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 Technology | **Effective Term:** Fall 2013 (2013*03)

Program Majors Under Pathway

Program Major / Classification of Instruction Programs (CIP) Code		Credential Level(s) Offered	Program 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 4th 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 ASQ, 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.*

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I. General Education Academic Core

[*Curriculum Requirements for associate degree, diploma, and certificate programs in accordance with 1D SBCCC 400.10]*: *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: Mechanical 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.							
Communications:							
*	COM	101	Workplace Communication	3 SHC			
	COM	110	Introduction to Communication	3 SHC	**6 SHC**	**3-6 SHC**	**Optional**
	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			
Humanities/Fine Arts:							
*	HUM	101	Values in the Workplace	2 SHC			
	HUM	110	Technology and Society	3 SHC	**3 SHC**	**0-3 SHC**	**Optional**
	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			
	GEO	131	Physical Geography	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			
Natural Sciences/Mathematics:							
	MAT	110	Math Measurement & Literacy	3 SHC	**3 SHC**	**0-3 SHC**	**Optional**
	MAT	121	Algebra/Trigonometry I	3 SHC			
	MAT	143	Quantitative Literacy	3 SHC			
	MAT	152	Statistical Methods I	4 SHC			
	MAT	171	Precalculus Algebra	4 SHC			
	MAT	223	Applied Calculus	3 SHC			
	MAT	271	Calculus I	4 SHC			

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

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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: Mechanical Engineering Technology				**AAS**	**Diploma**	**Certificate**
Minimum Major Hours Required:				**49 SHC**	**30 SHC**	**12 SHC**
A. Technical Core:				**21-25 SHC**		
Engineering Fundamentals						
Pick One Set:						
EGR	250	Statics and Strength of Mat	5 SHC			
		OR				
EGR	251	Statics	3 SHC *and*			
EGR	252	Strength of Materials	3 SHC			
Two-Dimensional Drawing						
Choose one::						
DFT	151	CAD I	3 SHC			
DFT	170	Engineering Graphics	3 SHC			
EGR	120	Eng and Design Graphics	3 SHC			
Three-Dimensional Drawing						
Choose one::						
DFT	153	CAD III	3 SHC			
DFT	154	Intro Solid Modeling	3 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			
Manufacturing						
Choose one set:						
MEC	145	Mfg Materials I	3 SHC			
		OR				
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						

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

ALT, ARC, ATR, BAT, BMT, BPR, BTC, BUS, CEG, CET, CHM, CIS, CIV, CMT, CSC, CTI, CTS, DBA, DDF, DEA, DFT, EGR, ELC, ENV, ELN, EPP, FBG, FMW, GIS, HYD, IMS, ISC, ITN, LEO, LOG, MAC, MAT, MCO, MEC, MLG, MNT, NAN, NDE, NET, NOS, NUC, OMT, OSS, PCI, PHY, PLA, PMT, PPT, RCT, SST, TCT, TDP, TNE, WBL 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**

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