 Marine Biotechnology       4 SHC		5 SHC	
from the Laboratory Technology program major          Marine Biotechnology         Select a minimum of 12 SHC from the following courses for the Marine         Biotechnology AAS program:         AQU 215 Algae Culture       3 SHC         AQU 230 Fish Genetics & Breeding       3 SHC         AQU 255 Invert Culture       3 SHC         BTC 260 Marine Biotechnology       4 SHC	A Laboratory Technology diploma requires a	minimum of 12 SHC selected	
Select a minimum of 12 SHC from the following courses for the MarineBiotechnology AAS program:AQU 215 Algae Culture3 SHCAQU 230 Fish Genetics & Breeding3 SHCAQU 255 Invert Culture3 SHCBTC 260 Marine Biotechnology4 SHC			
Biotechnology AAS program:AQU 215 Algae Culture3 SHCAQU 230 Fish Genetics & Breeding3 SHCAQU 255 Invert Culture3 SHCBTC 260 Marine Biotechnology4 SHC	Marine Biotechnology		
AQU 215 Algae Culture3 SHCAQU 230 Fish Genetics & Breeding3 SHCAQU 255 Invert Culture3 SHCBTC 260 Marine Biotechnology4 SHC	Select a minimum of 12 SHC from the follow	ving courses for the Marine	
AQU 230 Fish Genetics & Breeding3 SHCAQU 255 Invert Culture3 SHCBTC 260 Marine Biotechnology4 SHC	Biotechnology AAS program:		
AQU 255 Invert Culture3 SHCBTC 260 Marine Biotechnology4 SHC	AQU 215 Algae Culture	3 SHC	
BTC 260 Marine Biotechnology 4 SHC	AQU 230 Fish Genetics & Breeding	3 SHC	
	AQU 255 Invert Culture	3 SHC	
BTC 181 Basic LabTechniques 4 SHC	BTC 260 Marine Biotechnology	4 SHC	
	BTC 181 Basic LabTechniques	4 SHC	
A Marine Biotechnology diploma requires a minimum of 12 SHC extracted from	A Marine Biotechnology diploma requires a m	inimum of 12 SHC extracted from	
the required technical/program major core of the AAS degree.	the required technical/program major core of	the AAS degree.	

ACC, AGR, ALT, ANS, AQU, BIO, BTC, BUS, CHM, CIS, CIV, COE, COM, CSC, CTC, EHS, ENV, FOR, GEL, GIS, HEA, HOR, ISC, LBT, LID, MAT, MSC, NAN, PHS, PHY, SCI, SST, WAT, WEB, and VEN

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

#### **III. Other Required Hours**

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

#### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- **A.** Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- H. Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or selfemployed business owner.

\*\*The North Carolina Career Clusters Guide was developed by the North Carolina Department of Public Instruction and the North Carolina Community College system to link the academic and Career and Technical Education programs at the secondary and postsecondary levels to increase student achievement. Additional information about Career Clusters is located at: <u>http://www.nc-net.info/NC career clusters quide.php</u> or <u>http://www.careertech.org</u>.

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

## Curriculum Standard for Science and Math: Environmental Science Technology Career Cluster: Science, Technology, Engineering, and Math \*\*

**Cluster Description:** Planning, managing, and providing scientific research and professional and technical services (e.g., physical science, social science, engineering) including laboratory and testing services, and research and development services.

Pathway: Science and Mathematics Ef		Effective Term: Fall 20	013 (2013*03)	
Program Majors Under Pathway				
Program Major / Classification of Instruction	n Programs (CIP)	Credential Level(s)	Program	
Code		Offered	Major Code	
Environmental Management Technology	CIP Code 03.0101	AAS/Diploma/Certificate	A2014X	
Environmental Science Technology	CIP Code: 03.0103	AAS/Diploma/Certificate	A20140	
Invasive Species Management Technology	CIP Code: 03.0204	AAS/Diploma/Certificate	A2014X	

## **Pathway Description:**

The Environmental Science Technology curriculum is designed to prepare individuals for employment in environmental testing, consulting, remediation, and related industries. Major emphasis is placed on biological and chemical evaluation of societal impact and sustainable management of the environment. Coursework includes optional emphasis in invasive species treatment, and management of the environment.

Coursework includes computer applications, biology, chemistry, industrial safety, water quality, environmental health, and waste management. Coursework specific for Invasive Species includes assessment, management, identification, and control of both invasive plants and animals and GIS/GPS. Coursework specific for Environmental Management includes land resource management, field sampling and analysis, environmental health pathogens, and rural watershed protection.

Graduates are prepared for employment opportunities with numerous positions within the industry. Employment opportunities include, but not limited to, the following: Chemical and Biological Analysis, Water and Wastewater Treatment, EPA Compliance, Hazardous Material Handling, Contaminated Site Assessment and Remediation, Federal, State, and Local land management agencies, Private conservation organizations, Environmental Regulatory Compliance and Enforcement.

Program Major Description: Choose one of the following  $4^{th}$  paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each **Program Major**:

**Environmental Management Technology:** A general program that focuses on the studies and activities relating to the natural environment and its conservation, use, and improvement. Potential course work includes instruction in subjects such as climate, air, soil, water, land, fish and wildlife, and plant resources; in the basic principles of environmental science and natural resources management; and the recreational and economic uses of renewable and nonrenewable natural resources.

**Environmental Science Technology:** A program that focuses on environment-related issues using scientific, social scientific, or humanistic approaches or a combination. Potential course work includes instruction in the basic principles of ecology and environmental science and related subjects such as policy, politics, law, economics, social aspects, planning, pollution control, natural resources, and the interactions of human beings and nature.

**Invasive Species Management Technology:** A program that focuses on the application of economic concepts and methods to the analysis of issues such as air and water pollution, land use planning, waste disposal, invasive species and pest control, conservation policies, and related environmental problems. Potential course work includes instruction in cost-benefit analysis, environmental impact assessment, evaluation and assessment of alternative resource management strategies, policy evaluation and monitoring, and descriptive and analytic tools for studying how environmental developments affect the economic system.

\*Within the degree program, the institution shall include opportunities for the achievement of competence in reading, writing, oral communication, fundamental mathematical skills, and basic use of computers.

[Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204(3)]: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours of semester hours must be in communications. General education is optional in certificate programs.

	Iath: Environmental Science		Dimla	Contif
Recommended General Education Academic C		AAS	Diploma	Certificate
Minimum General Education Hours Required		15 SHC	6 SHC	0 SHC
Courses listed below are recommended general educe standard. Colleges may choose to include additional courses to meet local curriculum needs.	÷			
*Recommended certificate and diploma level curricunt to the included in associate degree programs.	lum courses. These courses may			
Communication:		6 SHC	3-6 SHC	Optional
*COM 101 Workplace Communication	3 SHC			
COM 110 Introduction to Communication	3 SHC			
COM 120 Intro Interpersonal Com	3 SHC			
COM 231 Public Speaking	3 SHC			
*ENG 101 Applied Communications I	3 SHC			
*ENG 102 Applied Communications II	3 SHC			
ENG 110 Freshman Composition	3 SHC			
ENG 111 Expository Writing	3 SHC			
ENG 112 Argument-Based Research	3 SHC			
ENG 114 Prof Research & Reporting	3 SHC			
ENG 115 Oral Communication	3 SHC			
ENG 116 Technical Report Writing	3 SHC			
Humanities/Fine Arts:		A 611 G		
*HUM 101 Values in the Workplace	2 SHC	3 SHC	0-3 SHC	Optional
HUM 110 Technology and Society	3 SHC			
HUM 115 Critical Thinking	3 SHC			
HUM 230 Leadership Development	3 SHC			
PHI 230 Introduction to Logic	3 SHC			
PHI 240 Introduction to Ethics	3 SHC			
Social /Behavioral Sciences:		3 SHC	0-3 SHC	Optional
ECO 151 Survey of Economics	3 SHC	5 5HC	0-5 500	Optional
ECO 251 Prin of Microeconomics	3 SHC			
GEO 110 Introduction to Geography	3 SHC			
GEO 111 World Regional Geography	3 SHC			
*PSY 101 Applied Psychology	3 SHC			
*PSY 102 Human Relations	2 SHC			
PSY 118 Interpersonal Psychology	3 SHC			
PSY 135 Group Processes	3 SHC			
PSY 150 General Psychology	3 SHC			
*SOC 105 Social Relationships	3 SHC			
SOC 210 Introduction to Sociology	3 SHC			
SOC 215 Group Processes	3 SHC	3 SHC	0-3 SHC	Optional
-		5 5110		
Natural Sciences/Mathematics:				
BIO 140 Environmental Biology	3 SHC			
BIO 160 Introductory Life Science	3 SHC			
*MAT 101 Applied Mathematics I	3 SHC			
MAT 110 Mathematical Measurement	3 SHC			
MAT 115 Mathematical Models	3 SHC			
MAT 120 Geometry and Trigonometry	3 SHC			
MAT 121 Algebra/Trigonometry I	3 SHC			
MAT 140 Survey of Mathematics	3 SHC			
MAT 151 Statistics I	3 SHC			
MAT 155 Statistical Analysis	3 SHC			
PHY 110 Conceptual Physics	3 SHC			
PHY 121 Applied Physics I	4 SHC			

- A. Technical Core. The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C.** Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from each prefix listed, with the exception of prefixes listed in the core.

Science and Math: Environmental Science Technology		AAS	Diploma	Certificate			
Minimum Major Hours Required:		49 SHC	49 SHC 30 SHC		30 SHC	12 SHC	12 SHC
A.	Technical Core:						
	*ENV 218 Environmental Health	3 SHC	28-36 SHC	14-18 SHC			
	*Biology. Choose one:						
	BIO110 Principles of Biology	4 SHC					
	BIO111 General Biology I	4 SHC					
	*Chemistry. Choose one:						
	CHM131 Introduction to Chemistry	3 SHC					
	CHM151 General Chemistry I	4 SHC					
	*Science. Choose one:						
	BIO 140 Environmental Biology	3 SHC					
	ENV110 Environmental Science	3 SHC					
	Water Quality. Choose one:						
	ENV214 Water Quality	4 SHC					
	WAT110Basic Water Trmt	3 SHC					
B.	Program Major(s):						
En	vironmental Management						
	+ENV 224 Land Resource Management	4 SHC					
	+ENV 240 Field Sampling & Analysis	3 SHC					
	+ENV 250 Rural Watershed Protection	4 SHC					
	+ENV 255 Envir/Public Hth.Pathogen	4 SHC					
	Courses required for the Environmental Manage designated with +						

Environmental Science Technology	
Waste Management. Choose one:	4 6110
ENV 210 Management of Waste BIO 240 Waste Management	4 SHC 3 SHC
Dio 240 Waste Management	5 5110
* Safety. Choose one:	
ISC 112 Industrial Safety	2 SHC
ISC 121 Environmental Health & Safety	3 SHC
EHS 114 OSHA Regulations	4 SHC
Select additional courses from the BIO, ENV, EHS minimum of 12 SHC for the Environmental Science program:	1 0 0
Courses required for the Environmental Science Te designated with *	echnology Diploma are
Invasive Species Management	
GIS 110 Survey of GIS/GPS	1 SHC
IVS 110 Intro to Invasive Species	3 SHC
#IVS 210 Inv Species Mgmt Strat	3 SHC
#IVS 211 Inv Species Mgmt Programs	3 SHC
#IVS 260 State License Exam Prep	1 SHC
# Select one set:	
IVS 220 Inv Plant Survey Methods	4 SHC
IVS 221 Inv Plant Control Methods	3 SHC
IVS 230 Aq Nuisance Survey Meth	4 SHC
IVS 231 Aq Nuisance Control Meth	3 SHC
0ľ	
IVS 240 Insct/Dis Survey Methods	4 SHC
IVS 241 Inset/Dis Control Methods	3 SHC
or IVS 250 Inj Wildlife Survey Meth	4 SHC
IVS 250 III Wildlife Control Meth	3 SHC
1v3 251 mj whante control weth	5 5110
Courses required for the Invasive Species Manage	ement Diploma are
designated with #	

### C. Other Major Hours.

To be selected from the following prefixes:

AGR, ALT, ANS, ARC, AST, BIO, BPM, BTC, BUS, CHM, CIS, CIV, COE, CMT, CSC, CST, CTS, DFT, EGR, EHS, ELC, ELN, ENV, ETR, FOR, FWL, GEL, GEO, GIS, HOR, HYD, ISC, IVS, LAR, LID, MAT, MSC, PHS, PHY, PTC, SRV, SST, VEN, WAT, WLD, and ZAS.

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

### **III. Other Required Hours**

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- A. Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- **H.** Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or self-employed business owner.

\*\*The North Carolina Career Clusters Guide was developed by the North Carolina Department of Public Instruction and the North Carolina Community College system to link the academic and Career and Technical Education programs at the secondary and postsecondary levels to increase student achievement. Additional information about Career Clusters is located at: <u>http://www.nc-net.info/NC career clusters quide.php</u> or <u>http://www.careertech.org</u>.

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

# Curriculum Standard for Science and Math: Zoo and Aquarium Science Technology Career Cluster: Science, Technology, Engineering, and Math \*\*

**Cluster Description:** Planning, managing, and providing scientific research and professional and technical services (e.g., physical science, social science, engineering) including laboratory and testing services, and research and development services.

Pathway: Science and MathematicsEffective Term: H		Effective Term: Fall 20	013 (2013*03)	
Program Majors Under Pathway				
Program Major / Classification of Instruction Programs (CIP)		Credential Level(s)	Program	
Code		Offered	Major Code	
Zoological Science Technology	CIP Code 26.0709	AAS/Diploma/Certificate	A2022X	
Aquarium Science Technology	CIP Code: 26.0799	AAS/Diploma/Certificate	A2022X	

### **Pathway Description:**

The Science and Math curriculum prepares students for employment in zoological parks, aquaria, or other settings requiring animal care, breeding, education/conservation, or health of exotic animals.

Course work emphasizes anatomy, physiology, reproduction, behavior, and nutrition of exotic animals that are on exhibit for education and/or conservation purposes or for animals maintained for medical purposes. Students have practical experiences with basic husbandry skills, animal handling/capture/restraint skills, the ability to detect illness, and creative design of exhibits.

Graduates of the curriculum should qualify for entry-level employment opportunities in a variety of settings, including zoos, aquaria, nature science centers, and animal research facilities.

Program Major Description: Choose one of the following  $4^{th}$  paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each **Program Major**:

**Zoo Science Technology:** A program that focuses on the application of biological principles to the study of vertebrate wildlife, wildlife habitats, and related ecosystems in remote and urban areas. Potential course work includes instruction in animal ecology; adaptational biology; urban ecosystems; natural and artificial habitat management; limnology; wildlife pathology; and vertebrate zoological specializations such as mammalogy, herpetology, ichthyology, ornithology, and others.

**Aquarium Science Technology:** A program that prepares individuals to conserve and manage wilderness areas and the flora, marine and aquatic life therein, and manage wildlife reservations and zoological/aquarium facilities for recreational, commercial, and ecological purposes. Potential course work includes instruction in wildlife biology, marine/aquatic biology, freshwater and saltwater ecosystems, the design and operation of natural and artificial wildlife habitats, limnology, wildlife pathology, and vertebrate zoological specializations such as mammalogy, herpetology, ichthyology, ornithology, and others.

\*Within the degree program, the institution shall include opportunities for the achievement of competence in reading, writing, oral communication, fundamental mathematical skills, and basic use of computers.

[Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204(3)]: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours of semester hours must be in communications. General education is optional in certificate programs.

Science and Math: Zoo and Aquarium Science Technology					
Recommend	ded General Education Academi	c Core	AAS	Diploma	Certificate
Minimum C	General Education Hours Requir	red:	15 SHC	6 SHC	0 SHC
standard. Co courses to me	d below are recommended general ea olleges may choose to include additio eet local curriculum needs.	nal or alternative general education			
	ed certificate and diploma level curr	ciculum courses. These courses may			
<u>not</u> be include	ed in associate degree programs.				
Communicat	tion:		6 SHC	3-6 SHC	Optional
	101 Workplace Communication	3 SHC			
	110 Introduction to Communication	3 SHC			
COM	120 Intro Interpersonal Com	3 SHC			
COM 2	231 Public Speaking	3 SHC			
*ENG	101 Applied Communications I	3 SHC			
	102 Applied Communications II	3 SHC			
	110 Freshman Composition	3 SHC			
	111 Expository Writing	3 SHC			
	112 Argument-Based Research	3 SHC			
	114 Prof Research & Reporting	3 SHC			
	115 Oral Communication	3 SHC			
	116 Technical Report Writing	3 SHC			
Litte	reconneur report writing	5 5110	3 SHC	0-3 SHC	Optional
Humanities/H			5 5110		Optional
	101 Values in the Workplace	2 SHC			
	110 Technology and Society	3 SHC			
	115 Critical Thinking	3 SHC			
	230 Leadership Development	3 SHC			
	230 Introduction to Logic	3 SHC			
PHI 2	240 Introduction to Ethics	3 SHC			
Social /Rohav	vioral Sciences:		3 SHC	0-3 SHC	Optional
	151 Survey of Economics	3 SHC			
	251 Prin of Microeconomics	3 SHC			
	110 Introduction to Geography	3 SHC			
	111 World Regional Geography	3 SHC			
		3 SHC			
	<ul><li>101 Applied Psychology</li><li>102 Human Relations</li></ul>	2 SHC			
	118 Interpersonal Psychology	3 SHC			
	135 Group Processes	3 SHC			
	150 General Psychology	3 SHC			
	105 Social Relationships	3 SHC			
	<ul><li>210 Introduction to Sociology</li><li>215 Group Processes</li></ul>	3 SHC 3 SHC			
300	215 Group Processes	5 5HC			
Natural Scier	nces/Mathematics:		3 SHC	0-3 SHC	Optional
BIO	140 Environmental Biology	3 SHC			
	160 Introductory Life Science	3 SHC			
	101 Applied Mathematics I	3 SHC			
	110 Mathematical Measurement	3 SHC			
	115 Mathematical Models	3 SHC			
	120 Geometry and Trigonometry	3 SHC			
	121 Algebra/Trigonometry I	3 SHC			
	140 Survey of Mathematics	3 SHC			
	151 Statistics I	3 SHC			
	155 Statistical Analysis	3 SHC			
	110 Conceptual Physics	3 SHC			
	121 Applied Physics I	4 SHC		1	1

- A. Technical Core. The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C.** Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from each prefix listed, with the exception of prefixes listed in the core.

Science and Math: Zoo and Aqua	rium Science	AAS	Diploma	Certificate
Minimum Major Hours Required:		49 SHC	30 SHC	12 SHC
A. Technical Core:				
BIO 111 General Biology I	4 SHC	30 SHC		
BIO 112 General Biology II	4 SHC			
ZAS 112 Intro to Zoo and Aquarium Science	1 SHC			
ZAS 113 Animal Exhibits	1 SHC			
ZAS 120 Zoonotic Diesases	2 SHC			
ZAS 130 Introduction to Ethology	3 SHC			
ZAS 234 Zoo Herpetology	3 SHC			
3. Program Major(s).				
Zoological Science				
Select a minimum of 12 SHC from the following co	ourses for the			
Zoological Science AAS program:				
ZAS 110 Intro to Zookeeping	5 SHC			
ZAS 131 Applied Animal Psych	3 SHC			
ZAS 232 Zoo Invertebrates	3 SHC			
ZAS 235 Zoo Ornithology	3 SHC			
ZAS 236 Zoo Mammalogy	3 SHC			
Aquarium Science				
Select a minimum of 12 SHC from the following co	ourses for the Aquarium			
Science AAS program:				
BIO 243 Marine Biology	3 SHC			
MSC 174 Marine Invertebrate Zoo	4 SHC			
ZAS 210 Intro to Aquarium Science	1 SHC			
ZAS 233 Zoo Ichthyology	3 SHC			
ZAS 234 Zoo Herpetology	3 SHC			
ZAS 243 Prin of Aquarium Science	3 SHC			
ZAS 272 Aquatic Pathophysiology	3 SHC			

### C. Other Major Hours.

### To be selected from the following prefixes:

ACC, AGR, ANS, ARC, BIO, BTC, BUS, CHM, CIS, COE, CSC, CST, CUL, DFT, ECO, ETR, FOR, GCM, GIS, HET, HOR, IVS, LAR, LID, LSG, MSC, SEL, SST, TRF, VEN and ZAS

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

### III. Other Required Hours

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

### IV. Employability Competencies

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- **A.** Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- H. Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or selfemployed business owner.

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	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

## **Curriculum Standard for Sustainability Technologies**

Career Cluster: Science, Technology, Engineering, and Mathematics\*\*

**Cluster Description:** Planning, managing, and providing scientific research and professional and technical services (e.g., physical science, social science, engineering) including laboratory and testing services, and research and development services.

Pathway: Engineering an	nd Technology	Effective Term: Fall 2013	(2013*03)
	Program Majors U	<b>Inder Pathway</b>	
Program Major / Classification (CIP) Code	of Instruction Programs	Credential Level(s) Offered	Program Major Code
Sustainability Technologies	CIP Code: 15.0503	AAS/Diploma/Certificate	A40370

## **Pathway Description:**

The Sustainability Technologies curriculum is designed to prepare individuals for employment in environmental, construction, renewable energy, or related industries, where key emphasis is placed on energy production and waste reduction along with sustainable technologies.

Course work includes renewable energy, green building technology, and environmental technologies. Additional topics may include sustainability, energy management, waste reduction, renewable energy, site assessment, and environmental responsibility.

Graduates should qualify for positions within the renewable energy, construction, and/or environmental industries. Employment opportunities exist in both the government and private industry sectors where graduates may function as renewable energy technicians, sustainability consultants, environmental technicians, or green building supervisors.

Program Description: Choose one of the following 4<sup>th</sup> paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each **Program Major:** 

N/A

[Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204(3)]: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours must be in communications. General education is optional in certificate programs.

	Sustainal	oility Technologies			
Recommende	Recommended General Education Academic Core		AAS	Diploma	Certificate
Minimum General Education Hours Required:			15 SHC	6 SHC	0 SHC
standard. Colle	elow are recommended general education ges may choose to include additional or a local curriculum needs.	-			
	certificate and diploma level curriculum in associate degree programs.	courses. These courses may			
Communication	18:		6 SHC	3-6 SHC	Ontional
*COM 101	Workplace Communication	3 SHC	0 500	3-0 SHC	Optional
COM 11	D Introduction to Personal Communications	3 SHC			
COM 120		3 SHC			
COM 23		3 SHC			
*ENG 101		3 SHC			
*ENG 102		3 SHC			
ENG 110		3 SHC			
ENG 11		3 SHC			
ENG 114	1 8	3 SHC			
ENG 116	Technical Report Writing	3 SHC			
Humanities/Fir	e Arts:				
*HUM 101	Values in the Workplace	2 SHC	3 SHC	0-3 SHC	Optional
HUM 110		3 SHC			_
HUM 115		3 SHC			
	0 Leadership Development	3 SHC			
PHI 230	6	3 SHC			
PHI 240	Introduction to Ethics	3 SHC			
Social/Behavio					
ECO 151	•	3 SHC	3 SHC	0-3 SHC	Optional
ECO 251		3 SHC			-
GEO 110		3 SHC			
GEO 111		3 SHC			
GEO 131		4 SHC			
*PSY 101		3 SHC			
*PSY 102		2 SHC			
PSY 118	1 0 00	3 SHC			
PSY 135	*	3 SHC			
PSY 150		3 SHC			
*SOC 105 SOC 210	•	3 SHC 3 SHC			
SOC 210		3 SHC 3 SHC			
	•	- 5110			
	es/Mathematics:	2 8110	3 SHC	0-3 SHC	Ontional
MAT 120	5 8 5	3 SHC	3 SHC	U-3 SHC	Optional
MAT 121 MAT 161	e e .	3 SHC			
MAT 161 MAT 17	6 6	3 SHC			
MAT 17 MAT 17:	0	3 SHC 4 SHC			
MAT 17: MAT 223		3 SHC			
MAT 223 MAT 271	11	4 SHC			

- A. Technical Core. The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C.** Other Major Hours. Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from each prefix listed, with the exception of prefixes listed in the core.

Sustainability Technologies (A40370) Minimum Major Hours Required:		AAS	Diploma	Certificate
		49 SHC	30 SHC	12 SHC
A. Technical Core:		24-25 SHC	12 SHC	
A diploma offered under this AAS degree requires a mi 12 SHC extracted from the required subject/course cor	0			
Required Courses:				
ENV 110 Environmental Science	3 SHC			
or BIO 140 Environmental Biology	3 SHC			
SST 110 Intro to Sustainability	3 SHC			
SST 120 Energy Use Analysis	3 SHC			
SST 210 Issues in Sustainability	3 SHC			
Required Subject Areas: Select one.				
Renewable Energy.				
ALT 120 Renewable Energy Tech	3 SHC			
ELC 220 Photovoltaic Sys Tech	3 SHC			
ALT 250 Thermal Systems	3 SHC			
SST 130 Modeling Renewable Energy	3 SHC			
Green Building.				
CST 111 Construction I	4 SHC			
SST 140 Green Building & Design Concepts	3 SHC			
CST 150 Building Science	3 SHC			
ARC 131 Building Codes	3 SHC			
or CMT120 Codes and Inspections	3 SHC			

#### C. Other Major Hours: To be selected from the following prefixes:

AHR, ALT, ARC, AGR, ATR, BAS, BIO, BPR, BUS, CAR, CEG, CHM, CIS, CIV, CMT, COE, CSC, CST, DBA, DFT, EGR, EHS, ELC, ELN, ENV, EPP, FMW, FOR, GEL, GEO, GIS, HOR, ISC, LAR, LID, LSG, MAC, MEC, MNT, NET, OMT, PAD, PHS, PHY, PLU, PME, PMT, SRV, SST, and WAT

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

### **III. Other Required Hours**

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

#### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- **A.** Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- **H.** Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or self-employed business owner.

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	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18

## Curriculum Standard for Mobile Equipment Maintenance and Repair

Career Cluster: Transportation, Distribution and Logistics \*\*

**Cluster Description:** The planning, management, and movement of people, materials, and goods by road, pipeline, air, rail and water and related professional and technical support services such as transportation infrastructure planning and management, logistics services, mobile equipment and facility maintenance.

Pathway: Mobile Equipment	Effe
Maintenance and Repair	

**Effective Term:** Fall 2013 (2013\*03)

Program Majors Under Pathway						
Program Major / Classification of Instructio	Credential Level(s)	Program				
Code			Offered	Major Code		
Agricultural Systems Technology	CIP Code	01.0205	AAS/Diploma/Certificate	A60XXX		
Alternative Transportation Technology	CIP Code:	47.0614	Diploma/Certificate	D60XXX		
Automotive Customizing Technology	CIP Code	47.0603	AAS/Diploma/Certificate	A60190		
Automotive Light-Duty Diesel Technology	CIP Code	47.0605	Diploma/Certificate	D60XXX		
Automotive Restoration Technology	CIP Code	47.0603	Diploma/Certificate	D60140		
Automotive Systems Technology	CIP Code	47.0604	AAS/Diploma/Certificate	A60160		
Collision Repair and Refinishing Technology	CIP Code	47.0603	AAS/Diploma/Certificate	A60130		
Construction Equipment Systems Technology	CIP Code	47.0302	AAS/Diploma/Certificate	A60XXX		
Diesel and Heavy Equipment Technology	CIP Code	47.0613	AAS/Diploma/Certificate	A60XXX		
Motorcycle Mechanics	CIP Code	47.0611	AAS/Diploma/Certificate	A60260		
Recreational Vehicle Maintenance and Repair	CIP Code	47.0618	Diploma/Certificate	D60310		
Technology						

# **Pathway Description:**

Curriculums in the Mobile Equipment Maintenance and Repair pathway prepare individuals for employment as entrylevel transportation service technicians. The program provides an introduction to transportation industry careers and increases student awareness of the diverse technologies associated with this dynamic and challenging field.

Course work may include transportation systems theory, braking systems, climate control, design parameters, drive trains, electrical/electronic systems, engine repair, engine performance, environmental regulations, materials, product finish, safety, steering/suspension, transmission/transaxles, and sustainable transportation, depending on the program major area chosen.

Graduates of this pathway should be prepared to take professional licensure exams, which correspond to certain programs of study, and to enter careers as entry-level technicians in the transportation industry.

Program Description: Choose one of the following 4<sup>th</sup> paragraphs to use in conjunction with the first three paragraphs of the pathway description above for documentation used to identify each **Program Major:** 

**Agricultural Systems Technology:** A program that prepares individuals to maintain and repair specialized farm, ranch, and agribusiness power equipment and vehicles. Includes instruction in the principles of diesel, combustion, electrical, steam, hydraulic, and mechanical systems and their application to the maintenance of terrestrial and airborne crop-spraying equipment; tractors and hauling equipment; planting and harvesting equipment; cutting equipment; power sources and systems for silos; irrigation and pumping equipment; dairy, feeding, and shearing operations; and processing systems

\*Within the degree program, the institution shall include opportunities for the achievement of competence in reading, writing, oral communication, fundamental mathematical skills, and basic use of computers.

**Alternative Transportation Technology:** A program that prepares individuals to apply technical knowledge and skills to the maintenance of alternative fuel vehicles (AFV), hybrid electric vehicles and the conversion of standard vehicles to AFV status. Includes instruction in electrical vehicles, hybrid electric vehicles, liquefied petroleum gas (LPG) vehicles, compressed natural gas (CNG) vehicles, hybrid fuel technology, electrical and electronic systems, engine performance, diagnosis and repair, and conversion/installation.

**Automotive Customizing Technology:** A program that prepares individuals to modify existing automotive vehicle components, fabrication techniques to create custom vehicle components, non-structural damage repair, custom painting and refinishing techniques, custom upholstery and glass removal/replacement/custom modifications, and other automotive technology related systems.

Automotive Light-Duty Diesel Technology: A program that prepares individuals to apply technical knowledge and skills to diagnose, adjust, repair, or overhaul light duty diesel vehicles under one ton classification. Includes instruction in electrical systems, diesel-electric drive, engine performance, engine repair, emission systems, and all types of diesel engines related to the light duty diesel vehicle. Includes technicians working primarily with automobile diesel engines.

**Automotive Restoration Technology:** A program that prepares individuals to apply technical knowledge and skills to repair, reconstruct, finish and restore automobile bodies, fenders, and external features of a wide range of classic vehicles typically from year models 1900 - 1970. Includes instruction in internal combustion engines, transmissions, brakes, restoring original sheet metal, upholstery, and wood components, rebuilding starters, generators, and painting and refinishing techniques.

**Automotive Systems Technology:** A program that prepares individuals to apply technical knowledge and skills to repair, service, and maintain all types of automobiles. Includes instruction in brake systems, electrical systems, engine performance, engine repair, suspension and steering, automatic and manual transmissions and drive trains, and heating and air condition systems

**Collision Repair and Refinishing Technology:** A program that prepares individuals to apply technical knowledge and skills to repair, reconstruct and finish automobile bodies, fenders, and external features. Includes instruction in structure analysis, damage repair, non-structural analysis, mechanical and electrical components, plastics and adhesives, painting and refinishing techniques, and damage analysis and estimating.

**Construction Equipment Systems Technology:** A program that prepares individuals to apply technical knowledge and skills in the field maintenance and repair of construction equipment, and in the general maintenance and overhaul of such equipment. Includes instruction in inspection, maintenance, and repair of tracks, wheels, brakes, operating controls, pneumatic and hydraulic systems, electrical circuitry, engines and in techniques of welding and brazing.

**Diesel and Heavy Equipment Technology:** A program that prepares individuals to apply technical knowledge and skills to repair, service, and maintain diesel engines in vehicles such as Heavy Duty Trucks over one ton classification, buses, ships, railroad locomotives, and equipment; as well as stationary diesel engines in electrical generators and related equipment.

**Motorcycle Mechanics:** A program that prepares individuals to apply technical knowledge and skills to repair, service, and maintain motorcycles and other similar powered vehicles. Includes instruction in lubrication and cooling systems, electrical and ignition systems, carburetion, fuel systems and adjustments of moving parts.

**Recreational Vehicle Maintenance and Repair Technology:** A program that prepares individuals to apply technical knowledge and skills to build, test, inspect, repair, service and maintain recreational vehicles, systems, and interior and exterior components. Includes instruction in brake, hydraulic, and towing systems; electrical systems; propane systems and propane and electric appliances; carpentry; plumbing; welding; and structural frames.

[Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 23 NCAC 02E.0204(3)]: Degree programs must contain a minimum of 15 semester hours including at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural sciences/mathematics. Degree programs must contain a minimum of 6 semester hours of communications. Diploma programs must contain a minimum of 6 semester hours must be in communications. General education is optional in certificate programs.

Mobile Equipment Maintenance and Repair					
Recommended	General Education Academic C	ore	AAS	Diploma	Certificate
Minimum Gen	eral Education Hours Required:		15 SHC	6 SHC	0 SHC
standard. Colleg	vlow are recommended general educa ges may choose to include additional ocal curriculum needs.				
	certificate and diploma level curricul: n associate degree programs.	um courses. These courses may			
— Communication			6 SHC	3-6 SHC	Optional
	Workplace Communication	3 SHC			
COM 110	-	3 SHC			
COM 120		3 SHC			
	Public Speaking	3 SHC			
	Applied Communications I	3 SHC			
	Applied Communications I	3 SHC			
	Freshman Composition	3 SHC			
ENG 110 ENG 111		3 SHC			
ENG 114		3 SHC			
ENG 116	Technical Report Writing	3 SHC			
Humanities/Fine	e Arts:		3 SHC	0-3 SHC	Optional
*HUM 101	Values in the Workplace	2 SHC			
HUM 110	Technology and Society	3 SHC			
HUM 115	Critical Thinking	3 SHC			
HUM 230	Leadership Development	3 SHC			
PHI 230	Introduction to Logic	3 SHC			
PHI 240	Introduction to Ethics	3 SHC			
Social /Behavior	al Sciences:		3 SHC	0-3 SHC	Optional
ECO 151		3 SHC			
	Principles of Microeconomics	3 SHC			
*SOC 105	Social Relationships	3 SHC			
SOC 210		3 SHC			
SOC 215		3 SHC			
*PSY 101	Applied Psychology	3 SHC			
*PSY 102	Human Relations	2 SHC			
	Interpersonal Psychology	3 SHC			
PSY 135		3 SHC			
PSY 150	-	3 SHC			
Natural Science	Mathamatics		3 SHC	0-3 SHC	Optional
	Applied Mathematics I	3 SHC			
	Mathematical Measurements	3 SHC			
	Mathematical Models				
		3 SHC			
	Geometry and Trigonometry	3 SHC			
	Algebra/Trigonometry	3 SHC			
	Conceptual Physics	3 SHC			
PHY 121	Applied Physics I	4 SHC			

- **A. Technical Core.** The technical core is comprised of specific courses which are required for all Program Majors under this Curriculum Standard. A diploma program offered under an approved AAS program standard or a certificate which is the highest credential level awarded under an approved AAS program standard must include a minimum of 12 semester hours credit derived from the curriculum core courses or core subject area of the AAS program.
- **B. Program Major(s).** The Program Major must include a minimum of 12 semester hours credit from required subjects and/or courses. The Program Major is in addition to the technical core.
- **C. Other Major Hours.** Other major hours must be selected from prefixes listed on the curriculum standard. A maximum of 9 semester hours of credit may be selected from each prefix listed, with the exception of prefixes listed in the core.

Ν	Aob	ile Equipment Maintena	nce and Repair	AAS	Diploma	Certificate
Minimum	Minimum Major Hours Required: A. Technical Core:		49 SHC	30 SHC	12 SHC	
A. Techni						
Cours	es req	uired for the diploma program major ar	e designated with an asterisk (*).	19-23 SHC	17-20 SHC	
*Fundament	al Tra	ansportation Skills. Choose one minin	num:			
TRN	110	Intro to Transport Tech	2 SHC			
TRN	170	PC Skills for Transp	2 SHC			
HET	134	Diesel Fuel and Power Sy	3 SHC			
*Intermediat	e Tra	nsportation Skills. Choose one minim	um:			
TRN	120	Basic TranspElectricity	5 SHC			
TRN	130	Intro to Sustainable Transp	3 SHC			
TRN	180	Basic Welding for Transp	3 SHC			
Specialized	Tran	sportation Skills. Choose one minimu	n:			
		Transp Climate Control	2 SHC			
		Adv Transp Electronics	3 SHC			
WLD	110	Cutting Processes	2 SHC			
For both AA	S Dez fixes	l <b>ajor(s).</b> gree and Diploma, select one progra listed within the same program majo <sup>c</sup> credits.				
Agricul	tural	Systems Technology				
ELN	112	Diesel Electronics System	4 SHC			
PME	111	Harvest and Spraying Equip	4 SHC			
PME	112	Consumer Products	2 SHC			
PME	121	Component Controls	2 SHC			
Alternat	tive T	ransportation Technology				
ATT	115	Green Trans Safety and Service	2 SHC			
ATT	125	Hybrid-Electric Transportation	4 SHC			
ATT	140	Emerging Transp Techn	3 SHC			

Automotiv	e Customizing Technology		
	111 Auto Customizing Research	3 SHC	
	112 Auto Custom Fabrication	4 SHC	
	115 Glass Customizing Methods	4 SHC	
Automot	ive Restoration Technology		
ARS	112 Auto Restoration Research	3 SHC	
ARS	113 Automotive Upholstery	4 SHC	
ARS	114 Restoration Skills I	4 SHC	
Automot	ive Systems Technology		
AUT	141 Suspension and Steering	3 SHC	
AUT	151 Brake Systems	3 SHC	
AUT	181 Engine Performance I	3 SHC	
1101	101 Englie Ferformulee I	5 5110	
Automot	ive Light-Duty Diesel Technology		
LDD	112 Intro Light-Duty Diesel	3 SHC	
LDD	116 Diesel Electric-Drive	4 SHC	
LDD	181 LDD Fuel Systems	4 SHC	
Collision	Repair and Refinishing Technology		
AUB	111 Painting and Refinishing I	4 SHC	
AUB	121 Non-Structural Damage I	3 SHC	
AUB	131 Structural Damage I	4 SHC	
neb	151 Structural Danlage 1	1 bire	
	tion Equipment Systems Technology		
HYD	134 Hyd/Hydrostatic Construction	4 SHC	
	117 Equipment Braking Systems	3 SHC	
PME	118 Undercarriage Components	2 SHC	
PME	221 Const Equip Servicing	2 SHC	
Diosol an	d Heavy Equipment Technology		
HET	110 Diesel Engines	6 SHC	
HET	114 Power Trains	5 SHC	
HET	125 Preventive Maintenance	2 SHC	
1121	Or	2 5110	
MRN		4 SHC	
MRN	147 Marine Power Trains	4 SHC	
MRN	150 Adv. Marine Electricity	5 SHC	
	cle Mechanics	5 0110	
	111 Motorcycle Mechanics	7 SHC	
MCM	5 5	5 SHC	
MCM	115 Motorcycle Chassis	3 SHC	
Recreatio	onal Vehicle Maintenance and Repair Tech	nology	
	112 RV Preventive Maintenance	2 SHC	
	115 Pre-Delivery Inspection	2 SHC	
	160 RV Water Systems	4 SHC	
	-		
7 Other	Major Hours		

### C. Other Major Hours.

To be selected from the following prefixes:

ACA , ACC, ARS, ATR, ATT, AUB, AUC, AUM, AUT, BMS, BPR, BTB, BUS, CIS, COE, CSC, CTS, DBA, DDF, DEA, DFT, ELC, ELN, FBG, GRA, HET, HYD, ISC, LDD, LOG, MAC, MCM, MEC, MKT, MPS, MRN, MSM, NOS, PHY, PME, RCT, RVM, SEL, SST, TRN, WEB, and WLD

Foreign language courses (including ASL) that are not designated as approved other major hours may be included in all programs up to a maximum of 3 semester hours of credit.

### III. Other Required Hours

A college may include courses to meet graduation or local employer requirements in a certificate (0-1 SHC), diploma (0-4 SHC), or an associate in applied science (0-7 SHC) program. These curriculum courses shall be selected from the Combined Course Library and must be approved by the System Office prior to implementation. Restricted, unique, or free elective courses may not be included as other required hours.

### **IV. Employability Competencies**

Fundamental competencies that address soft skills vital to employability, personal, and professional success are listed below. Colleges are encouraged to integrate these competencies into the curriculum by embedding appropriate student learning outcomes into one or more courses or through alternative methods.

- **A.** Interpersonal Skills and Teamwork The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- **B.** Communication The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- **C.** Integrity and Professionalism Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- **D. Problem-solving** The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- **E.** Initiative and Dependability Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- F. Information processing The ability to acquire, evaluate, organize, manage, and interpret information.
- **G.** Adaptability and Lifelong Learning The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- **H.** Entrepreneurship The knowledge and skills necessary to create opportunities and develop as an employee or self-employed business owner.

\*\*The North Carolina Career Clusters Guide was developed by the North Carolina Department of Public Instruction and the North Carolina Community College system to link the academic and Career and Technical Education programs at the secondary and postsecondary levels to increase student achievement. Additional information about Career Clusters is located at: <u>http://www.nc-net.info/NC\_career\_clusters\_guide.php</u> or <u>http://www.careertech.org</u>.

	AAS	Diploma	Certificate
Minimum General Education Hours	15	6	0
Minimum Major Hours	49	30	12
Other Required Hours	0-7	0-4	0-1
Total Semester Hours Credit (SHC)	64-76	36-48	12-18