NORTH CAROLINA COMMUNITY COLLEGE SYSTEM
James C. Williamson, Ph. D.
President

October 27, 2016

MEMORANDUM

To: Presidents
           Chief Academic Officers

From: Wesley Beddard, Associate Vice President
           Programs

Subject: Curriculum Review Committee Course Approvals

The Curriculum Review Committee (CRC) has the responsibility for maintaining the curriculum courses in the *Combined Course Library* (CCL). The approved course requests from the Fall 2016 CRC meeting, held on October 11, 2016, are attached for your information. *Course revisions may involve the removal of required prerequisites or corequisites. Please note that colleges may add local prerequisites and/or corequisites if they determine a need exists.*

Course Revision Impact to Curriculum Standards
The CRC approved requests to revise the **course description, prerequisite(s), corequisite(s), and/or class/lab hours** of core courses found on the curriculum standard listed below. Please note that the only change indicated on the printed standard will be the inclusion of the statement *"CRC Revised-Electronic Only 10/11/16",* since only the electronic version of the standard in Colleague will be revised.

Digital Effects and Animation Technology (A30130)
Mechatronics Engineering Technology (A40350)

The State Board of Community Colleges has delegated authority to the Senior Vice President to approve curriculum standard changes involving **core course title and/or credit hour changes** resulting from CRC action. The standard listed below has been revised as a result of CRC approved changes to one or more core courses.

Health and Fitness Science (A45630)

The following curriculum standard will be submitted to the October 21, 2016 State Board of Community College meeting for additional action.

Respiratory Therapy (A45720)

CC16-045
Email Copy

Please be aware that you must implement the attached revised courses and standards no later than one year after the effective term. You must update your college's electronic program of study and receive approval from the System Office *prior* to implementation of the revised courses and programs.

Curriculum standards, curriculum courses and procedures for submitting requests to the CRC are available on the Academic Programs home page at:

http://www.nccommunitycolleges.edu/academic-programs.

If you need assistance or clarification, please contact Ms. Jennifer Frazelle, Director of Academic Programs at frazellej@nccommunitycolleges.edu or (919) 807-7120.

WB/dm

Attachments
c: Curriculum Review Committee
      Dr. Lisa M. Chapman
      Ms. Jennifer Frazelle
      Program Coordinators

Course Prefix #	Title	Approved Request	Effective Semester	Curriculum Standard Core Course
AER 171	Flight-Commercial Pilot	Change prerequisite from "AER 161" to "AER 151"	Fall 2017	NA
BAT 151	HVAC Motors and Drives	New Course	Spring 2017	NA
BAT 211	BAS Documentation	New Course	Spring 2017	NA
BAT 212	BAT Logic and Programming	New Course	Spring 2017	NA
BAT 221	BAS Networking	New Course	Spring 2017	NA
BAT 231	BAS Integration	New Course	Spring 2017	NA
BAT 261	BAS Controls Retuning	New Course	Spring 2017	NA
BTC 182	Pharma Lab Techniques I	New Course	Spring 2017	NA
BTC 183	Pharma Lab Techniques II	New Course	Spring 2017	NA
DEA 220	DEAT Compositing	Change corequisites from "DEA 212 and 213" to "DEA 212"	Fall 2017	Digital Effects and Animation Technology (A30130)
ELC 130	Advanced Motor/Controls	Change prerequisites from" ELC 111, 112 or 138" to "ELC 111, 112, 131 or 138"	Fall 2017	Mechatronics Engineering Technology (A40350)
ENG 001	English Skills Support	New Course	Spring 2017	NA
PSF 110	Exercise Science	Change prefix to HFS	Fall 2017	Health and Fitness Science (A45630)
PSF 111	Fitness & Exer Testing I	Change prefix to HFS	Fall 2017	Health and Fitness Science (A45630)
PSF 114	Phys Fit Theory & Instruction	Change prefix to HFS	Fall 2017	NA
PSF 116	Pvnt & Care Exer Injuries	Change prefix to HFS	Fall 2017	Health and Fitness Science (A45630)
PSF 118	Fitness Facility Mgmt	Change prefix to HFS	Fall 2017	Health and Fitness Science (A45630)
PSF 120	Group Exer Instruction	Change prefix to HFS	Fall 2017	Health and Fitness Science (A45630)
PSF 210	Personal Training	Change prefix to HFS	Fall 2017	Health and Fitness Science (A45630)
PSF 211	Fitness & Exer Testing II	Change prefix to HFS	Fall 2017	NA
PSF 212	Exercise Programming	Change prefix to HFS	Fall 2017	Health and Fitness Science (A45630)
PSF 214	Health and Fitness Law	Change prefix to HFS	Fall 2017	NA
PSF 218	Lifstyle Chng & Wellness	Change prefix to HFS	Fall 2017	Health and Fitness Science (A45630)
RCP 110	Intro to Respiratory Care	Change description	Fall 2017	Respiratory Therapy (A45720)
RCP 111	Therapeutics and Diagnostics	Change description	Fall 2017	Respiratory Therapy (A45720)
RCP 112	Patient Management	Change description	Fall 2017	NA
RCP 115	C-P Pathophysiology	Change description	Fall 2017	NA
RCP 210	Critical Care Concepts	Change description	Fall 2017	Respiratory Therapy (A45720)
RCP 211	Adv Monitoring/Procedures	Change description	Fall 2017	Respiratory Therapy (A45720)
RCP 213	Neonatal/Pediatric Concepts	Change description	Fall 2017	NA
RCP 214	Neonatal/Pediatric RC	Change description	Fall 2017	NA

Curriculum Course Requests Approved By the Curriculum Review Committee (CRC)
October 11, 2016

Course Prefix #	Title	Approved Request	Effective Semester	Curriculum Standard Core Course
RCP 215	Career Prep-Adv Level	Change description, Change title to "Career Preparation"	Fall 2017	NA
SPI 241	Legal Interpreting I	Change corequisites from "SPI 221 and WBL 111" to "None"	Fall 2017	NA
SPI 243	Medical Interpreting I	Change corequisites from "SPI 221 and WBL 111" to "None"	Fall 2017	NA
TRE 270	Mental Retardation and Developmental Disabilities Lab	Change description, Change title to "Intellectual Development Disabilities Lab"	Fall 2017	NA

CURRICULUM STANDARD

Curriculum Program Title	**Digital Effects and Animation Technology**	Program Code	**A30130**
Concentration	**(not applicable)**	CIP Code	**10.0304**

Curriculum Description

The Digital Effects and Animation Technology curriculum is designed to provide students with the training necessary to become competent in creating, manipulating, and animating digital images. These skills have application in the production of a variety of moving image forms.

Students will take courses covering computer hardware/software applications, computer animation, creation and manipulation of digital images and nonlinear editing. They will become proficient at using media industry standard hardware/software to generate and manipulate images, and create digital special effects.

Upon completion of this program, students will be able to generate moving images and manipulate captured images for a variety of media production applications. Graduates should qualify for employment in the creation and/or editing of a variety of media forms.

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*Curriculum Requirements**
[for associate degree, diploma, and certificate programs in accordance with 1D SBCCC 400.97 (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 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-based learning 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 (SHC)	**64-76**	**36-48**	**12-18**

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*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. 1D SBCCC 400.97 (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-based learning 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.

Digital Effects and Animation Technology A30130

	AAS	Diploma	Certificate
Minimum Major Hours Required	**49 SHC**	**30 SHC**	**12 SHC**
A. CORE	**33 SHC**	**NR**	

Required Courses:

DEA	111	Introduction to DEAT	3 SHC
DEA	112	2D Design and Animation I	3 SHC
DEA	212	2D Design and Animation II	3 SHC
DEA	213	3D Design and Animation I	3 SHC
DEA	214	3D Design and Animation II	3 SHC
DEA	220	DEAT Compositing	3 SHC
DEA	221	DEAT Modeling	3 SHC
DEA	230	Implementation Project I	4 SHC
DEA	231	Implementation Project II	4 SHC
DEA	240	DEAT Portfolio Review	4 SHC

Required Subject Areas:
None

B.   CONCENTRATION *(Not applicable)*

C.   OTHER MAJOR HOURS
To be selected from the following prefixes:

ACA, ART, BPT, CIS, CSC, DEA, DES, FVP, GRA, ITN, SGD, WBL and WEB

Up to two semester hour credits may be selected from ACA.

Up to three semester hour credits may be selected from the following prefixes: ARA, ASL, CHI, FRE, GER, ITA, JPN, LAT, POR, RUS and SPA.

CURRICULUM STANDARD

Curriculum Program Title	**Health and Fitness Science**	Program Code	**A45630**
Concentration	**(not applicable)**	CIP Code:	*31.0599*

Curriculum Description

The Health and Fitness Science program is designed to provide students with the knowledge and skills necessary for employment in the fitness and exercise industry.

Students will be trained in exercise science and be able to administer basic fitness tests and health risk appraisals, teach specific exercise and fitness classes and provide instruction in the proper use of exercise equipment and facilities.

Graduates should qualify for employment opportunities in commercial fitness clubs, YMCA's/YWCA's, wellness programs in business and industry, Parks & Recreation Departments and other organizations implementing exercise & fitness programs.

Curriculum Requirements*

[for associate degree, diploma, and certificate programs in accordance with 1D SBCCC 400.97 (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 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-based learning 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 (SHC)	**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. 1D SBCCC 400.97 (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-based learning 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.

Health and Fitness Science A45630			
	AAS	**Diploma**	**Certificate**
Minimum Major Hours Required	**49 SHC**	**30 SHC**	**12 SHC**
A. **CORE**	**41 SHC**	**NR**	**16 SHC**

Required Courses:

HEA	112	CPR & First Aid	2 SHC
HFS	110	Exercise Science	4 SHC
HFS	111	Fitness & Exercise Testing I	4 SHC
HFS	116	Prevention & Care of Exercise Related Injuries	3 SHC
HFS	118	Fitness Facility Management	4 SHC
HFS	120	Group Exercise Instruction	3 SHC
HFS	210	Personal Training	3 SHC
HFS	212	Exercise Programming	3 SHC
HFS	218	Exercise Programming	4 SHC

Required Subject Areas:

BIO	155	Nutrition	3 SHC
BIO	168	Anatomy & Physiology I	4 SHC
BIO	169	Anatomy & Physiology II	4 SHC

B. **CONCENTRATION** *(Not applicable)*

C. **OTHER MAJOR HOURS**
To be selected from the following prefixes:

BIO, BUS, CIS, DAN, HEA, HFS, MUS, PED, PSF, PSY, RSM, SOC, and WBL

Up to two semester hour credits may be selected from ACA.

Up to three semester hour credits may be selected from the following prefixes: ARA, ASL, CHI, FRE, GER, ITA, JPN, LAT, POR, RUS and SPA.

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 Technology	**Effective Term:** Spring 2017 (2017*01)

Program Majors Under Pathway

Program Major / Classification of Instruction Programs (CIP) Code		Credential Level(s) Offered	Program 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
Mission Critical Operations	CIP Code: 15.0406	AAS/Diploma/Certificate	A40430

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 4th 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.

Mission Critical Operations: The Mission Critical Operations curriculum prepares graduates for employment in a wide range of positions in specific mission critical environments, operations technology, and maintenance. Course work includes the development of a student's ability to maintain technically sophisticated systems for business continuity and near continuous uptime using engineering, information technology, and industrial management and maintenance skills. The course work emphasizes analytical and problem-solving skills required to sustain high availability national security interests and includes instruction in electromechanical systems, networking, automation, cybersecurity, emergency management and systems integration. Graduates should qualify for employment as entry-level technicians with businesses, industries, educational systems, and governmental agencies in national critical infrastructure areas including, but not limited to, communications, emergency services, energy, financial services, healthcare, information technology, and transportation.

I. General Education Academic Core
[*Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 1D SBCCC 400.97 (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 general education; 3 semester hours must be in communications. General education is optional in certificate programs.

Engineering and Technology: Applied, Automation and Mechatronics Engineering Technology

General Education Academic Core					AAS	Diploma	Certificate
Minimum General Education Hours Required:					**15 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.

*Recommended certificate and diploma level curriculum courses. These courses may not be included in associate degree programs.

					AAS	Diploma	Certificate
Communications:					**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	Writing and Inquiry	3 SHC			
	ENG	114	Professional 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			
	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			
	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		

				AAS	Diploma	Certificate
Natural Sciences/Mathematics:				**3 SHC**	**0-3 SHC**	**Optional**
	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		

II.   Major Hours. AAS, diploma, and certificate programs must include courses which offer specific job knowledge and skills. Work-based learning 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. Below is a description of each section under Major Hours.

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 Core:**

*   **Computer Applications**
Choose one:

CIS	110	Introduction to Computers	3 SHC
EGR	111	Eng Comp and Careers	3 SHC
EGR	125	Appl Software for Tech	2 SHC
ELC	127	Software for Technicians	2 SHC

*   **Safety**
Choose one:

ISC	112	Industrial Safety	2 SHC
ISC	115	Construction Safety	2 SHC

B.   **Program Major(s):**
For AAS Degree select one program major.

Applied Engineering Technology

*   **Computers**
Choose one:

DFT	119	Basic CAD	2 SHC
ELC	127	Software for Technicians	2 SHC

*   **Electricity**
Choose one:

ELC	131	Circuit Analysis I	4 SHC
ELC	138	DC Circuit Analysis	4 SHC
ELC	139	AC Circuit Analysis	4 SHC

* **Engineering**
Choose one:

HYD	110	Hydraulics/Pneumatics I	3 SHC
HYD	112	Hydraulics/Med/Heavy Duty	2 SHC
HYD	115	Industrial Hydraulics	3 SHC
MNT	165	Mechanical Industrial Sys	2 SHC

* **Motors and Controls**
Choose one:

ELC	117	Motors and Controls	4 SHC
ELC	128	Intro to PLC	3 SHC

* **Specialty**
Choose one:

ATR	112	Intro to Automation	3 SHC
CET	110	Intro to CET	1 SHC
ELN	131	Analog Electronics I	4 SHC
MEC	110	Intro to CAD/CAM	2 SHC

Automation Engineering Technology

*	ATR	112	Intro to Automation	3 SHC
*	ATR	215	Sensors and Transducers	3 SHC
*	ELC	128	Intro to PLC	3 SHC
	ELN	133	Digital Electronics	4 SHC
	PCI	171	Fieldbus Systems	4 SHC

* **Basic Electricity**
Choose one set:

ELC	131	Circuit Analysis I	4 SHC
ELC	133	Circuit Analysis II	4 SHC
	OR		
ELC	138	DC Circuit Analysis	4 SHC
ELC	139	AC Circuit Analysis	4 SHC

Specialty
Choose one:

ATR	121	Intro to Machine Vision	4 SHC
BAT	111	Building Automation Systems	2 SHC
HYC	110	Hydraulics/Pneumatics I	3 SHC
MEC	130	Mechanisms	3 SHC
MNT	250	PLC Interfacing	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	Intro to Electricity	3 SHC
	OR		
ELC	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:						
	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			
	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			
	ELC	130	Advanced Motors/Controls	3 SHC			
	ELC	135	Electrical Machines I	3 SHC			
	AND						
	ELC	136	Electrical Machines II	4 SHC			
	Programmable Logic Controllers						
	Choose one:						
	ELC	128	Intro to PLC	3 SHC			
	ELN	260	Prog Logic Controllers	4 SHC			
*	**Physics**						
	Choose one:						
	PHY	131	Physics-Mechanics	4 SHC			
	PHY	151	College Physics I	4 SHC			
	Mission Critical Operations						
*	MCO	110	Intro to MCO	3 SHC			
*	MCO	115	MCO Infrastructure	3 SHC			
	MCO	210	Critical Site Operations	3 SHC			
	Operations Technology						
	ATR	112	Intro to Automation	3 SHC			
*	MNT	222	Industrial Sys Schematics	2 SHC			

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

AHR, ALT, ATR, BAT, BPM, BPR, BTB, BTC, BUS, CCT, CEG, CET, CHM, CIS, CIV, CMT, CSC, CTI, CTS, DBA, DDF, DEA, DFT, EGR, ELC, ELN, EPP, EPT, FBG, GRA, HET, HPC, HYD, ISC, LOG, MAC, MAT, MCM, MCO, MEC, MKT, MLG, MNT, MPS, MSM, NET, NOS, NUC, OMT, PCI, PHY, PKG, PMT, RCT, RVM, SEC, SST, TCT, TDP, TEL, TNE, TRN, WAT, WBL, WEB and WLD

Up to two semester hour credits may be selected from ACA.

Up to three semester hour credits may be selected from the following prefixes: ARA, ASL, CHI, FRE, GER, ITA, JPN, LAT, POR, RUS and SPA.

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.

*An **Employability Skills Resource Toolkit** has been developed by NC-NET for the competencies listed above.   Additional information is located at: http://www.nc-net.info/employability.php*

**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: http://www.nc-net.info/NC_career_clusters_guide.php or http://www.careertech.org.*

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**