

CONSTRUCTION TECHNOLOGIES

The following programs of study are available only at the Kirtland M-TEC in Gaylord.

Certificates

- *Electrical Technology*
- *Heating/Ventilation/Air Conditioning/Refrigeration*

Associate in Applied Science

- *Electrical Technology*
- *Heating/Ventilation/Air Conditioning/Refrigeration*

Partnership Programs

- *Davenport University*
- *Ferris State University*
- *Franklin University*

See information on our partnership programs on the web at

<http://www.kirtland.edu/students/transferfrom/>

Foundation

Kirtland Community College recognizes the importance of students possessing basic academic skills in English, reading, and mathematics in order to successfully complete college-level courses. Therefore, all entry-level students are required to demonstrate their proficiency in basic academic skills, as these courses are the foundation for success in all programs. The student's advisor will indicate which of the following courses need to be taken based on ACT scores or COMPASS placement testing results. It is highly recommended that students take these courses during the first semester in order to prepare for the road ahead, as well as possibly satisfying prerequisites needed for more advanced courses. Specific courses needed may be tracked below. *Students must plan additional time to complete their program requirements if placement results demonstrate the need to begin with preparatory courses (courses numbered less than 10000).*

- | | |
|--|---|
| <input type="checkbox"/> ENG-10000 Writing Lab (if required) | <input type="checkbox"/> Mathematics: _____ |
| <input type="checkbox"/> English: _____ | <input type="checkbox"/> Reading: _____ |

For more information or advising, please contact the M-TEC.

989-705-3600

mtec.kirtland.edu

ELECTRICAL TECHNOLOGY

Certificate of Completion (CELC2)

Minimum Credits: 30

Contact Hours: 46.88

After completing requirements for the certificate, students may continue on with the Associate in Applied Science: Electrical Technology.

Core Courses (3.5 credits, 87.5 classroom hours):

Course	Title	Credits	Classroom Hours
COR-10001	Basic Safety	0.5	12.5
COR-10002	Introduction to Construction Math	0.4	10
COR-10003	Introduction to Hand Tools	0.4	10
COR-10004	Introduction to Power Tools	0.4	10
COR-10005	Introduction to Construction Drawings	0.4	10
COR-10006	Basic Rigging	0.6	15
COR-10007	Basic Communication Skills	0.3	7.5
COR-10008	Employability Skills	0.3	7.5
COR-10009	Intro to Materials Handling	0.2	5

Electrical Level 1 (4.5 credits, 112.5 classroom hours):

ELT-10101	Orientation to the Electrical Trade	0.1	2.5
ELT-10102	Electrical Safety	0.4	10
ELT-10103	Introduction to Electrical Circuits	0.3	7.5
ELT-10104	Electrical Theory	0.3	7.5
ELT-10105	Intro to the NEC	0.3	7.5
ELT-10106	Device Boxes	0.4	10
ELT-10107	Hand Bending	0.4	10
ELT-10108	Raceways & Fittings	0.8	20
ELT-10109	Conductors & Cables	0.4	10
ELT-10110	Basic Electrical Construction Drawings	0.3	7.5
ELT-10111	Residential Electric Services	0.6	15
ELT-10112	Electrical Test Equipment	0.2	5

Electrical Level 2 (5.8 credits, 145 classroom hours):

ELT-10202	Alternating Current	0.7	17.5
ELT-10203	Motors: Theory & Application	0.8	20
ELT-10204	Electrical Lighting	0.6	15
ELT-10205	Conduit Bending	0.6	15
ELT-10206	Pull & Junction Boxes	0.5	12.5
ELT-10207	Conductor Installations	0.4	10
ELT-10208	Cable Tray	0.3	7.5
ELT-10209	Conductor Terminations & Splices	0.3	7.5
ELT-10210	Grounding & Bonding	0.6	15
ELT-10211	Circuit Breakers & Fuses	0.5	12.5
ELT-10212	Control System/Fundamental Concepts	0.5	12.5

Electrical Level 3 (6.2 credits, 155 classroom hours):

ELT-20303	Load Calc – Branch & Feeder Circuits	0.7	17.5
ELT-20304	Conductor Selection & Calculations	0.6	15
ELT-20305	Practical Applications of Lighting	0.5	12.5
ELT-20306	Hazardous Locations	0.6	15
ELT-20307	Overcurrent Protection	1	25
ELT-20308	Distribution Equipment	0.5	12.5
ELT-20309	Transformers	0.5	12.5
ELT-20310	Commercial Electrical Services	0.4	10
ELT-20311	Motor Calculations	0.5	12.5
ELT-20312	Voice, Data, & Video	0.4	10
ELT-20313	Motor Controls	0.5	12.5

Electrical Level 4 (7 credits, 175 classroom hours):

ELT-20404	Load Calculations – Feeder & Services	0.8	20
ELT-20405	Health Care Facilities	0.4	10
ELT-20406	Standby & Emergency Systems	0.4	10
ELT-20407	Basic Electronic Theory	0.4	10
ELT-20408	Fire Alarm Systems	0.6	15
ELT-20409	Specialty Transformers	0.4	10
ELT-20410	Advanced Motor Controls	0.8	20

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ELT-20411	HVAC Controls	0.6	15
ELT-20412	Heat Tracing & Freeze Protection	0.4	10
ELT-20413	Motor Operation & Maintenance	0.4	10
ELT-20414	Medium Voltage Termination & Splices	0.4	10
ELT-20415	Special Locations	0.8	20
ELT-20416	Introductory Skills for the Crew Leader	0.6	15

Electives (3.0 credits, 75 classroom hours):

	Technical electives approved by advisor (Choose from: CAP-20001 through 20004, CPT, ELT, HVC, IND, MPT, PLB, and/or WLD)	1.8	45
ELT-14000	Solar/Wind Energy Systems	3.0	64
ELT-20417	Programmable Logic Controllers	1.0	25
ELT-20418	Michigan Laws and Rules	0.6	15

ELECTRICAL TECHNOLOGY

Associate in Applied Science (DELC2)

Minimum Credits: 60
Contact Hours: 77.88-85.88

Students who have completed the requirements for the certificate may continue on with the Associate in Applied Science: Electrical Technology by completing the requirements listed below. *In addition to requirements for the certificate, students must complete the following requirements and any electives necessary.*

Engineering Design Technologies (formerly CAD)

Course	Title	Credits	Classroom Hours
EDT-11000	Detailing w/AutoCAD	3	64
EDT-14000	Architectural Drawing/CAD	4	64
EDT Totals		7	128

General Education

ENG-10000	Writing Lab (if required)	0-1	0-32
ENG-10303	English Composition I w/Computers	3	48
ENG-10403 Or ENG-10602	English Composition II w/Computers Or Technical Writing	3	48
MTH-12000	Intermediate Algebra or higher (excluding MTH-20500 or MTH-20600)	3-4	48-64
POL-10100	Introduction to American Government	3	48
SPE-10500 Or SPE-11400	Fundamentals of Speech Or Intro to Interpersonal & Public Comm	3	48
	Humanities elective	2-4	32-64
	Any Science course with a lab	3-5	48-80
	Any Social Science Elective	3-4	48-64
General Education Totals		23-30	368-496

Summary—Electrical Technology--Associate in Applied Science

	Credits	Classroom Hours
ELT Certificate of Completion	30	750
Engineering Design Technologies	7	128
General Education	23	368-496
Total	60	1,246-1,374

HEATING/VENTILATION/AC/REFRIGERATION**Minimum Credits: 30**

Certificate of Completion (CHVC2)

Contact Hours: 46.88

After completing requirements for the certificate, students may continue on with the Associate in Applied Science:
Heating / Ventilation / AC / Refrigeration.

Core Courses (3.5 credits, 87.5 classroom hours):

Course	Title	Credits	Classroom Hours
COR-10001	Basic Safety	0.5	12.5
COR-10002	Introduction to Construction Math	0.4	10
COR-10003	Introduction to Hand Tools	0.4	10
COR-10004	Introduction to Power Tools	0.4	10
COR-10005	Introduction to Construction Drawings	0.4	10
COR-10006	Basic Rigging	0.6	15
COR-10007	Basic Communication Skills	0.3	7.5
COR-10008	Employability Skills	0.3	7.5
COR-10009	Intro to Materials Handling	0.2	5

HVAC Level 1 (4.1 credits, 102.5 classroom hours):

HVC-11000	Intro to HVAC	0.3	7.5
HVC-11001	Trade Mathematics	0.4	10
HVC-11002	Copper & Plastic Piping Practices	0.2	5
HVC-11003	Soldering & Brazing	0.3	7.5
HVC-11004	Ferrous Metal Piping Practices	0.2	5
HVC-11005	Basic Electricity	0.5	12.5
HVC-11006	Intro to Cooling	1.2	30
HVC-11007	Intro to Heating	0.6	15
HVC-11008	Air Distribution Systems	0.4	10

HVAC Level 2 (7 credits, 175 classroom hours):

HVC-10200	Commercial Air Side Systems	0.5	12.5
HVC-10201	Chimneys, Vents, & Flues	0.2	5
HVC-10202	Intro to Hydronic Systems	0.4	10
HVC-10203	Air Quality Equipment	0.2	5
HVC-10204	Leak Detect/Evacuate/Recover/Charge	0.8	20
HVC-10205	Alternating Current	0.3	7.5
HVC-10206	Basic Electronics	0.2	5
HVC-10207	Control Circuit Troubleshooting	1.2	30
HVC-10208	Troubleshooting Gas Heating	0.5	12.5
HVC-10209	Troubleshooting Cooling	0.8	20
HVC-10210	Heat Pumps	0.8	20
HVC-10211	Installation/Maintenance Practices	0.7	17.5
HVC-10212	Sheet Metal Duct Systems	0.2	5
HVC-10213	Fiberglass/Flex Duct Systems	0.2	5

HVAC Level 3 (5.8 credits, 145 classroom hours):

HVC-20300	Refrigerants & Oils	0.4	10
HVC-20301	Compressors	0.6	15
HVC-20302	Metering Devices	0.3	7.5
HVC-20303	Retail Refrigeration	0.8	20
HVC-20304	Commercial Hydronic Systems	0.5	12.5
HVC-20305	Steam Systems	0.4	10
HVC-20306	Planned Maintenance	0.8	20
HVC-20307	Water Treatment	0.4	10
HVC-20308	Troubleshooting Electronic Controls	0.3	7.5
HVC-20309	Troubleshooting Oil Heating	0.4	10
HVC-20310	Troubleshooting Heat Pumps	0.5	12.5
HVC-20311	Troubleshooting Accessories	0.4	10

HVAC Level 4 (7.2 credits, 180 classroom hours):

HVC-20400	Construction Drawing/Specification	1	25
HVC-20401	Air Properties & Air System Balancing	0.8	20
HVC-20402	Indoor Air Quality	0.6	15
HVC-20403	Energy Conservation Equipment	0.4	10
HVC-20404	Building Management Systems	0.7	17.5

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HVC-20405	System Start-Up & Shut-Down	0.9	22.5
HVC-20406	Heating & Cooling System Design	1	25
HVC-20407	Commercial & Industrial Refrigeration	0.9	22.5
HVC-20408	Alternative Heating & Cooling Equipment	0.4	10
HVC-20409	Introduction to Supervisory Skills	0.5	12.5

Electives (2.4 credits, 60 classroom hours):

	Technical electives approved by advisor (Choose from: CAP-20001 through 20004, CPT, ELT, HVC, IND, MPT, PLB, and/or WLD)	2.4	60
HVC-14000	Geothermal Heat Pump Systems	3	64

HEATING/VENTILATION/AC/REFRIGERATION **Minimum Credits: 60**
Associate in Applied Science (DHVC2) **Contact Hours: 77.88-85.88**

Students who have completed requirements for the certificate may continue on with the Associate in Applied Science: Heating / Ventilation / AC / Refrigeration by completing the requirements listed below. *In addition to requirements for the certificate, students must complete the following requirements and any electives necessary.*

Engineering Design Technologies (7 credits, 128 classroom hours):

Course	Title	Credits	Classroom Hours
EDT-11000	Detailing w/AutoCAD	3	64
EDT-14000	Architectural Drawing/CAD	4	64

General Education (23-30 credits, 368-496 classroom hours):

ENG-10000	Writing Lab (if required)	0-1	0-32
ENG-10303	English Composition I w/Computers	3	48
ENG-10403 Or ENG-10602	English Composition II w/Computers Or Technical Writing	3	48
MTH-12000	Intermediate Algebra or higher (excluding MTH-20500 or MTH-20600)	3-4	48-64
POL-10100	Introduction to American Government	3	48
SPE-10500 Or SPE-11400	Fundamentals of Speech Or Intro to Interpersonal & Public Communication	3	48
	Humanities elective	2-4	32-64
	Any Science course with a lab	3-5	48-80
	Any Social Science elective	3-4	48-64

Summary—Heating/Ventilation/AC/Refrigeration--Associate in Applied Science

	Credits	Classroom Hours
HVAC/R Certificate of Completion	30	750
Engineering Design Technologies	7	128
General Education	23	368-496
Total	60	1,246-1,374

