MEMORANDUM OF AGREEMENT

BY AND BETWEEN

CLEVELAND STATE COMMUNITY COLLEGE

SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS (STEM) AND ADVANCED TECHNOLOGIES

AND

THE UNIVERSITY OF TENNESSEE AT CHATTANOOGA

COLLEGE OF ENGINEERING AND COMPUTER SCIENCE

UT-Chattanooga/Cleveland State Community College
Articulation/Transfer Agreement

This Agreement is entered into by and between Cleveland State Community College, Cleveland, Tennessee (hereinafter referred to as "ClSCC") by and through its Division of Science, Technology, Engineering, and Mathematics (hereafter referred to as "STEM") and Advanced Technologies; and the University of Tennessee, on behalf of its Chattanooga campus, Chattanooga, Tennessee (hereinafter referred to as "UTC") by and through the UTC College of Engineering and Computer Science (hereinafter referred to as "CECS"). This Agreement implements the educational (transition) pathway for students completing their Associate of Applied Science degrees from STEM and Advanced Technologies and/or Associate of Science degrees from STEM and Advanced Technologies at ClSCC into the bachelor's degree programs hosted in CECS at UTC.

The parties hereto agree as follows:

I. TERMS AND CONDITIONS

A. The Dean of STEM and Advanced Technologies at ClSCC and the Dean of CECS at UTC, or their appointed representatives will cooperate closely to maintain academic requirements for the Agreement to the extent permitted by governing authorities and accreditation standards for each institution. For curriculum and course changes, each institution will work with the other party to maintain the requirements of both this Agreement and academic programs.

B. Future individual program agreements between ClSCC through STEM and Advanced Technologies and UTC through CECS will be included as an appendix to this Agreement.

II. RESPONSIBILITIES OF ClSCC

A. Designate a program liaison faculty member, acceptable to UTC, who is responsible for working with his or her counterpart at UTC.

B. Include the transition path from ClSCC to UTC in marketing of its STEM and Advanced Technologies AAS degree programs and STEM and Advanced Technologies AS degree programs.

C. Support activities to facilitate UTC admissions personnel to hold conferences with ClSCC students interested in transferring to UTC under the auspices of this Agreement.

D. Permit access to and use of ClSCC facilities, laboratories and/or equipment by UTC CECS students for the performance of educational activities subject to ClSCC guidelines and procedures.

III. RESPONSIBILITIES OF UTC

A. Designate a program liaison faculty member, acceptable to ClSCC, who is responsible for working with his or her counterpart at ClSCC.

B. Accept ClSCC graduates who have earned an Associate of Applied Science (AAS) degree with a minimum 2.0 cumulative grade from STEM and Advanced Technologies or an Associate of Science (AS) degree with a minimum 2.0 cumulative grade from STEM and Advanced Technologies at ClSCC into one of the CECS bachelor's degree programs at UTC.

C. Review the official ClSCC transcript for students who apply for admission to the UTC Office

of Admissions.

D. Accept all pre-approved courses for transfer (see degree programs list in Appendix A).

E. Include the transition path from ClSCC to UTC in marketing of its CECS BS degree programs.

IV. JOINT RESPONSIBILITIES

A. Each party will notify the other of any changes in the curricula, degree requirements, and admission requirements.

B. Share in marketing responsibilities pursuant to this Agreement regarding recruiting, placement, and advising current and future students.

C. Agree to hold institutional meetings, at a minimum, annually to discuss activities and efforts related to this Agreement.

V. TERM AND TERMINATION

A. This Agreement will commence on November 1, 2018 and continue to be valid until amended, modified, or terminated. The Agreement will be reviewed every three years or as needed to either make necessary revisions or to be terminated. Neither party shall be bound by this Agreement until it is signed by appropriate officials representing the two institutions on the signature page of this Agreement.

B. The Agreement may be terminated by either party by written notification at least six (6) months prior to the desired termination date.

VI. MEDIA

The parties agree not to use each other party's name or programs in any promotional material and public announcement without prior written or oral consent of the other.

IN WITNESS WHEREOF, the parties hereto have caused this AGREEMENT to be executed by their duly authorized representatives and thereby become effective on the date specified.

Cleveland State Community College

Recommended BY:

_____ _____
Dr. Tim Wilson Date
Department Chair of Advanced Technologies

_____ _____
Ms. Karen Wyrick Date
Interim Dean of STEM and Advanced Technologies

Approved BY:

William Seymour, Ph.D. President Date

University of Tennessee at Chattanooga

Recommended BY:

_____ _____
Daniel J. Pack, Ph.D., P.E.
Dean of College of Engineering and Computer Science

Approved BY:

Steven R. Angle, Ph.D. Chancellor Date

APPENDIX A – CLEAR PATHS

B.S. Engineering Technology Management: Engineering Management

Cleveland State Community College,
A.A.S. Mechatronics

FRESHMAN	Fall	Spring	SOPHOMORE	Fall	Spring
GEN 1010	3		MECH 2440	4	
MECH 1310	3		MECH 2441	4	
MECH 1320	3		ENGL 1010	3	
MECH 1330	3		Humanities/FA Elective	3	
MECH 1340	3		COMM 2025		3
INFS 1010		3	Behavioral/SS Elective		3
ENST 1300		3	MECH 2480		4
MECH 2425		4	MECH 2491		4
PHYS 1030		4			
MECH 2320		3			
	15	17		14	14
			Total:	60	

The University of Tennessee at Chattanooga
(B.S. Engineering Technology Management: Engineering Management)

JUNIOR	Hours	SENIOR	Hours
ACC 2010	3	ETCM 3150	3
ACC 2020	3	ETEM 3580	3
ETEM 1000	1	ETEM 3870	3
MGT 3150	3	ETEM 4050	3
BUS 3350	3	ETEM 4500	3
Natural Science	3	ETEM 4540	3
ECON 1020	3	ETEM 4560	3
ENGL 1020	3	ETEM 4590	3
ENCE 3520	3	ETEM 4960r	3
ETEM 3550	3	INTD 2090	3
MGT 2110 or MATH 2010	3	Non-Western Culture	3
MATH 1950 or MATH 1830	3-4	Humanities Elective	3
ETEM 1320	3		
	37-38		36
			73-74
			133-134

B.S. Engineering Technology Management: Engineering Management

Cleveland State Community College,
A.A.S. Electrical Engineering Technology

FRESHMAN	Fall	Spring	SOPHOMORE	Fall	Spring	
GEN 1010	3		EETC 2332	3		
ENST 1300	3		ENST 2361	3		
EETC 1313	3		Social/Behavioral Science Elective*	3		
EETC 1300	3		EETC 1370	3		
EETC 1320	3		ENGL 1010	3		
EETC 1314		3	EETC 2350		3	
EETC 1322		3	EETC 2361		3	
EETC 2331		3	PHYS 1030		4	
EETC 2311		3	COMM 2025		3	
ENST 1311		3	Humanities/FA Elective		3	
	15	15		15	16	
			Total:			61

The University of Tennessee at Chattanooga
(B.S. Engineering Technology Management: Engineering Management)

JUNIOR	Hours	SENIOR	Hours	
ACC 2010	3	ETCM 3150	3	
ACC 2020	3	ETEM 3580	3	
ETEM 1000	1	ETEM 3870	3	
MGT 3150	3	ETEM 4050	3	
BUS 3350	3	ETEM 4500	3	
Natural Science	3	ETEM 4540	3	
ECON 1020	3	ETEM 4560	3	
ENGL 1020	3	ETEM 4590	3	
ENCE 3520	3	ETEM 4960r	3	
ETEM 3550	3	INTD 2090	3	
MGT 2110 or MATH 2100	3	Non-Western Culture	3	
MATH 1950 or MATH 1830	3-4	Humanities Elective	3	
ETEM 1320	3			
	37-38		36	73-74 133-134

B.S. Engineering Technology Management: Engineering Management

Cleveland State Community College,
A.A.S. Electromechanical

FRESHMAN	Fall	Spring	SOPHOMORE	Fall	Spring	
EETC 1313	3		EETC 1321	3		
GEN 1010	3		INT 1310	3		
ENST 1300	3		INT 2310	3		
ENST 1370	3		MATH 1200	3		
ENST 2361	3		COMM 2025	3		
ENGL 1010		3	EETC 1370		3	
ENST 1362		3	EETC 2331		3	
ENST 1340		3	PHYS 1030		4	
ENST 1350		3	Humanities/FA		3	
Math/Nat. Sci.		3-4	Social/Behavioral Sciences		3	
Technical Elective		2				
	15	17-18		15	16	
			Total:			63-64

The University of Tennessee at Chattanooga
(B.S. Engineering Technology Management: Engineering Management)

JUNIOR	Hours	SENIOR	Hours	
ACC 2010	3	ETCM 3150	3	
ACC 2020	3	ETEM 3580	3	
ETEM 1000	1	ETEM 3870	3	
MGT 3150	3	ETEM 4050	3	
BUS 3350	3	ETEM 4500	3	
Natural Science	3	ETEM 4540	3	
ECON 1020	3	ETEM 4560	3	
ENGL 1020	3	ETEM 4590	3	
ENCE 3520	3	ETEM 4960r	3	
ETEM 3550	3	INTD 2090	3	
MGT 2110 or MATH 2100	3	Non-Western Culture	3	
MATH 1950 or MATH 1830	3-4	Humanities Elective	3	
ETEM 1320	3			
	37-38		36	73-74
				133-134

B.S. Engineering Technology Management: Construction Management

Cleveland State Community College,
A.A.S. in Engineering Systems Technology

FRESHMAN	Fall	Spring	SOPHOMORE	Fall	Spring	
ENST 1330	3		ENST 1320	3		
ENST 1314	3		ENST 1370	3		
ENST 1311	3		ENGL 1010	3		
GEN 1010	3		Social/Behavioral Science	3		
ENST 1332	3		Humanities/Fine Arts	3		
ENST 1331		3	ENST 2330		3	
ENST 1312		3	PHYS 1030		4	
ENST 1233		2	ENST 2390		3	
ENST 1300		3	COMM 2025		3	
ENST 1350		3	ENST 2331		3	
	15	14		15	16	
			Total:			60

The University of Tennessee at Chattanooga
(B.S. Engineering Technology Management: Construction Management)

JUNIOR	Hours	SENIOR	Hours	
ACC 2010	3	ETCM 3150	3	
ACC 2020	3	ETEM 3580	3	
ETEM 1000	1	ETEM 3870	3	
MGT 3150	3	ETEM 4050	3	
BUS 3350	3	ETEM 4500	3	
Natural Science	3	ETEM 4540	3	
ECON 1020	3	ETEM 4560	3	
ENGL 1020	3	ETEM 4590	3	
ENCE 3520	3	ETEM 4960r	3	
ETEM 3550	3	INTD 2090	3	
MGT 2110 or MATH 2100	3	Non-Western Culture	3	
MATH 1950 or MATH 1830	3-4	Humanities Elective	3	
	34-35		36	70-71 137-138

B.S. Engineering Technology Management: Construction Management

Cleveland State Community College,
A.A.S. in Electromechanical

FRESHMAN	Fall	Spring	SOPHOMORE	Fall	Spring	
GEN 1010	3		INT 1310	3		
EETC 1313	3		INT 2310	3		
ENST 1300	3		MATH 1200	3		
ENST 1370	3		EETC 1321	3		
ENS 2361	3		COMM 2025	3		
ENGL 1010		3	EETC 2331		3	
ENST 1350		3	EETC 1370		3	
ENST 1340		3	PHIL 1040		3	
ENST 1362		3	PHYS 1030		4	
MATH 1530		3	PSYC 1030 or SOCI 1010		3	
CPE 2100 or ENST 1311		2/3				
	15	17/18		15	16	
			Total:			63/64

The University of Tennessee at Chattanooga
(B.S. Engineering Technology Management: Construction Management)

JUNIOR	Hours	SENIOR	Hours	
ACC 2010	3	ETCM 3150	3	
ACC 2020	3	ETEM 3580	3	
ETEM 1000	1	ETEM 3870	3	
MGT 3150	3	ETEM 4050	3	
BUS 3350	3	ETEM 4500	3	
Natural Science	3	ETEM 4540	3	
ECON 1020	3	ETEM 4560	3	
ENGL 1020	3	ETEM 4590	3	
ENCE 3520	3	ETEM 4960r	3	
ETEM 3550	3	INTD 2090	3	
MGT 2110 or MATH 2100	3	Non-Western Culture	3	
MATH 1950 or MATH 1830	3-4	Humanities Elective	3	
	34-35		36	70-71
				137-138

UT-Chattanooga/Cleveland State Community College
Articulation/Transfer Agreement

B.S. Civil Engineering

Cleveland State Community College,
Civil Engineering Emphasis: University Parallel Major, A.S. (TTP)

FRESHMAN	**Fall**	**Spring**	**SOPHOMORE**	**Fall**	**Spring**
MATH 1910	4		MATH 2110	4	
ENGL 1010	3		PHYS 2120	4	
CHEM 1110	4		ENGR 2110	3	
GEN 1010	3		ENGL 2110 or 2210 or 2310	3	
HIST 2310	3		ECON 2010	3	
MATH 1920		4	MATH 2120		3
ENGL 1020		3	ENGR 2120		3
PHYS 2110		4	MUS 1030		3
MATH 2010		3	ECON 2020		3
HIST 2320		3	ART 2000 or 2020		3
			COMM 2025		3
	17	17		17	18
			Total:		69

The University of Tennessee at Chattanooga
(B.S. in Civil Engineering)

JUNIOR	**Hours**	**SENIOR**	**Hours**
ENCE 2010	3	ENCE 3850	3
ENCE 2620	2	ENCE 4610	3
ENCE 2620L	1	ENCE 4680	3
ENME 3070	3	ENCE 3620	3
ENME 3070L	1	4000-LEVEL TECHNICAL ELECTIVE**	3
ENCE 3640	3	ENCE 4850	3
ENCE 3500	3	ENCE 4620	3
ENCE 3500L	1	CE ELECTIVE (ENCE 4380, 4640, or 4780)	3
SCIENCE ELECTIVE*	4	NON-WESTERN CUTURE	3
ENCE 3610	3	FINE ARTS/ HUMANITIES	3
ENCE 3610L	1	BEH/SOC SCIENCE	3
ENCE 3680	3	3000-LEVEL TECHNICAL ELECTIVE	***
ENCE 3380	3		
ENCE 3520	3		
	34		**33** **67**

*Science elective: GEOL 1110/1110L, GEOL 1160, GEOL 1230, BIOL 1100, or BIOL 1110; others with department head approval.
**Any 4000-level engineering course. Some courses may require additional pre-requisites.
*** UTC's 3000-level technical elective requirement will be fulfilled by Cleveland State's ENGR 2130 course.

B.S. Electrical Engineering

Cleveland State Community College,
Electrical Engineering Emphasis: University Parallel Major, A.S. (TTP)

FRESHMAN	Fall	Spring	SOPHOMORE	Fall	Spring
CHEM 1110	4		PHYS 2120	4	
ENGL 1010	3		MATH 2110	4	
GEN 1010	3		ECON 2010	3	
MATH 1900	3		ENGL 2110 or 2210 or 2310	3	
MATH 1910	4		HIST 2310	3	
MATH 1920		4	MATH 2120		3
ENGL 1020		3	ART 2000 OR 2020		3
PHYS 2110		4	MATH 2010		3
MUS 1030		3	ECON 2020		3
HIST 2320		3	COMM 2025		3
			ENGR 2130*		4*
	17	17		17	19
			Total:		70

*ENGR 2130 should be taken at Chattanooga State Community College or UTC during the summers prior to transferring and reverse articulate.

The University of Tennessee at Chattanooga
(B.S. in Electrical Engineering)

JUNIOR	Hours	SENIOR	Hours	
ENEE 3250	3	ENEE 3850	3	
ENEE 3720	3	EE Focus Elective***	3	
ENEE 3720L	1	EE Elective*	3	
ENEE 3800	3	EE Lab Elective**	1	
ENEE 3800L	1	EE Technical Elective****	3	
ENEE 3750	3	Fine Arts/Humanities	3	
Fine Arts/Humanities	3	ENEE 4500	3	
ENEE 3790	3	ENEE 4900	1	
ENEE 4800	3	EE Elective*	3	
EE Focus Elective***	3	EE Lab Elective**	1	
EE Focus Elective Lab***	1	EE Focus Elective***	3	
EE Technical Elective****	3	Non-Western Culture	3	
EE Elective*	3			
	33		**30**	**63**

***EE Electives:**
THREE 3-hour courses (3000-4000) except ENEE 3280 and ENEE 3700.

****EE Lab Electives:**
TWO 1-hour laboratory courses (3000-4000) from the following: ENEE 3770L, ENEE 4600L, ENEE 4720L, ENEE 4750L OR ENEE 4790L

*****EE Focus Electives + EE Focus Lab Elective:**
TWO 3-hour EE focus area courses and ONE 1-hour EE focus laboratory from ONE of the following

clusters:

a.) POWER SYSTEMS: REQUIRED - ENEE 4720 + ENEE 4720L; *ELECT ONE:* ENEE 4750 OR ENEE 4820; *ELECT ONE:* ENEE 4620 OR ENEE 4670
b.) COMMUNCATIONS: REQUIRED – ENEE 4750 + ENEE 4750L; ENEE 4710; *ELECT ONE:* ENEE 4760 OR ENEE 4820
c.) MICROELECTRONICS: REQUIRED – ENEE 3770 + ENEE 3770L; ENEE 4820; *ELECT ONE:* ENEE 4600 OR ENEE 4710

******EE Technical Electives:**
TWO 3-hour Engineering Courses (3000-4000) from the following: ENME, ENCE, ENCH or ENEE except ENEE 3280 and ENEE 3700.
HIGHLY RECOMMENDED: ENCE 3520 OR ENME 3050 OR ENME 3030 OR ENME 3070.

B.S. Mechanical Engineering

Cleveland State Community College,
Mechanical Engineering Emphasis: University Parallel Major, A.S. (TTP)

FRESHMAN	**Fall**	**Spring**	**SOPHOMORE**	**Fall**	**Spring**
MATH 1910	4		MATH 2110	4	
ENGL 1010	3		PHYS 2120	4	
CHEM 1110	4		ENGL 2110 or 2210 or 2310	3	
GEN 1010	3		ENGR 2110	3	
HIST 2310	3		ECON 2010	3	
MATH 1920		4	MATH 2120		3
ENGL 1020		3	ENGR 2120		3
PHYS 2110		4	MUS 1030		3
MATH 2010		3	ECON 2020		3
HIST 2320		3	ART 2000 OR 2020		3
			COMM 2025		3
	17	17		17	18
			Total:		69

The University of Tennessee at Chattanooga
(B.S. in Mechanical Engineering)

JUNIOR	**Hours**	**SENIOR**	**Hours**	
ENME 3030	3	ENME 4420	3	
ENME 3400	3	ENME 4430	3	
ENME 3470	2	ENME 4470	2	
ENME 3480	3	ME Elective	3	
ENME 3070	3	ENME 3850	3	
ENME 3070L	1	ENME 4850	3	
ENME 3700	3	ENME 4500	3	
ENME 3580	3	Beh/Soc Sci	3	
ENCE 3520	3	Non-Western Cult	3	
ENME 3040	3	Humanities/Fine Arts	3	
ENEE 3280	3	ME Elective	3	
ENEE 3280L	1			
ENME 3090 or ENCH 3320	3			
	34		**32**	**66**
				130

ME electives: Fall – ENME 4400, ENME 4450, ENME 4999;
Spring: ENME 4410, ENME 4460 or ENME 4480

B.A.S. Mechatronics Engineering Technology

Cleveland State Community College,
A.A.S. Mechatronics

FRESHMAN	Fall	Spring	SOPHOMORE	Fall	Spring
GEN 1010	3		MECH 2440	4	
MECH 1310	3		MECH 2441	4	
MECH 1320	3		ENGL 1010	3	
MECH 1330	3		Humanities/FA Elective	3	
MECH 1340	3		COMM 2025		3
INFS 1010		3	Behavioral/SS Elective		3
ENST 1300		3	MECH 2480		4
MECH 2425		4	MECH 2491		4
PHYS 1030		4			
MECH 2320		3			
	15	17		14	14
			Total:	60	

*A course in MATH 1710/1720 or MATH 1730 required.

The University of Tennessee at Chattanooga
(B.A.S. Mechatronics Engineering Technology)

JUNIOR	Hours	SENIOR	Hours	
ENGL 1020	3	ETEM 3550	3	
ETME 2100	3	ETEM 4590	3	
MATH 1950	4	ETEM 4500 or ETEM 4960	3	
MGT 2110	3	ETME 3120	3	
ETCM 2010	3	ETME 4110	3	
PHYS 1040/1040L	4	ETME 4120	3	
ENCE 3520	3	ECON 1020	3	
ETME 3010	3	ETME 3210	3	
ETME 3230	3	ETME 4130	3	
ETME 3110	3	ETME 4210	3	
Humanities Elective	3	ETME 4220	3	
	35		33	68
				132

B.A.S. Mechatronics Engineering Technology

Cleveland State Community College,
A.A.S. Electrical Engineering Technology

FRESHMAN	**Fall**	**Spring**	**SOPHOMORE**	**Fall**	**Spring**	
GEN 1010	3		EETC 2332	3		
ENST 1300	3		ENST 2361	3		
EETC 1313	3		Social/Behavioral Science Elective*	3		
EETC 1300	3		EETC 1370	3		
EETC 1320	3		ENGL 1010	3		
EETC 1314		3	EETC 2350		3	
EETC 1322		3	EETC 2361		3	
EETC 2331		3	PHYS 1030		4	
EETC 2311		3	COMM 2025		3	
ENST 1311		3	Humanities/FA Elective		3	
	15	15		15	16	
			Total:			61

*A course in MATH 1710/1720 or MATH 1730 required.

The University of Tennessee at Chattanooga
(B.A.S. Mechatronics Engineering Technology)

JUNIOR	**Hours**	**SENIOR**	**Hours**	
ENGL 1020	3	ETEM 3550	3	
ETME 2100	3	ETEM 4590	3	
MATH 1950	4	ETEM 4500 or ETEM 4960	3	
MGT 2110	3	ETME 3120	3	
ETCM 2010	3	ETME 4110	3	
PHYS 1040/1040L	4	ETME 4120	3	
ENCE 3520	3	ECON 1020	3	
ETME 3010	3	ETME 3210	3	
ETME 3230	3	ETME 4130	3	
ETME 3110	3	ETME 4210	3	
Humanities Elective	3	ETME 4220	3	
	35		33	68
				132

B.A.S. Mechatronics Engineering Technology

Cleveland State Community College,
A.A.S. Electromechanical

FRESHMAN	**Fall**	**Spring**	**SOPHOMORE**	**Fall**	**Spring**
EETC 1313	3		EETC 1321	3	
GEN 1010	3		INT 1310	3	
ENST 1300	3		INT 2310	3	
ENST 1370	3		MATH 1200	3	
ENST 2361	3		COMM 2025	3	
ENGL 1010		3	EETC 1370		3
ENST 1362		3	EETC 2331		3
ENST 1340		3	PHYS 1030		4
ENST 1350		3	Humanities/FA		3
Math/Nat. Sci.		3-4	Social/Behavioral Sciences		3
Technical Elective		2			
	15	17-18		15	16

Total: 63-64

*A course in MATH 1710/1720 or MATH 1730 required.

The University of Tennessee at Chattanooga
(B.A.S. Mechatronics Engineering Technology)

JUNIOR	**Hours**	**SENIOR**	**Hours**	
ENGL 1020	3	ETEM 3550	3	
ETME 2100	3	ETEM 4590	3	
MATH 1950	4	ETEM 4500 or ETEM 4960	3	
MGT 2110	3	ETME 3120	3	
ETCM 2010	3	ETME 4110	3	
PHYS 1040/1040L	4	ETME 4120	3	
ENCE 3520	3	ECON 1020	3	
ETME 3010	3	ETME 3210	3	
ETME 3230	3	ETME 4130	3	
ETME 3110	3	ETME 4210	3	
Humanities Elective	3	ETME 4220	3	
	35		33	68
				132

APPENDIX B – CLEVELAND STATE ADVANCED TECHNOLOGIES PROGRAMS AND COURSE DESCRIPTIONS

Cleveland State Community College Course Descriptions of Programs of Study for**: Mechatronics, Electrical Engineering Technology, Electromechanical, and Engineering Systems Technology, A.A.S.**	
EETC 1300	An introduction to the electrical engineering technology discipline.
EETC 1313	An introductory course in DC circuits.
EETC 1314	An introductory course in AC circuits.
EETC 1321	An introductory course in solid state devices.
EETC 1322	This course is a continuation of the Electronics 1 course. More advanced topics in solid-state electronics will be covered.
EETC 1370	This is an intermediate level course that provides an understanding of electrical machinery.
EETC 2311	An introductory course in industrial power systems.
EETC 2331	An introductory course in programmable logic controllers.
EETC 2332	This course covers advanced topics in PLC programming.
EETC 2350	This course is a study of robotic technology integration into an automated manufacturing system.
EETC 2361	This course covers various components, circuits, instruments, and control techniques used by industry in automated process control systems.
ENST 1300	This course is designed to introduce students to architectural planning and design through the creation of residential working drawings using manual drafting.
ENST 1311	This course is designed to develop the fundamental visualization and graphic communication skills used within a technical environment through manual and computer means.
ENST 1312	This course is an intermediate and advanced 2-dimensional CAD course that is designed to build upon a basic CAD course.
ENST 1314	This course is designed to provide the student with an in-depth understanding of the system of orthographic projection through the use of manual drafting techniques.
ENST 1320	This course is an introductory course in 3-dimensional parametric modeling using Solidworks. The course covers 2-dimensional sketching and the basic tools used to convert 2-dimensional sketches into 3-D dimensional models.
ENST 1330	This course is designed to introduce students to architectural planning and design through the creation of residential working drawings using manual drafting.
ENST 1331	This course is designed to introduce students to architectural planning and design through the creation of residential working drawings using 2-dimensional software.
ENST 1332	This course is designed to introduce students to civil drafting and design through the creation of maps and architectural/engineering drawings using manual or 2D CAD techniques.
ENST 1333	This course is designed to advance students from the manual drafting board/2D CAD techniques, into creating models, maps and drawings using 3D CAD software.

ENST 1340	An introductory course into the application of basic metal working machine tools used in industry.
ENST 1350	This course focuses on industrial safety, including personal safety and equipment, hazard recognition and safeguards.
ENST 1362	This course covers the process of reading prints and technical drawings used in an industrial setting.
ENST 1370	This course focuses on manufacturing processes and provides an overview of the production cycle from planning to shipping.
ENST 1350	To provide study in theory of welding shop safety, oxy-acetylene, and shielded metallic arc (stick) welding basics, to include the effects of welding on metals with various properties and design. Perform practical application of the basic welding theories as they apply to shielded metal arc welding in flat and horizontal positions.
ENST 1370	Materials, components, terminology, theory, and application of heating and refrigeration systems. Design calculations, installation and servicing of commercial and residential systems.
MECH 1310	A study of the basic electrical components in a mechatronic system. Topics include basic functions and physical properties of electrical components.
MECH 1320	A study of the basic mechanical components and electrical drives in a mechatronics system. Topics include basic functions and physical properties or mechanical components and electrical AC and DC drives.
MECH 1330	A study of the basics of pneumatic, electro pneumatic and hydraulic control circuits in a mechatronic system. Topics include functions and properties of control elements based upon physical principles, and the roles they play within the system.
MECH 1340	A study of basic digital logic and programmable logic controllers (PLCs) in a mechatronics system. Topics include basic PLC functions and testing; identification of malfunctioning PLCs; and troubleshooting techniques.
MECH 2320	A study of the principles of AC and DC motors, motor control, and general machine operations in a mechatronic system including functions, and properties of machine control elements and the roles they play within the system. Topics include general machine operations and motor control techniques.
MECH 2425	This course is a study of the mechanical components that are included in a complex mechatronic system. Topics covered will include an overview of Statics and Kinetics with a focus on force system analysis, study of equilibrium, frames and machines, friction and the effects of forces on the motion of objects. Fundamentals and classification of machine elements to include calculations involving force, stress and wear analysis are covered.
MECH 2440	This course is a study of the Process Control technologies associated with a complex mechatronics system. Topics covered will include the Closed Loop Control; interaction between controllers, sensors, and actuators; controller operating parameters; PID controllers; ON/OFF and PID controllers; and the differences between controllers typically used in mechatronic systems. The analysis of plant documentation and manuals, the creation and interpretation of charts with diagrams for time-based changes of measured values is covered.
MECH 2441	This course is an introduction to Totally Integrated Automation of PLC systems. Topics covered will include the automation pyramid, analogue sensors and actuators, STEP 7 functions, MPI-Bus and PROFIBUS systems, and systems maintenance and troubleshooting.

MECH 2480	This course is a study of the automation systems utilized within a mechatronics system. Topics covered will include Metal Cutting, CNC, CAD, CAM, and programming microcontrollers used in modern manufacturing technologies.
MECH 2490	A study of manufacturing improvement processes in a mechatronics system for real world applications. Topics covered will include process variation, waste reduction, continuous improvement, and basic time study methods. Students will work as a team to apply improvement methods in a real world application with a final presentation.

Cleveland State Community College Catalog Description for courses in Civil, Electrical, and Mechanical Engineering curriculum maps (those courses with a ♦ symbol before the course description fulfill General Education requirements)	**Transfers to UTC as:**
ART 2000 - Art History Survey I (3 cr hr) ♦ Major periods of art history from prehistoric times to the 15th century. Three hours lecture per week. (Prerequisite(s): Completion of all learning support reading and writing courses.) S	ART 2140
ART 2020 - Art History Survey II (3 cr hr) ♦ Major periods of art history from the 15th century to the present. Three hours lecture per week. (Prerequisite(s): Completion of all required learning support reading and writing courses.) F	ART 2150
CHEM 1110 - General Chemistry I (4 cr hr) ♦ Theoretical and descriptive chemistry for science, engineering, medicine and allied health majors. Atomic theory, chemical bonding, stoichiometry, molecular structure, gas laws and solution chemistry. May not be used in conjunction with CHEM 1010 to satisfy General Education requirements for Natural Science. Three hours lecture and three hours lab per week. (Prerequisite(s): All required learning support courses and high school chemistry or CHEM 1010.) F, S	CHEM 1110
COMM 2025 - Fundamentals of Communication (3 cr hr) ♦ Fundamental theories and practices with particular reference to intrapersonal, interpersonal, group, organizational, and public communication. Three hours lecture per week. F,S	THSP 1090
ECON 2010 – Macroeconomics (3 cr hr) ♦ Economic analysis including unemployment, inflation, national income and its determination, international economics, fiscal policy, money and banking, monetary policy and economic growth. Three hours lecture per week. F, S	ECON 1010
ECON 2020 – Microeconomics (3 cr hr) ♦ Economic analysis including demand, supply, price, revenues, costs, profits, market structures, monopoly and oligopoly power and real-world markets. Three hours lecture per week. F, S	ECON 1020
ENGL 1010 - English Composition I (3 cr hr) ♦ Writing with emphasis on the expository and argumentative essay. Three hours lecture per week. F, S	ENGL 1010
ENGL 1020 - English Composition II (3 cr hr) ♦ Critical and analytical writing based on works of literature; documented library research paper required. Three hours lecture per week. (Prerequisite(s): ENGL 1010.) F, S	ENGL 1020
ENGL 2110 - Early American Literature (3 cr hr) ♦ Colonial, Federalist and Romantic literature. Three hours lecture per week. (Prerequisite(s): ENGL 1020.) F	ENGL 2110
ENGL 2210 - Early British Literature (3 cr hr) ♦ Medieval, Renaissance, Neo-classic and Pre-Romantic British literature. Three hours lecture per week. (Prerequisite(s): ENGL 1020.) F	ENGL 2210

ENGL 2310 - Early World Literature (3 cr hr) ♦ Selected world masterpieces from the ancient, medieval and Renaissance periods. Three hours lecture per week. (Prerequisite(s): ENGL 1020.) F	ENGL 2410
ENGR 2110 - Engineering Statics (3 cr hr) A three-dimensional treatment of particles and rigid bodies in equilibrium; and introductory mechanics of materials including stress-strain relations, torsion, shear and bending. May also be registered as PHYS 2710. Three hours lecture per week. (Prerequisite(s): PHYS 2110.) F	ENEE 1040
ENGR 2120 - Engineering Dynamics (3 cr hr) Kinematics and dynamics of particles and rigid bodies from an advanced standpoint with emphasis on rigid-body kinetics; and a general analysis of oscillatory mechanical systems. May also be registered as PHYS 2720. Three hours lecture per week. (Prerequisite(s): ENGR 2110.) (Corequisite(s): MATH 2120.) S	ENME 2840
ENGR 2130 - Engineering Circuits (3 cr hr) DC and AC analysis of circuits with resistors, capacitors, inductors and operational amplifiers; first- and second-order transients; and Laplace transform. May also be registered as PHYS 2610. Three hours lecture and two hours lab per week. (Prerequisite(s): PHYS 2120.) S	ENEE 2700, ENEE 2701L
GEN 1010 - First Year Seminar (3 cr hr) First Year Seminar enhances success in college by assisting students in obtaining life skills necessary to their educational, career, and life objectives. Students will create and apply critical thinking strategies in areas of time management, learning styles, study skills, career planning, resource utilization and media literacy. Students will learn skills that will allow them to be self-aware, self-motivated, civically aware, and personally responsible. Three hours lecture per week. F,S	USTU 1010
HIST 2310 - Early World History (3 cr hr) ♦ A survey of human history from the earliest hominids to 1500, with emphasis on key cultural, economic, political, religious and social events and trends. Three hours lecture per week. (Prerequisite(s): All required learning support reading courses.) F,S,Su	HIST 1110
HIST 2320 - Modern World History (3 cr hr) ♦ A survey of human history from 1500 to the present, with emphasis on key cultural, economic, political, religious and social events and trends. Three hours lecture per week. (Prerequisite(s): All required learning support reading courses.) F,S,Su	HIST 1120
MATH 1830 - Basic Calculus (3 cr hr) ♦ A one-semester course of limits and continuity and differential and integral calculus. The applications will include derivatives and integrals of exponential, logarithmic and composite functions. Three hours lecture per week. (Prerequisite(s): MATH 1630, MATH 1710 or ACT of 22 or higher.) F,S	MATH 1830
MATH 1900 - Scientific Programming (3 cr hr) Visual C++ programming including solutions of equations, data analysis and numerical techniques in engineering; historical, social, psychological and economical aspects of computer technology. Meets computer literacy requirement. Three hours lecture per week. (Prerequisite(s): Four years of high school mathematics including geometry and trigonometry.) F	ENGR 2250
MATH 1910 - Calculus I (4 cr hr) ♦ Single variable calculus for students majoring in science, mathematics and engineering. Topics include limits, rates of change, differentiation and integration of algebraic, exponential, logarithmic and trigonometric functions with applications. Graphing calculator required - see course syllabus for details. Four hours lecture per week. (Prerequisite(s): ACT Math score of at least 26 or MATH 1710.) F, S	MATH 1950

MATH 1920 - Calculus II (4 cr hr) Integral calculus with applications. Topics include techniques or integration, plane analytic geometry, transcendental functions, hyperbolic functions, polar coordinates, sequences and series. Graphing calculator required - see course syllabus for details. Four hours lecture per week. (Prerequisite(s): MATH 1910 with a grade of C or better and MATH 1720.) S,Su	MATH 1960
MATH 2010 - Linear Algebra (3 cr hr) A study of systems of linear equations, matrices, determinants, eigenvalues, eigenvectors and linear transformations. Three hours lecture per week. (Prerequisite(s): MATH 1910.) S	MATH 2200
MATH 2110 - Calculus III (4 cr hr) Vectors, partial and directional derivatives, gradients, multiple integrals and vector analysis. Four hours lecture per week. (Prerequisite(s): MATH 1920.) F	MATH 2560
MATH 2120 - Differential Equations (3 cr hr) Ordinary differential equations and their solution techniques, equations with constant coefficients, Laplace transform with applications to initial value problems, series solutions and numerical methods. Three hours lecture per week. (Prerequisite(s): MATH 2110.) S	MATH 2450
MUS 1030 - Music Appreciation (3 cr hr) ♦ Experience in listening to and understanding music from the Middle Ages to the present. Three hours lecture per week. (Prerequisite(s): All required learning support reading and writing courses must be completed.) F,S	MUS 1110
PHIL 1040 - Introduction to Ethics (3 cr hr) ♦ Survey of ethics in personal relations, politics, business, the professions and the military. Three hours lecture per week. UD	PHIL 2210
PHYS 2110 - Calculus Based Physics I (4 cr hr) ♦ Calculus-based mechanics, statics, rectilinear and curvilinear kinematics and dynamics, rigid body motion, harmonic motion, fluid statics and dynamics. May not be used in conjunction with either PHYS 1030 or 2010 to satisfy General Education requirements for Natural Science. Four hours lecture and two hours laboratory per week. (Prerequisite(s): MATH 1910.) S	PHYS 2300
PHYS 2120 - Calculus Based Physics II (4 cr hr) ♦ Electrostatics, magnetostatics, induction, direct and alternating current circuits, electrical transients, waves and geometrical optics. Four hours lecture and two hours laboratory per week. (Prerequisite(s): PHYS 2110.) F	PHYS 2310