

## **ENGINEERING TECHNOLOGIES**

### **David Wagner**

Dean of Engineering Technologies  
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### **Associate of Applied Science Degrees**

Communications  
Electrical  
Mechanical

### **Associate of Technical Study Degrees**

Alternative Energy Technician  
Electric Power Utilities  
Electro-Mechanical Technician  
Individually Planned ATS - Engineering (special application required)

### **Certificates**

Alternative Energy Power Technician  
CAD Specialist  
Communications Technician  
Industrial Maintenance Technician  
Wind and Solar Installation

### **Additional Offerings**

University Transfer - Engineering  
Undecided - Engineering

## ENGINEERING TECHNOLOGIES

### Program

#### Communications Technology

Communications Technicians install, program, and maintain a variety of telephone and communications systems. They perform basic cabling and linework for copper and optical systems, troubleshoot and coordinate both inside plant (Central Office) and outside plant activities, and manipulate modern interconnectivity components.

### Degree

#### Associate of Applied Science

Two-year full-time degree schedule; mixture of core telephony/installation courses along with physics, math, engineering, and communications/customer service classes; this program can be completed on a part-time basis.

### Careers

Business Telecom Technician  
Central Office Equipment Programmer  
Central Office or Headend Installer/Repair Specialist  
Construction Cable Splicer  
Customer Engineer – Data Applications  
Customer Zone Technician  
Lineworker/Senior Lineworker  
Certified Fiber Optic Technician

## STUDENT LEARNING OUTCOMES

### Graduates of this program will be able to:

- distinguish between circuit-switched and IP based phone systems
- name the different Digital Subscriber Lines (DSL) protocols provided to residential and small business customers
- analyze, troubleshoot, and maintain state-of-the-art data communications equipment found within Ethernet LANS along with Broadband, VoIP and Wireless solutions
- install, troubleshoot, and maintain copper and fiber optic cable systems in outside plant applications
- install, troubleshoot, and maintain UTP, STP, Coaxial and Fiber Optic cabling infrastructures for customer premises applications
- install, program, and maintain the features of Central Office switching systems and transport equipment and the interconnectivity of these systems
- interpret communication cabling infrastructure diagrams and identification systems including cable pair color coding
- install, maintain, and troubleshoot telephone switching and peripheral devices in residential as well as small business service areas
- safely use ladders, bucket trucks, and other equipment necessary to maintain aerial cabling and/or buried cable infrastructure
- coordinate activities with competitive local exchange carriers and other carriers
- classify the appropriate protocol for present day Cellular voice and broadband networks and their common back-haul technologies
- practice the 5S approach for visual order, organization, cleanliness and standardization
- work both independently and as an integral part of a technical team

- produce concise correspondence, reports, instructions, and proposals that will be effective in a technical work setting
- independently maintain and improve upon both technical skill level and knowledge of current technology
- communicate effectively with customers, suppliers, and co-workers

### Admission

#### Requirements

1. MTC Application for Admission and nonrefundable applicable fee.
2. Final high school transcript (or GED results) and college transcripts (if applicable).
3. Successful completion of the Basic Skills Assessment (COMPASS) and Technology Skills Test is required. Any College Foundation courses recommended by COMPASS results are also required.

### Options

**Certified Fiber Optic Technician (CFOT) Exam** includes a test of the applicant's level of knowledge of fiber optics in a broad-based exam that covers technology, components, installation and testing and requires verified skills in fiber optics. MTC offers courses preparing individuals to pass the certification exam.

**Cooperative Education (or co-op)** is a learning experience that integrates academic skills with workplace experience. Students in Engineering Technologies can earn college credit, make valuable professional contacts, and link their classroom studies to real-world workplace challenges. See the department dean or academic advisor for details.

# Communications Technology

## Associate of Applied Science Degree

Course No	Course Title	Quarter Credit Hours		Term(s) Offered	Pre-Requisites
<b>FIRST QUARTER (Fall 2011)</b>					
TCT 1000A	Intro to Telecommunications	4		F	None
TCT 2200A	EPBAX Switching Systems	4		F	TCT1000A or conc or TCT1000
OIS 1240A	Computer Applications I	4		All	OIS1200A or TST or OIS1200
TMT 1500B	Applied Technical Math I	5		All	COMPASS or MTH0990A or MTH0990
<i>Term Total</i>		17			
<b>SECOND QUARTER (Winter 2012)</b>					
ENG 1090A	English Composition I	4		All	OIS1240A or concurrent or OIS1240
GEN 0000A	General Education Elective	4		All	<i>See specific course listings</i>
EET 2300C	Basic Electrical Applications	3		All	None
TCT 1750A	Network Structure	4		F, W	None
<i>Term Total</i>		15			
<b>THIRD QUARTER (Spring 2012)</b>					
TCT 1030A	Broadband Delivery Technologies	4		Sp	TCT1000A or TCT1000
TCT 1300A	Intro To Switching Technology	4		Sp	None
TWR 1100A	Technical Writing	4		Sp	ENG1090A or ENG1000
TCT 1660A	Technician Work Safety	3		Sp	None
ENG 1100A	English Composition II	2		All	ENG1090A or ENG1000
<i>Term Total</i>		17			
<i>Total Quarter Hrs - 1st year</i>		49			
<b>FOURTH SEMESTER (Fall 2012)</b>					
Course No			Semester Credit Hours	Term(s) Offered	Pre-Requisites
CIT 1510	IT Essentials/A+		5	F	OIS1200 or TST or OIS1200A
TCT 2100	Fiber Optics & Splicing		3	F	TCT1200 or TCT1300A or Dept approval
TCT 2200	Cellular Service		3	F	None
MGT 1400	Introduction to Management		3	All	None
<i>Term Total</i>			14		
<b>FIFTH SEMESTER (Spring 2013)</b>					
ENG 1400	Oral Communications		3	All	None
TCT 2300	Transport Systems		3	SP	TCT1300A or TCT1200
GEN 0000	General Education Elective		3	ALL	<i>See specific course listings</i>
TCT 2400	Advance C.O. Switching Technology		3	SP	TCT1200 or TCT1300A
CIT 2200	Supporting Microsoft Server OR		3	SP	CIT1510 or CIT1510
CIT 1610	Networking Fundamentals/Cisco I				OIS1200 or TST or OIS1200A
TCT 2700	Comm Technology Co-op Work Exp. OR		1	SP	Greater than 40 cr. hrs
TCT 2800	Comm Technology Applied Project				
<i>Term Total</i>			16		
<i>Total Semester Hrs - 2nd year</i>			30		

## ENGINEERING TECHNOLOGIES

### Program

#### Electrical Engineering

Electrical Engineering Technicians help design, develop, test, and manufacture electrical and electronic equipment such as communication equipment; radar, industrial and medical monitoring or control devices; navigational equipment and computers. They may work in product evaluation and testing, using measuring and diagnostic devices to adjust, test, and repair equipment. They often fit older manufacturing equipment with new automated control devices.

### Degree

#### Associate of Applied Science

Two-year full-time degree schedule; mixture of core engineering, mathematics, CAD, and communications courses; program can be completed on a part-time basis.

### Careers

Associate Engineer  
Maintenance Technician  
Field Representative  
Systems Designer  
Testing Technician

## STUDENT LEARNING OUTCOMES

### Graduates of this program will be able to:

- analyze, interpret and troubleshoot DC and AC electric circuits
- develop and interpret electrical diagrams for installation and troubleshooting
- select and use various electrical tools and instruments such as the digital multimeter, oscilloscope and function generator
- develop and interpret technical specifications used in designs and acceptance tests for electrical applications
- prepare electrical schematics using manual and computer assisted drafting software
- select, install and troubleshoot various DC and AC motors used for various applications in industry
- construct, analyze, and troubleshoot power and control circuits
- identify and explain the operation of the basic components in an electric power distribution system
- program, interface and troubleshoot systems controlled by programmable logic controllers
- program, operate and troubleshoot legacy programmable controllers that are still in use
- program, operate and troubleshoot industrial robots
- follow required electrical and environmental safety procedures
- practice the 5S approach for visual order, organization, cleanliness and standardization
- work both independently and as an integral part of a technical team
- produce concise correspondence, reports, instructions, and proposals that will be effective in a technical work setting
- independently maintain and improve upon both technical skill level and knowledge of current technology
- communicate effectively with customers, suppliers, and co-workers

### Admission

#### Requirements

1. MTC Application for Admission and nonrefundable applicable fee.
2. Final high school transcript (or GED results) and college transcripts (if applicable).
3. Successful completion of the Basic Skills Assessment (COMPASS) and Technology Skills Test is required. Any College Foundation courses recommended by COMPASS results are also required.
4. COMPASS math score of 41 or above required to take the first algebra course in the engineering program

### Options

**Cooperative Education** (or **co-op**) is a learning experience that integrates academic skills with workplace experience. Students in Engineering Technologies can earn college credit, make valuable professional contacts, and link their classroom studies to real-world workplace challenges. See the department dean or academic advisor for details.

# Electrical Engineering Technology

Associate of Applied Science Degree

Course No	Course Title	Quarter Credit Hours		Term(s) Offered	Pre-Requisites
<b>FIRST QUARTER (Fall 2011)</b>					
IET 1000A	Intro to Engineering	2		All	COMPASS or MTH0990A or MTH0990
TMT 1500B	Applied Technical Math I	5		F,W	COMPASS or MTH0990A or MTH0990
OIS 1240A	Computer Applications I	4		All	OIS1200A or TST or OIS1200
EET 2300C	Basic Electrical Applications	3		All	None
EET 2200B	Digital Circuits I	3		F	None
<i>Term Total</i>		17			
<b>SECOND QUARTER (Winter 2012)</b>					
EET 2220A	Digital Circuits II	3		W	EET2200B or EET1200
BPT 1300B	Reading Technical Prints	3		All	None
PHY 1300A	Applied Physics I	5		W, Sp	TMT1500B or TMT1100
TMT 1550A	Applied Technical Math II	5		W, Sp	COMPASS or TMT1500B or TMT1100
MET 1500A	Metrology	2		All	None
<i>Term Total</i>		19			
<b>THIRD QUARTER (Spring 2012)</b>					
PHY 1350A	Applied Physics II	5		Sp, Su	PHY1300A or PHY1100
ENG 1090A	English Composition I	4		All	OIS1240A or conc or OIS1240
ENG 1160A	Oral Communications	4		All	None
EET 1100B	Circuit Analysis I	3		Sp	EET2300C or EET1000
EET 1101A	Circuit Analysis I Lab	1		Sp	EET1100B co-requisite
<i>Term Total</i>		17			
<i>Total Quarter Hrs - 1st year</i>		53			
Course No	FOURTH SEMESTER (Fall 2012)		Semester Credit Hours	Term(s) Offered	Pre-Requisites
EET 2000	Intro to Programmable Controllers		3	F	EET1000 or EET2300C
EET 1550	Circuit Analysis II		3	F	EET1500 or EET1100B
ENG 1100	English Composition II		3	All	ENG1000 or ENG1090A
EET 2400	Robotics I		2	F	None
EET 2200	Electrical Distribution Systems		2	F	EET1500 or EET1100B
GET 2100	Basic Problem Solving		1	F,Sp	None
<i>Term Total</i>			14		
<b>FIFTH SEMESTER (Spring 2013)</b>					
GET 2200	Technical Writing		3	Sp	ENG1100 or ENG1100A
EET 2050	Advanced Programmable Controllers		2	Sp	EET2000 or EET2320B
EET 2450	Robotics II		2	Sp	EET2400 or EET2600B
EET 2300	Electronics		4	Sp	EET1250 or EET2020A
GET 2300	Engineering Statistics		2	Sp	TMT1150 or TMT1550A
EET 2500	SCADA Systems		1	Sp	EET1000 or EET2300C
MFT 2200	Process Improvement & Lean Manufacturing		3	Sp	GET2300 or conc or MFT1410A
GET 2700	Engineering Cooperative Work Experience OR		1	Sp	Greater than 40 cr hrs
GET 2800	Engineering Applied Project				
<i>Term Total</i>			18		
<i>Total Semester Hrs – 2nd year</i>			32		

## ENGINEERING TECHNOLOGIES

### Program

#### Mechanical Engineering

Mechanical Engineering Technicians help engineers design, develop, test, and manufacture industrial machinery, consumer products, and other equipment. They may assist in product tests by, for example, setting up instrumentation for auto crash tests. They may make sketches and rough layouts, record and analyze data, make calculations and estimates, and report on their findings. When planning production, mechanical engineering technicians prepare layouts and drawings of the assembly process and of manufactured parts. They estimate labor costs, equipment life, and plant space. Some test and inspect machines and equipment or work with engineers to eliminate production problems.

### Degree

#### Associate of Applied Science

Two-year full-time degree schedule; mixture of core engineering courses along with physics, communications, and math studies; program can be completed on a part-time basis.

### Careers

Mechanical Engineering Technician  
Product/Design Engineering Technician  
Maintenance Technician  
Drafter

## STUDENT LEARNING OUTCOMES

### Graduates of this program will be able to:

- identify, analyze, and formulate solutions to mechanical design problems through the application of engineering principles and technical skills
- analyze trusses and other multi-member structures
- properly select and recommend appropriate materials for mechanical systems and structures based on design criteria and component application
- identify the key principles and components in design, operation, and maintenance of fluid power systems
- demonstrate fundamental knowledge of CNC programming
- apply lean principles to design and maintenance projects, and process improvement
- create, update, and interpret mechanical drawings and details using appropriate CAD software
- calculate cost estimates for new and existing design and maintenance projects using common cost structures and approaches
- utilize data analysis techniques for process analysis and improvement
- demonstrate basic knowledge of the fundamentals of electrical circuits and control devices
- understand and use tools and procedures commonly found in a technical laboratory setting
- follow required mechanical and environmental safety procedures
- practice the 5S approach for visual order, organization, cleanliness and standardization
- work both independently and as an integral part of a technical team
- produce concise correspondence, reports, instructions, and proposals that will be effective in a technical work setting

- independently maintain and improve upon both technical skill level and knowledge of current technology
- communicate effectively with customers, suppliers, and co-workers

### Admission

#### Requirements

1. MTC Application for Admission and nonrefundable applicable fee.
2. Final high school transcript (or GED results) and college transcripts (if applicable).
3. Successful completion of the Basic Skills Assessment (COMPASS) and Technology Skills Test is required. Any College Foundation courses recommended by COMPASS results are also required.
4. COMPASS math score of 41 or above required to take the first algebra course in the engineering program

### Options

**Cooperative Education (or co-op)** is a learning experience that integrates academic skills with workplace experience. Students in Engineering Technologies can earn college credit, make valuable professional contacts, and link their classroom studies to real-world workplace challenges. See the department dean or academic advisor for details.

# Mechanical Engineering Technology

Associate of Applied Science Degree

Course No	Course Title	Quarter Credit Hours		Term(s) Offered	Pre-Requisites
<b>FIRST QUARTER (Fall 2011)</b>					
IET 1000A	Intro to Engineering	2		All	COMPASS or MTH0990A or MTH0990
TMT 1500B	Applied Technical Math I	5		F, W	COMPASS or MTH0990A or MTH0990
OIS 1240A	Computer Applications I	4		All	OIS1200A or TST or OIS1200
BPT 1300B	Reading Technical Prints	3		All	None
EET 2300C	Basic Electrical Applications	3		All	None
MET 1330B	Computer Aided Drafting (CAD) I	2		F, W	None
<i>Term Total</i>		19			
<b>SECOND QUARTER (Winter 2012)</b>					
MET 1500A	Metrology	3		All	None
MET 1340B	Computer Aided Drafting (CAD) II	4		W, Sp	MET1330B & BPT1300B or MET1000
PHY 1300A	Applied Physics I	5		W, Sp	TMT1500B or TMT1100
TMT 1550A	Applied Technical Math II	5		W, Sp	COMPASS or TMT1500B or TMT1100
<i>Term Total</i>		17			
<b>THIRD QUARTER (Spring 2012)</b>					
MET 1400A	CAD Parametric Parts & Assembly Modeling	4		W, Sp	MET1340B or MET1000
PHY 1350A	Applied Physics II	5		Sp, Su	PHY1300A or PHY1100
ENG 1090A	English Composition I	4		All	OIS1240A or concurrent or OIS1240
MFT 2500A	Manufacturing Materials & Processes	2		Sp	None
MFT 1060B	Basic Problem Solving	2		W, Sp	None
<i>Term Total</i>		17			
<i>Total Quarter Hrs - 1st year</i>		53			
Course No	<b>FOURTH SEMESTER (Fall 2012)</b>		Semester Credit Hours	Term(s) Offered	Pre-Requisites
ENG 1100	English Composition II		3	All	ENG1000 or ENG1090A
ENG 1400	Oral Communications		3	All	None
EET 2000	Introduction to Programmable Controllers		2	F	EET1000 or conc or EET2300C
MFT 2100	Computer Numeric Control (CNC)		3	F	None
MET 2100	Fluid Mechanics		3	F	TMT1100 or conc or TMT1500B
MET 2200	Statics		3	F	PHY1100 or PHY1300A
<i>Term Total</i>			18		
<b>FIFTH SEMESTER (Spring 2013)</b>					
GET 2200	Technical Writing		3	Sp	ENG1000 or ENG1090A
MET 2300	Strength of Materials		3	Sp	PHY1150 or PHY1300A
MET 2400	Machine Design		3	Sp	MET2300 or conc or MET2020B
GET 2300	Engineering Statistics		2	Sp	TMT1150 or TMT1550A
MFT 2200	Process Improvement and Lean Manufacturing		3	Sp	GET2300 or conc or MFT1410A
GET 2700	Engineering Cooperative Work Experience OR		1	Sp	Greater than 40 cr hrs
GET 2800	Engineering Applied Project				
<i>Term Total</i>			15		
<i>Total Semester Hrs - 2nd year</i>			33		

## ENGINEERING TECHNOLOGIES

### Program

#### Alternative Energy Technician

Alternative Energy Technicians assist in the design, installation, testing and maintenance of alternative energy systems. Utilizing the appropriate electrical and mechanical courses from other degree programs, plus the addition of specialized courses, this program focuses on both solar and wind technologies. Courses range from a global introduction to alternative energy systems to the installation of wind turbines and solar panels. The Alternative Energy technician will have the skills and abilities to play key roles in nearly every phase of renewable energy solutions.

### Degree

#### Associate of Technical Study (A.T.S.)

Two-year full-time degree schedule; mixture of core technical courses along with basic mathematics, science, and communications classes; program can be completed on a part-time basis.

### Careers

Associate Alternative Energy Engineer  
Field Representative  
Installation Technician  
System monitoring Technician  
Energy Audit Technician

## STUDENT LEARNING OUTCOMES

### Graduates of this program will be able to:

- discuss the advantages and disadvantages associated with fossil fuel energy and alternative energy sources
- properly utilize terminology associated with wind and solar energy
- calculate the pay-back time of the wind and solar systems based on the measurement of the energy consumption and generation
- identify typical wind turbine components
- identify electrical, electronic, and mechanical device components and their functions used with solar and wind energy systems
- conduct site assessments for the optimal placement of wind turbines and solar panels
- install, operate, maintain, and troubleshoot wind and solar energy systems
- select appropriate methods of connecting the wind and solar systems to the power grid
- discuss the advantages of utilizing SCADA hardware and software in wind and solar systems
- utilize a programmable logic controller in wind turbine control
- follow required electrical, mechanical, and environmental safety procedures
- practice the 5S approach for visual order, organization, cleanliness and standardization
- work both independently and as an integral part of a technical team
- produce concise correspondence, reports, instructions, and proposals that will be effective in a technical work setting

- independently maintain and improve upon both technical skill level and knowledge of current technology
- communicate effectively with customers, suppliers, and co-workers

### Admission

#### Requirements

1. MTC Application for Admission and nonrefundable applicable fee.
2. Final high school transcript (or GED results) and college transcripts (if applicable).
3. Successful completion of the Basic Skills Assessment (COMPASS) and Technology Skills Test is required. Any College Foundation courses recommended by COMPASS results are also required.
4. COMPASS math score of 41 or above required to take the first algebra course in the engineering program

### Options

**Cooperative Education (or co-op)** is a learning experience that integrates academic skills with workplace experience. Students in Engineering Technologies can earn college credit, make valuable professional contacts, and link their classroom studies to real-world workplace challenges. See the department dean or academic advisor for details.

## Alternative Energy Technician

Associate of Technical Studies Degree

Course No	Course Title	Quarter Credit Hours		Term(s) Offered	Pre-Requisites
<b>FIRST QUARTER (Fall 2011)</b>					
IET 1000A	Intro to Engineering	2		All	COMPASS or MTH0990A or MTH0990
TMT 1500B	Applied Technical Math I	5		F, W	COMPASS or MTH0990A or MTH0990
AET 1010A	Intro to Alternative Energy	4		F, W	None
OIS 1240A	Computer Applications I	4		All	OIS1200A or TST or OIS1200
EET 2200B	Digital Circuits I	3		F	None
<i>Term Total</i>		18			
<b>SECOND QUARTER (Winter 2012)</b>					
EET 2300C	Basic Electrical Applications	3		All	None
AET 1050A	Turbine Technology I	4		W, Sp	None
PHY 1300A	Applied Physics I	5		W, Sp	TMT1500B or TMT1100
TMT 1550A	Applied Technical Math II	5		W, Sp	COMPASS or TMT1500B or TMT1100
<i>Term Total</i>		17			
<b>THIRD QUARTER (Spring 2012)</b>					
ENG 1090A	English Composition I	4		All	OIS1240A or conc or OIS1240
AET 1070A	Turbine Technology II	4		Sp, Su	AET1050A or AET1200
PHY 1350A	Applied Physics II	5		Sp, Su	PHY1300A or PHY1100
MET 1060B	Basic Problem Solving	2		W, Sp	None
EET 1100B	Circuit Analysis I	3		Sp	EET2300C or EET1000
EET 1101A	Circuit Analysis I Lab	1		Sp	EET1100B or EET1550 co-requisite
<i>Term Total</i>		19			
<i>Total Quarter Hrs - 1st year</i>		54			
Course No	FOURTH SEMESTER (Fall 2012)	Semester Credit Hours		Term(s) Offered	Pre-Requisites
EET 2000	Intro to Programmable Controllers	3		F	EET1000 or EET2300C
EET 1550	Circuit Analysis II	3		F	EET1500 or EET1100B
ENG 1100	English Composition II	3		All	ENG1000 or ENG1090A
AET 2100	Photovoltaic Technology	3		F	None
EET 2200	Electrical Distribution Systems	2		F	EET1500 or EET1100B
<i>Term Total</i>		14			
<b>FIFTH SEMESTER (Spring 2013)</b>					
EET 2300	Electronics	4		Sp	EET1250 or EET2220A
EET 2500	SCADA Systems	1		Sp	EET1000 or EET2300B
AET 2200	Alternative Energy Control & Delivery	3		Sp	AET2100
GET 2200	Technical Writing	3		Sp	ENG1100 or ENG1100A
ENG 1400	Oral Communications	3		All	None
AET 2700	Alt. Energy Cooperative Work Experience OR	1		Sp	Greater than 40 cr hrs
AET 2800	Alternative Energy Applied Project				
<i>Term Total</i>		15			
<i>Total Semester Hrs - 2nd year</i>		29			

## ENGINEERING TECHNOLOGIES

### Program

#### Electric Power Utilities

Electrical power line installers and repairers, also called line erectors or “power linemen” or “power lineworkers”, install and maintain the networks of power lines that go from generating plants to the customer. They erect utility poles and towers, or dig trenches, to carry the wires and cables. They connect wiring to houses and check the connections for proper voltage readings. Line erectors also may install and replace transformers, circuit interrupters, switches, power-line fuses, and other equipment to control and direct the electrical current.

### Degree

#### Associate of Technical Study (A.T.S.)

Two-year full-time degree schedule; mixture of core technical courses along with basic mathematics, science, and communications classes; program can be completed on a part-time basis.

### Careers

Power Distribution Lineworker  
Electric Utility Groundsman  
Engineering Technician  
Line Foreman/Supervisor

## STUDENT LEARNING OUTCOMES

### Graduates of this program will be able to:

- follow required safety procedures
- ascend and descend wooden poles using traditional and/or non-traditional pole climbing equipment
- perform pole-top rescue, bucket rescue and First Aid/CPR
- demonstrate proper transformer fusing, conductor sizing, and troubleshooting using basic electrical principles
- inspect, setup and operate digger derricks and bucket trucks
- install and replace wooden poles, transformers, metering, capacitors, regulators, circuit interrupters, and switches
- install, maintain, troubleshoot, and repair overhead distribution power systems
- install, maintain, troubleshoot, and repair underground distribution power systems
- operate and interpret digital controls for apparatus and substations
- practice the 5S approach for visual order, organization, cleanliness and standardization
- work both independently and as an integral part of a line crew
- produce concise correspondence, reports, instructions, and proposals that will be effective in a technical work setting
- independently maintain and improve upon both technical skill level and knowledge of current technology
- communicate effectively with customers, suppliers, and co-workers

### Admission

#### Requirements

1. MTC Application for Admission and nonrefundable applicable fee.
2. Final high school transcript (or GED results) and college transcripts (if applicable).
3. Successful completion of the Basic Skills Assessment (COMPASS) and Technology Skills Test is required. Any College Foundation courses recommended by COMPASS results are also required.
4. Meet with the Director of Lineman Training for approval.

### Options

**Available Certifications** include, First Aid/CPR/AED, Wood Pole Climbing, Pole Top Rescue/Bucket rescue and Class A CDL.

## Electric Power Utilities

Associate of Technical Studies Degree

Course No	Course Title	Quarter Credit Hours	Term(s) Offered	Pre-Requisites
<b>FIRST QUARTER (Fall 2011)</b>				
MGT 1430A	Customer Relationship Management	2	F	None
EUT 1001A	Intro to Power Linework I	4	#	None
EUT 1011A	Intro to Power Linework II	4	#	EUT1001A or EUT1000
OIS 1240A	Computer Applications I	4	All	OIS1200A or TST or OIS1200
TMT 1500B	Applied Technical Math I	5	F, W	COMPASS or MTH0990A or MTH0990
<i>Term Total</i>		19		
<b>SECOND QUARTER (Winter 2012)</b>				
EUT 1021A	Electrical Power System Overview	4	#	None
EUT 1030B	Power Utility Safety – The NESC Code	4	#	None
TMT 1550A	Applied Technical Math II	5	F, W	COMPASS or TMT1500B or TMT1100
ENG 1090A	English Composition I	4	All	OIS1240A or conc or OIS1240
EET 2300B	Basic Electrical Applications	2	All	None
<i>Term Total</i>		19		
<b>THIRD QUARTER (Spring 2012)</b>				
EUT 1040A	Electric Utility Project Construction	4	#	EUT1021A or EUT1100
EUT 1090A	Distribution Transformers and Circuits	4	#	EUT1021A or EUT1100
ENG 1160A	Oral Communications	4	All	None
ENG 1100A	English Composition II	2	All	ENG1090A or ENG1000
MET 1060B	Basic Problem Solving	2	W, Sp	None
<i>Term Total</i>		16		
<i>Total Quarter Hrs - 1st year</i>		54		
Course No	FOURTH SEMESTER (Fall 2012)	Semester Credit Hours	Term(s) Offered	Pre-Requisites
EUT 2200	Underground Powerline Construction	2	#	None
EUT 2300	Overhead Powerline Maintenance I	2	#	EUT1300 or EUT1040A
EUT 2350	Overhead Powerline Maintenance II	2	#	EUT2300 or EUT1120A
GEN 0000	General Education Elective	3	All	See Specific Course Listings
MGT 1400	Introduction to Management	3	All	None
EUT 2700	Cooperative Work Experience I	1	#	EUT2300 or EUT2400A
<i>Term Total</i>		13		
Course No	FIFTH SEMESTER (Spring 2013)	Semester Credit Hours	Term(s) Offered	Pre-Requisites
EUT 2400	Electric Utility Apparatus and Substations	3	#	EUT2100 or EUT1090A
EUT 2500	Underground Powerline Maintenance	3	#	EUT2200 or EUT1100A
EUT 2600	Advanced Electric Utility Apparatus	3	#	EUT2400 or EUT2400A
GET 2200	Technical Writing	3	Sp	ENG1100 or ENG1090A
EET 2500	SCADA Systems	1	Sp	EET1000 or EET2300C
GEN 0000	General Education Elective	3	All	See Specific Course Listings
EUT 2750	Cooperative Work Experience II	1	#	EUT2700 or EUT2420A
<i>Term Total</i>		17		
<i>Total Semester Hrs - 2nd year</i>		30		

#See Yearly Schedule of Course Offerings

## ENGINEERING TECHNOLOGIES

### Program

#### Electro-Mechanical Technician

Electro-Mechanical Engineering Technicians combine knowledge of mechanical engineering technology with knowledge of electrical and electronic circuits to design, develop, test, and manufacture electronic and computer-controlled mechanical systems. Their work often overlaps that of both electrical and electronics engineering technicians and mechanical engineering technicians.

### Degree

#### Associate of Technical Study (A.T.S.)

Two-year full-time degree schedule; mixture of core technical courses along with basic mathematics, science, and communications classes; program can be completed on a part-time basis.

### Careers

Associate Electrical Engineer  
Field Representative  
Systems Designer  
Testing Technician

## STUDENT LEARNING OUTCOMES

### Graduates of this program will be able to:

- analyze, interpret and troubleshoot DC and AC electric circuits
- analyze and troubleshoot electro-mechanical circuits used in automation
- interpret electrical and mechanical diagrams and apply engineering principles to actual mechanical design situations
- use the appropriate tools and instruments to analyze electrical and mechanical systems
- select, construct, install, analyze and troubleshoot various DC and AC motor and power and control circuits used for various applications in industry
- create, update, and interpret mechanical and electrical drawings and details using appropriate CAD software
- program, interface and troubleshoot systems controlled by programmable logic controllers
- utilize data analysis techniques for process analysis and improvement
- demonstrate fundamental knowledge of CNC programming
- follow required mechanical, electrical and environmental safety procedures
- practice the 5S approach for visual order, organization, cleanliness and standardization
- work both independently and as an integral part of a technical team
- produce concise correspondence, reports, instructions, and proposals that will be effective in a technical work setting
- independently maintain and improve upon both technical skill level and knowledge of current technology
- communicate effectively with customers, suppliers, and co-workers

### Admission

#### Requirements

1. MTC Application for Admission and nonrefundable applicable fee.
2. Final high school transcript (or GED results) and college transcripts (if applicable).
3. Successful completion of the Basic Skills Assessment (COMPASS) and Technology Skills Test is required. Any College Foundation courses recommended by COMPASS results are also required.
4. COMPASS math score of 41 or above required to take the first algebra course in the engineering program

### Options

**Cooperative Education (or Co-op)** is a learning experience that integrates academic skills with workplace experience. Students in Engineering Technologies can earn college credit, make valuable professional contacts, and link their classroom studies to real-world workplace challenges. See the department dean or academic advisor for details.

## Electro-Mechanical Engineering Technology

Associate of Technical Studies Degree

Course No	Course Title	Quarter Credit Hours		Term(s) Offered	Pre-Requisites
<b>FIRST QUARTER (Fall 2011)</b>					
IET 1000A	Intro to Engineering	2		All	COMPASS or MTH0990A or MTH0990
TMT 1500B	Applied Technical Math I	5		F, W	COMPASS or MTH0990A or MTH0990
OIS 1240A	Computer Applications I	4		All	OIS 1200A or TST or OIS1200
EET 2300C	Basic Electrical Applications	3		All	None
EET 2200B	Digital Circuits I	3		F	None
<i>Term Total</i>		17			
<b>SECOND QUARTER (Winter 2012)</b>					
MET 1500A	Metrology	3		All	None
BPT 1300B	Reading Technical Prints	3		All	None
MET 1330B	Computer Aided Drafting (CAD) I	2		F, W	None
PHY 1300A	Applied Physics I	5		W, Sp	TMT1500B or TMT1100
TMT 1550A	Applied Technical Math II	5		W, Sp	COMPASS or TMT1500B or TMT1100
<i>Term Total</i>		18			
<b>THIRD QUARTER (Spring 2012)</b>					
MET 1340B	Computer Aided Drafting (CAD) II	4		W, Sp	MET1330B & BPT1300B or MET1000
PHY 1350A	Applied Physics II	5		Sp, Su	PHY1300A or PHY1100
ENG 1090A	English Composition I	4		All	OIS 1240A or conc or OIS1240
EET 1100B	Circuit Analysis I	3		Sp	EET2300C or EET1000
EET 1101A	Circuit Analysis I Lab	1		Sp	EET1100B co-requisite
<i>Term Total</i>		17			
<i>Total Quarter Hrs - 1st year</i>		52			
<b>FOURTH SEMESTER (Fall 2012)</b>					
Course No			Semester Credit Hours	Term(s) Offered	Pre-Requisites
EET 2000	Introduction to Programmable Controllers		3	F	EET1000 or conc or EET2300C
EET 1550	Circuit Analysis II		3	F	EET1500 or EET1100B & EET1101A
ENG 1100	English Composition II		3	All	ENG1000 or ENG 1090A
MET 2100	Fluid Mechanics		3	F	TMT1100 or conc or TMT1500B
GET 2100	Basic Problem Solving		1	F, Sp	None
MFT 2100	Computer Numerical Control		3	F	None
<i>Term Total</i>			16		
<b>FIFTH SEMESTER (Spring 2013)</b>					
GET 2200	Technical Writing		3	Sp	ENG1100 or ENG1100A
EET 2050	Advanced Programmable Controllers		2	Sp	EET2000 or EET2320B
MET 2300	Strength of Materials		3	Sp	PHY1100 or PHY1300
EET 2500	SCADA Systems		1	Sp	EET1000 or EET2300B
MET 2400	Machine Design		3	Sp	MET2400 or concurrent or MET2110
GET 2300	Engineering Statistics		2	Sp	TMT1150 or TMT1550A
GET 2700	Engineering Cooperative Work Experience OR		1	Sp	Greater than 40 cr hrs
GET 2800	Engineering Applied Project				
<i>Term Total</i>			16		
<i>Total Semester Hrs - 2nd year</i>			32		

## ENGINEERING TECHNOLOGIES CERTIFICATES

This page contains short synopsis statements pertaining to certificate programs within the Engineering Technologies area of MTC. To see each certificate's curriculum, please go to the appropriate page.

### **Credential Certificate**

Up to one year curriculum comprised of established core courses that provide direct training for a specific occupational competency; mixture of hands-on education and studies in basic engineering, mathematics, communications, physics, and/or CAD applications.

### **Admission Requirements**

1. MTC Application for Admission and nonrefundable applicable fee.
2. Final high school transcript (or GED results) and college transcripts (if applicable).
3. Successful completion of the Basic Skills Assessment (COMPASS) and Technology Skills Test is required. Any College Foundation courses suggested by COMPASS results are also required.
4. COMPASS math score of 41 or above required to take the first algebra course in the engineering program

## CERTIFICATE DESCRIPTIONS

### **Program**

#### **Alternative Energy Power Technician**

Prepares student to install and maintain wind turbines and solar panels and includes training in use of related equipment. This certificate can be earned on the way to completing the Alternative Energy ATS degree.

### **Program**

#### **CAD Specialist**

Prepares students to create engineering plans using CAD and Solid Edge software, and to interpret a variety of types of plans and drawings used in an engineering setting.

### **Program**

#### **Communications Technician**

Prepares students to install, repair, and maintain a wide variety of communications equipment and interconnectivity components in both internal network structures and outdoor settings.

### **Program**

#### **Industrial Maintenance Technician**

Students learn to utilize troubleshooting and electrical skills in an industrial repair environment and to effectively interface with other maintenance personnel.

### **Program**

#### **Wind and Solar Installation**

Prepares students with previous electrical experience or training to install and maintain wind turbines and solar panels.

## ALTERNATIVE ENERGY POWER TECHNICIAN

<sup>1</sup>Short-Term Technical Certificate

Course No	Course Title			Quarter Credit Hours	Terms Offered	Pre-Requisites
<b>FIRST QUARTER (Fall 2011)</b>						
TMT 1500B	Applied Technical Math I			5	F, W	COMPASS or MTH0990A
AET 1010A	Intro to Alternative Energy			4	F, W	None
OIS 1240A	Computer Applications I			4	All	OIS1200A or TST <sup>4</sup>
EET 2200B	Digital Circuits I			3	F	None
EET 2300C	Basic Electrical Applications			3	All	None
<b>SECOND QUARTER (Winter 2012)</b>						
AET 1050A	Turbine Technology I			4	W, Sp	EET2300C or Dept. Approval
PHY 1300A	Applied Physics I			5	W, Sp	TMT1500B
EET 2320B	Intro to Programmable Controllers			3	W, Sp	EET2300C
AET 2010A	Photovoltaic Technology			4	F, W	None
<b>THIRD QUARTER (Spring 2012)</b>						
AET 1070A	Turbine Technology II			4	Sp, Su	AET1050A
ENG 1090A	English Composition I			4	All	OIS1240A or conc
AET 2070A	PV Cell Installation Technology			4	Sp	AET2010A or Dept. Approval
EET 1100B	Circuit Analysis I			3	Sp	EET2300C
EET 1101A	Circuit Analysis I Lab			1	Sp	EET1100B co-requisite
<i>Credit Hour Total</i>				51		

OBR Operating Manual for Two-Year Colleges, page 392.05.

<sup>2</sup> TST = Technology Skills Test

## CAD SPECIALIST

<sup>1</sup>Short-Term Technical Certificate

Course No	Course Title			Quarter Credit Hours	Terms Offered	Pre-Requisites
<b>FIRST QUARTER (Fall 2011)</b>						
IET 1000A	Intro to Engineering			2	All	COMPASS or MTH0990A
BPT 1300B	Reading Technical Prints			3	All	None
TMT 1500B	Applied Technical Math I			5	F, W	COMPASS or MTH0990A
MET 1500A	Metrology			3	All	None
MET 1330B	Computer Aided Drafting (CAD) I			2	F, W	None
<b>SECOND QUARTER (Winter 2012)</b>						
MET 1340B	Computer Aided Drafting (CAD) II			4	W, Sp	MET1330B & BPT1300B
OIS 1240A	Computer Applications I			4	All	OIS1200A or TST <sup>2</sup>
ENG 1090A	English Composition I			4	All	OIS1240 or conc
MET 1060B	Basic Problem Solving			2	W, Sp	None
<b>THIRD QUARTER (Spring 2012)</b>						
MET 1400A	CAD Parametric Parts & Assembly Modeling			4	W, Sp	MET1340B
MET 2750A	Applied CAD Project			2	Sp	MET1400A or conc
<i>Credit Hour Total</i>				35		

OBR Operating Manual for Two-Year Colleges, page 392.05.

<sup>2</sup> TST = Technology Skills Test

## COMMUNICATIONS TECHNICIAN

### Technical Certificate

Course No	Course Title			Quarter Credit Hours	Terms Offered	Pre-Requisites
<b>FIRST QUARTER (Fall 2011)</b>						
TCT	1000A	Intro to Telecommunications		4	F	None
CIT	1300A	Information Technology Essentials/A+		4	F	OIS1200A or TST <sup>1</sup>
MGT	1430A	Customer Relations Management		2	F	None
OIS	1240A	Computer Applications I		4	All	OIS1200A or TST <sup>1</sup>
TMT	1500B	Applied Technical Math I		5	F, W	COMPASS or MTH0990A
<b>SECOND QUARTER (Winter 2012)</b>						
TCT	1200A	Introduction to Collocation		2	W	None
CIT	1500A	Supporting a Microsoft® Client OS/MCSE I		4	W	CIT1300A
TCT	1010A	Outside Plant I		4	W	TCT1000A
EET	2300C	Basic Electrical Applications		3	All	None
ENG	1090A	English Composition I		4	All	OIS1240A or conc
<b>THIRD QUARTER (Spring 2012)</b>						
TCT	1750A	Network Structure		4	F, Sp	None
TCT	1030A	Outside Plant II OR		4	Sp	TCT1010A
TCT	1040A	Broadband Delivery Technologies				
GEN	0000A	General Education Elective		4	All	<i>See specific course listings</i>
TCT	1660A	Technician Work Safety		3	Sp	None
TCT	1300A	Introduction to Switching Technology		4	Sp	None
<i>Credit Hour Total</i>				<b>55</b>		

TST = Technology Skills Test

## INDUSTRIAL MAINTENANCE TECHNICIAN

### <sup>1</sup>Short-Term Technical Certificate

Course No	Course Title			Quarter Credit Hours	Terms Offered	Pre-Requisites
<b>FIRST QUARTER (Fall 2011)</b>						
EET	2300C	Basic Electrical Applications		3	All	None
BPT	1300B	Reading Technical Prints		3	All	None
TMT	1500B	Applied Technical Math I		5	F, W	COMPASS or MTH0990A
MET	2400B	Fluid Mechanics		4	F	TMT1500B or concurrent
<b>SECOND QUARTER (Winter 2012)</b>						
MET	1500A	Metrology		3	All	None
EET	2600B	Robotics I		3	W	None
EET	2320B	Intro to Programmable Controllers		3	W, Sp	EET2300C
OIS	1240A	Computer Applications I		4	All	OIS1200A or TST <sup>2</sup>
<b>THIRD QUARTER (Spring 2012)</b>						
EET	2500B	Advanced Programmable Controllers		3	F, Sp	EET2320A
EET	2110B	SCADA Systems		2	Sp	EET2300C
EET	2020B	Electrical Distribution Systems		2	Sp	EET2300C
EET	2620A	Robotics II		3	Sp	EET2600B
MFT	1200A	Industrial Safety		4	All	None
<i>Credit Hour Total</i>				<b>42</b>		

OBR Operating Manual for Two-Year Colleges, page 392.05.

<sup>2</sup> TST = Technology Skills Test

## WIND AND SOLAR INSTALLATION

<sup>1</sup>Short-Term Technical Certificate

Course No	Course Title			Quarter Credit Hours	Terms Offered	Pre-Requisites
<b>FIRST QUARTER</b> (Fall 2011)						
TMT	1500B	Applied Technical Math I		5	F, W	COMPASS or MTH0990A
EET	2300C	Basic Electrical Applications		3	All	None
OIS	1240A	Computer Applications I		4	All	OIS1200A or TST <sup>2</sup>
AET	1010A	Intro to Alternative Energy		4	F, W	None
AET	2010A	Photovoltaic Technology		4	F, W	None
<b>SECOND QUARTER</b> (Winter 2012)						
AET	1050A	Turbine Technology I		4	W, Sp	EET2300C or Dept. Approval
AET	1070A	Turbine Technology II		4	Sp, Su	AET1050A
AET	2070A	PV Cell Installation Technology		4	Sp	AET2010A or Dept. Approval
AET	2050A	Alternative Energy Control Systems		4	W, Sp	AET1070A or AET2010A
<i>Credit Hour Total</i>				<b>36</b>		

OBR Operating Manual for Two-Year Colleges, page 392.05.

<sup>2</sup> TST = Technology Skills Test

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