

ELECTRONIC ENGINEERING TECHNOLOGY

Sylvania Campus
Science Technology Building (ST), Room 208
971-722-4159

www.pcc.edu/programs/electronic-engineering/

CAREER AND PROGRAM DESCRIPTION

Electronic Engineering Technology (EET) is concerned with the theory and practice of applied electronics engineering. Emphasis is placed on the practical application of engineering knowledge. To apply electronics engineering knowledge requires a thorough background in mathematics and science. EET graduates possess a combination of theoretical and practical understanding and require minimal on-the-job training to become productive.

Graduates of an Associate of Applied Science Degree program in EET are called electronic engineering technicians and find employment in circuits and systems testing, product development, prototype construction and testing, circuit and systems medication, systems operation and manufacturing. EET graduates are expected to have good communication skills and be capable of creative problem solving, working independently and in teams. They should have extensive knowledge of both the hardware and software of electronic systems.

Employers of EET engineering technicians include research and development laboratories, electronic equipment manufacturers, public utilities, colleges and universities, government agencies, medical laboratories and hospitals, electronic equipment distributors, semiconductor manufacturers and manufacturing and processing industries that use electronic control equipment and others.

Students can complete the EET degree and/or the EET options in Biomedical Engineering Technology, Wireless and Data Communications, Renewable Energy Systems, and Mechatronics/Automation/Robotics Engineering Technology. Following is an outline of the EET degrees/certificates.

DEGREES AND CERTIFICATES OFFERED

Associate of Applied Science Degree

Electronic Engineering Technology

Electronic Engineering Technology:

Biomedical Engineering Technology Option

Electronic Engineering Technology: Mechatronics/Automation/Robotics Engineering Technology Option

Electronic Engineering Technology:

Renewable Energy Systems Option

Electronic Engineering Technology: Wireless and

Data Communications Engineering Technology Option

One-Year Certificate

Electronic Engineering Technology

Less Than One-Year: Career Pathway Certificate

Renewable Energy Systems

PREREQUISITES AND REQUIREMENTS

All students must have an advising interview with an EET advisor. Basic computer skills in the Windows operating system, word processing and spreadsheets are required. Prerequisites and requirements vary depending upon the degree or certificate.

Electronic Engineering Technology AAS Degree

1. Completion of WR 121
2. Placement into MTH 111 or higher

Biomedical Engineering Technology AAS Degree

1. Completion of WR 121
2. Placement into MTH 111 or higher
3. Completion of any medical terminology course 3 credits or higher.
4. Completion of (BI 121 & 122) or (BI 231, 232, 233)

Mechatronics/Automation/Robotic Engineering Technology AAS degree

1. Completion of WR 121
2. Placement into MTH 111 or higher
3. Completion of CS 161

Renewable Energy Systems AAS Degree

1. Completion of WR 121
2. Placement into MTH 111 or higher

Wireless and Data Communications Engineering Technology AAS Degree

1. Completion of WR 121
2. Placement into MTH 111 or higher

Electronic Engineering Technology Certificate

1. Completion of WR 121
2. Placement into MTH 111 or higher

Renewable Energy Systems Certificate

1. Completion of WR 121
2. Placement into MTH 111 or higher

Full-time and Part-Time EET students: EET is a limited enrollment program for students seeking a degree. A day program starts in the fall and a late afternoon/evening program starts in the winter.

Students can transfer classes from the EET degree into any BSEET. The Electronic Engineering AAS as well as all other degrees and certificates within the program fully transfer into Oregon Institute of Technology's BSEET degree. Please check with the department for details.

Job-upgrade students: Students who want to upgrade their job skills must meet individual course prerequisites and complete an advising interview with an EET advisor prior to enrollment. Admission is granted on a space available basis after the needs of the degree/certificate seeking full-time and part-time students are met.

ELECTRONIC ENGINEERING TECHNOLOGY AAS DEGREE

Minimum 100 credits. Students must also meet Associate Degree Comprehensive Requirements and Associate of Applied Science Requirements. Students must complete a total of sixteen credits of General Education. Some courses specified within the program may be used as General Education. Students should consult with program advisors for course planning.

Electronic Engineering Degree Credit Summary

EET	64
PHY	12
MTH	14
Remaining General Education	6
CS	4
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Credit Total	100

COURSE OF STUDY

The coursework listed below is required. The following is an example of a term-by-term breakdown.

First Term

EET 101	Intro to Electronic Testing Equipment/Soldering/Tools	1
EET 111	Electrical Circuit Analysis I	5
EET 121	Digital Systems I	3
MTH 111	College Algebra*	5

Second Term

EET 112	Electrical Circuit Analysis II	5
EET 122	Digital Systems II	4
EET 188	Industrial Safety	1
MTH 112	Elementary Functions*	5
General Education		3

Third Term

CS 133U	Introduction to C ¹	4
EET 113	Electrical Power	5
EET 123	Digital Systems III	4
EET 178	PC Architecture for Technicians	4

Fourth Term

EET 221	Semiconductor Devices and Circuits	5
EET 241	Microcomputer Systems	4
MTH 243	Statistics I* ²	4
PHY 201	General Physics* ³	4

Fifth Term

EET 222	Operational Amplifier Circuits	5
EET 242	Microcontroller Systems	4
EET 254	EET Seminar	1
EET 272	Motors and Generators	3
PHY 202	General Physics* ⁴	4

Sixth Term

EET 223	RF Communications Circuits	5
EET 273	Electronic Control Systems	3
EET 256	Electronic Capstone Project	2
or		
EET 280A	CE: Electronics Engineering Technology	(2)
PHY 203	General Physics* ⁵	4
General Education		3

*Could be used to as General Education

Recommended General Education:

SP 111, Public Speaking is required by OIT (Arts and Letters).

¹CS 161 may be substituted (required by OIT)

²MTH 251 or MTH 252 may be substituted

³PHY 211 may be substituted

⁴PHY 212 may be substituted

⁵PHY 213 may be substituted

BIOMEDICAL ENGINEERING TECHNOLOGY AAS DEGREE

Minimum 102 credits. Students must also meet Associate Degree Comprehensive Requirements and Associate of Applied Science Requirements. Students must complete a total of sixteen credits of General Education. Some courses specified within the program may be used as General Education. Students should consult with program advisors for course planning.

Biomedical Engineering Technology Degree Credit Summary

EET	78
MTH	10
Remaining General Education	6
CIS	4
CS	4
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Credit Total	102

COURSE OF STUDY

The coursework listed below is required. The following is an example of a term-by-term breakdown.

First Term

EET 101	Intro to Electronic Testing Equipment Soldering/Tools	1
EET 111	Electric Circuit Analysis I	5
EET 121	Digital Systems I	3
MTH 111	College Algebra*	5
General Education		3

Second Term

CIS 179	Data Communication Concepts I	4
EET 112	Electric Circuit Analysis II	5
EET 122	Digital Systems II	4
EET 188	Industrial Safety	1
MTH 112	Elementary Functions*	5

Third Term

CS 133U	Introduction to C ¹	4
EET 113	Electrical Power	5
EET 123	Digital Systems III	4
EET 178	PC Architecture for Technicians	4

Fourth Term

EET 221	Semiconductor Devices and Circuits	5
EET 241	Microcomputer Systems	4
or		
CIS 278	Data Communication Concepts II	(4)
EET 260	Biomedical Equipment I	4
General Education		3

Fifth Term

EET 222	OP-Amp Circuits	5
EET 242	Microcontroller Systems	4
EET 254	EET Seminar	1
EET 261	Biomedical Equipment II	4
EET 280C	CE: BMET Practicum	4

Sixth Term

EET 223	RF Communications Circuits	5
EET 273	Electronic Control Systems	3
EET 280C	CE: BMET Practicum	7

*Could be used as General Education

¹CS 161 may be substituted (required by OIT)

Recommended General Education:

SP 111 Public Speaking is required by OIT (Arts and Letters).

PHL 205 Biomedical Ethics (Social Science)

MECHATRONICS/AUTOMATION/ROBOTICS ENGINEERING TECHNOLOGY AAS DEGREE

Minimum 108 credits. Students must also meet Associate Degree Comprehensive Requirements and Associate of Applied Science Requirements. Students must complete a total of sixteen credits of General Education. Some courses specified within the program may be used as General Education. Students should consult with program advisors for course planning.

Mechatronics/Automation/Robotics Engineering Technology Degree Credit Summary

EET	60
PHY	12
MTH	10
CMET	3
CS	4
ELT	6
MARET Degree Electives	3
MCH	4
Remaining General Education	6
Credit Total 108	

COURSE OF STUDY

The coursework listed below is required. The following is an example of a term-by-term breakdown.

First Term

EET 101	Intro to Electronic Testing Equipment Soldering/Tools	1
EET 111	Electrical Circuit Analysis I	5
EET 121	Digital Systems I	3
MTH 111	College Algebra*	5
PHY 201	General Physics* ¹	4

Second Term

EET 112	Electrical Circuit Analysis II	5
EET 122	Digital Systems II	4
EET 188	Industrial Safety	1
MTH 112	Elementary Functions*	5
PHY 202	General Physics* ²	4

Third Term

EET 113	Electrical Power	5
EET 123	Digital Systems III	4
PHY 203	General Physics* ³	4
General Education		3

Fourth Term

CS 162	Computer Science II*	4
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Fifth Term

CMET 213	Fluid Mechanics	3
EET 221	Semiconductor Devices and Circuits	5
EET 241	Microcomputer Systems	4
ELT 125	Basic PLC (PC Based)	2
MCH 121	Manufacturing Processes I	4

Sixth Term

EET 222	Operational Amplifier Circuits	5
EET 242	Microcontroller Systems	4
EET 254	EET Seminar	1
EET 272	Motors and Generators	3
ELT 126	Intermediate PLC (PC Based)	2

Seventh Term

EET 223	RF Communication Circuits	5
EET 273	Electronic Control Systems	3
EET 256	Electronic Capstone Project	2
or		
EET 280A	CE: Electronic Engineering Technology	(2)

ELT 225	Advanced PLC (PC Based)	2
MARET Degree Electives		3
General Education		3

*Could be used as General Education

Mechatronics/Automation/Robotics Engineering Technology

Degree Electives

CMET 113	Engineering Tech Graphics	3
DRF 126	Introduction to AutoCAD	3
DRF 270	SolidWorks Fundamentals	3
EET 178	PC Architecture for Technicians	4
MCH 158	Project Machine Technology II	3
MT 101	Introduction to Semiconductor Manufacturing	1
MT 102	Introduction to Semiconductor Devices	1
MT 104	Introduction to Solar Voltaic Processing	1
MT 222	Quality Control Methods In Manufacturing	3

Please check with the department for advice with electives for the following areas: general manufacturing, semiconductor/solar manufacturing, etc.

RENEWABLE ENERGY SYSTEMS AAS DEGREE

Minimum 107 credits. Students must also meet Associate Degree Comprehensive Requirements and Associate of Applied Science Requirements. Students must complete a total of sixteen credits of General Education. Some courses specified within the program may be used as General Education. Students should consult with program advisors for course planning.

Renewable Energy Systems Degree Credit Summary

EET	67
MTH	10
Remaining General Education	6
PHY	8
ELT	6
CS	4
CMET	3
RES Program Electives	3
Credit Total 107	

COURSE OF STUDY

The coursework listed below is required. The following is an example of a term-by-term breakdown.

First Term

EET 101	Intro to Electronic Testing Equipment/Soldering/Tools	1
EET 110	Introduction to Renewable Energy ¹	3
EET 111	Electric Circuit Analysis I	5
EET 121	Digital Systems I	3
MTH 111	College Algebra*	5

Second Term

EET 112	Electric Circuit Analysis II	5
EET 122	Digital Systems II	4
EET 188	Industrial Safety	1
MTH 112	Elementary Functions*	5
PHY 201	General Physics* ²	4

Third Term

CS	133U	Introduction to C ⁴	4
EET	113	Electrical Power	5
EET	123	Digital Systems III	4
EET	178	PC Architecture for Technicians	4

Fourth Term

PHY	202	General Physics* ³	4
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Fifth Term

CMET	213	Fluid Mechanics	3
EET	221	Semiconductor Devices and Circuits	5
EET	241	Microcomputer Systems	4
ELT	125	Basic PLC (PC Based)	2
General Education			3

Sixth Term

EET	222	Operational Amplifier Circuits	5
EET	242	Microcontroller Systems	4
EET	254	EET Seminar	1
EET	272	Motors and Generators	3
ELT	126	Intermediate PLC (PC Based)	2
General Education			3

Seventh Term

EET	223	RF Communication Circuits	5
EET	273	Electronic Control Systems	3
EET	256	Electronic Capstone Project	2
or			
EET	280A	CE: Electronic Engineering Tech	(2)
ELT	225	Advanced PLC (PC Based)	2
RES Program Electives			3

*Could be used as General Education

¹REE 201 of OIT can substitute; RET 101/102 of CGCC

²PHY 211 may be substituted

³PHY 212 may be substituted

⁴CS 161 can substitute (required by OIT)

Please check with the department for other course substitution or advice on choosing the RES electives and problems with enrollment into ELT courses.

Renewable Energy Systems Program Electives

Wind Power ⁵ :			
EET	269	Wind Mechanics	3
Solar Manufacturing:			
MT	101	Introduction to Semiconductor Manufacturing	1
MT	102	Introduction to Semiconductor Devices	1
MT	104	Introduction to Solar Voltaic Processing	1

⁵RET 122 of CGCC can be used as an elective

WIRELESS AND DATA COMMUNICATIONS ENGINEERING TECHNOLOGY AAS DEGREE

Minimum 98 credits. Students must also meet Associate Degree Comprehensive Requirements and Associate of Applied Science Requirements. Students must complete a total of sixteen credits of General Education. Some courses specified within the program may be used as General Education. Students should consult with program advisors for course planning.

Wireless and Data Communications Engineering Technology**Degree Credit Summary**

EET	58
MTH	14
CIS	16
CS	4
<u>Remaining General Education</u>	
	6
Credit Total 98	

COURSE OF STUDY

The coursework listed below is required. The following is an example of a term-by-term breakdown.

First Term

EET	101	Intro to Electronic Testing Equipment Soldering/Tools	1
EET	111	Electric Circuit Analysis I	5
EET	121	Digital Systems I	3
MTH	111	College Algebra*	5
General Education			3

Second Term

EET	112	Electric Circuit Analysis II	5
EET	122	Digital Systems II	4
EET	188	Industrial Safety	1
MTH	112	Elementary Functions*	5

Third Term

CS	133U	Introduction to C ¹	4
EET	113	Electric Power	5
EET	123	Digital Systems III	4
EET	178	PC Architecture for Technicians	4

Fourth Term

EET	221	Semiconductor Devices and Circuits	5
EET	241	Microcomputer Systems	4
MTH	243	Statistics I* ²	4
General Education			3

Fifth Term

CIS	179	Data Communication Concepts I	4
CIS	188	Introduction to Wireless Network	4
EET	222	Op-Amp Circuits	5
EET	242	Microcontroller Systems	4
EET	254	EET Seminar	1

Sixth Term

CIS	189	Wireless Security	4
CIS	278	Data Communication Concepts II	4
EET	223	RF Communications Circuits	5
EET	256	Electronic Capstone Project	2
or			
EET	280A	CE: Electronic Engineering Technology	(2)

*Could be used as General Education

Recommended General Education:

SP 111 Public Speaking is required by OIT (Arts and Letters).

¹CS 161 may be substituted (required by OIT)

²MTH 251 or MTH 252 may be substituted

ELECTRONIC ENGINEERING TECHNOLOGY ONE-YEAR CERTIFICATE

Minimum 49 credits. Students must meet certificate requirements. The Electronic Engineering Technology Certificate is a related certificate. All courses are contained in the Electronic Engineering Technology AAS Degree.

Electronic Engineering Technology Certificate Credit Summary

EET	32
MTH	10
CS	4
General Education	3
Credit Total 49	

COURSE OF STUDY

The coursework listed below is required. The following is an example of a term-by-term breakdown.

First Term

EET	101	Intro to Electronic Testing Equipment Soldering/Tools	1
EET	111	Electrical Circuit Analysis I	5
EET	121	Digital Systems I	3
MTH	111	College Algebra	5

Second Term

EET	112	Electrical Circuit Analysis II	5
EET	122	Digital Systems II	4
EET	188	Industrial Safety	1
MTH	112	Elementary Functions	5
General Education			3

Third Term

CS	133U	Introduction to C ¹	4
EET	113	Electrical Power	5
EET	123	Digital Systems III	4
EET	178	PC Architecture for Technicians	4

¹CS 161 may be substituted (required by OIT)

RENEWABLE ENERGY SYSTEMS: CAREER PATHWAY CERTIFICATE

Minimum 42 credits. Students must meet certificate requirements. The Renewable Energy Systems Certificate is a Career Pathway. All courses are contained in the Renewable Energy Systems AAS Degree.

Renewable Energy Systems Certificate Credit Summary

EET	27
ELT	2
MTH	10
RES Program Electives	3
Credit Total 42	

COURSE OF STUDY

The coursework listed below is required. The following is an example of a term-by-term breakdown.

First Term

EET	101	Intro to Electronic Testing Equipment Soldering/Tools	1
EET	110	Intro to Renewable Energy ¹	3
EET	111	Electric Circuit Analysis I	5
EET	121	Digital Systems I	3
MTH	111	College Algebra	5

Second Term

EET	112	Electric Circuit Analysis II	5
EET	122	Digital Systems II	4
EET	188	Industrial Safety	1
ELT	125	Basic PLC (PC Based)	2
MTH	112	Elementary Functions	5

Third Term

EET	113	Electrical Power	5
RES Program Electives			3

¹REE 201 at OIT can substitute for EET 110

Renewable Energy Systems Program Electives

Wind Power ² :			
EET	269	Wind Mechanics	3
Solar Manufacturing:			
MT	101	Introduction to Semiconductor Manufacturing	1
MT	102	Introduction to Semiconductor Devices	1
MT	104	Introduction to Solar Voltaic Processing	1

²RET 122 of CGCC can be used as an elective

COURSE DESCRIPTIONS

EET 101 Introduction to Electronic Testing Equipment/Soldering/Tools 1.00 Introduces the operation and use of various types of equipment and tools used in electronic technology including; oscilloscope, function generator, DMM, and voltage source, calculator, and EXCEL. Also uses software controls to obtain and analyze data available on this equipment. Use Pspice to perform simulation. Prerequisite: Placement in WR 115. Prerequisite/ concurrent: MTH 95. Audit available.

EET 110 Introduction to Renewable Energy 3.00 Introduction to sustainability and renewable energy (RE) sources and technologies including PV and solar thermal, geothermal, biomass, biodiesel, fuel cell, wind, hydro, ocean wave, photovoltaic, etc. Also covers RE environmental issues, demand and distribution management, and green and RE career opportunities, etc. Recommended: Placement in WR 115 and MTH 95. Audit available.

EET 111 Electrical Circuit Analysis I 5.00 Introduces International System of Units, engineering notation and prefixes, definitions of current, voltage, resistance, power, work and efficiency. DC circuits: Ohm's and Kirchoff's Laws; DC resistive networks including Thevenin and Norton equivalent circuits; node voltage and mesh current analysis methods; Includes a 3-hour per week laboratory session. Prerequisite: WR 115 or equivalent placement; prerequisite/concurrent MTH 111; prerequisite/concurrent: EET 101 or department approval. Audit available.

EET 112 Electrical Circuit Analysis II 5.00 Covers Capacitance; Inductance; RC/RL transient response; sinusoidal waveforms; reactance and impedance; AC power. Phasor analysis of RLC circuits; node voltage and mesh current analysis; superposition, Thevenin's and Norton's network theorems. Includes a 3-hour per week laboratory. Prerequisite: EET 111. Prerequisite/concurrent: MTH 112. Audit available.

EET 113 Electrical Power 5.00 Covers ac power, series and parallel resonant circuits, Q and selectivity, RL and RC filters, decibels, transfer functions and Bode diagrams, transformers, three phase power distribution, introduction to motors/ generators/ motor control. Fourier series and transform applied to circuit analysis. Prerequisite: EET 112. Audit available.

EET 121 Digital Systems I 3.00 The first course in digital electronics covering basic electrical concepts, number systems, combinational gates (AND, OR, NOT, NAND, NOR, and XOR), electrical characteristics and internal structures of TTL gates, Boolean algebra, Karnaugh mapping, and use of MSI devices including adders, decoders, encoders, multiplexers and demultiplexers. Includes a 3 hour per week laboratory. Prerequisite: MTH 95; placement into WR 115. Audit available.

EET 122 Digital Systems II 4.00 Second course in digital electronics presents sequential circuit elements (latches and D/JK flip-flops) with applications including counters, registers, and shift registers. Sequential network analysis and synthesis are covered including the use of state tables and state diagrams. Introduces sampling and the Nyquist Sampling Theorem including introductory coverage of analog-to-digital converters (ADC) and digital-to-analog converters (DAC). Includes a 3-hour per week laboratory. Prerequisite: EET 121 Audit available.

EET 123 Digital Systems III 4.00 Third course in digital electronics continues prior coverage of digital-to-analog converters (DACs) and analog-to-digital converters (ADCs) with additional conversion topologies, a more detailed analysis of the Nyquist sampling theorem, additional coverage of programmable logic devices (PLDs), and the implementation of sequential state machines. Includes a 3-hour per week laboratory. Prerequisite: EET 122 Audit available.

EET 178 PC Architecture for Technicians 4.00 Covers the architecture, assembly, and disassembly of IBM PC compatible computers. Includes basic operational concepts and identification, removal/installation, and configuration of motherboards, microprocessors, memory, power supplies, disk drives, video adapter boards, I/O boards and modems. Servicing hardware, software, and documentation will be reviewed. Includes a 3-hour per week laboratory. Prerequisite: EET 111. Audit available.

EET 188 Industrial Safety 1.00 Safety practices in the electronics industry. Covers: electrical safety, HAZMAT, flammable and combustible liquids, safe handling of electronic components in the manufacturing environment including ESD control, product testing/certification, bloodborne pathogens, fire safety, laser and radiation safety. Prerequisites: EET 111. Audit available.

EET 221 Semiconductor Devices and Circuits 5.00 Introduction to semiconductor devices. Characteristics and biasing of diodes and transistors. Design and analysis of circuits using diodes, bipolar transistors, and field effect transistors. Application of transistors as amplifiers and switches. A 3-hour per week laboratory includes the application of computer tools in circuit design, evaluation, and analysis. Prerequisite: EET 113, MTH 112. Audit available.

EET 222 Operational Amplifier Circuits 5.00 Characteristics and applications of operational amplifiers (op-amps). Design and analysis of op-amp amplifiers, comparators, voltage and current regulators, summers, integrators, and differentiators. Frequency response of op-amp circuits. Applications of the op-amp in power supplies and control systems. A 3-hour per week laboratory includes project design, evaluation, and documentation. Use of computer tools. Prerequisites: EET 221 Audit available.

EET 223 RF Communications Circuits 5.00 Transistor and diode AC models and equivalent circuits. Design and analysis of multistage amplifiers and RF communications systems. Frequency response and Bode plots. A 3-hour per week laboratory includes measuring and analyzing the performance of transistor circuits in RF communications systems. Prerequisite: EET 221 Audit available.

EET 241 Microcomputer Systems I 4.00 Introduces X86 assembly language programming for the IBM PC compatible computer including the use of BIOS and DOS function calls and the use of procedures. Structured programming techniques will be used to write programs and accept keyboard input and create displayed results. Appropriate program testing and debugging methods will be emphasized. Prerequisites: EET 122 and either CS 133U or CS 161. Audit available.

EET 242 Microcontroller Systems 4.00 Introduces the student to popular 8051 microcontroller. Topics include the hardware, software, and interfacing of the Intel 8051 microcontroller. The emphasis is on interfacing the 8051 to real-world devices such as switches, displays, motors, and A/D converters, through assembly language and possibly C language programming. Robotics projects included. Prerequisite: CS 133U; and EET 122. Audit available.

EET 254 Electronic Engineering Technology Seminar 1.00 Topics covered include information on finding employment in the electronics industry, writing resumes and cover letters, and practice interviewing. Prerequisite: EET 113. Audit available.

EET 255 Industrial Control Systems 4.00 Introduces electronic feedback control systems using analog and digital methods. Topics include temperature control, motor speed control, and servo systems. Lab exercises will include the interfacing and programming of a microcontroller IC. Prerequisite: EET 241 or EET 242. Prerequisite or concurrent: EET 222. Audit available.

EET 256 Capstone Project 2.00 Students learn how to work as teams on instructor approved projects. Students can choose projects in electronics, renewable energy systems, wireless/data communications and automation/robotics. Typical project activities include the research and design phase, the execution phase, and the project report phase. A written report and oral presentation is required. Prerequisite: EET 241 or EET 242; and EET 222 Audit available.

EET 260 Biomedical Equipment I 4.00 Introduction to the fundamentals of medical instrumentation, bioelectric signals and electrodes, recording systems, biomedical recorders, patient monitoring systems, arrhythmia and ambulatory monitoring instruments, fetal monitoring instruments, biomedical telemetry and telemedicine, oximeters, blood flowmeter, cardiac output measurement, pulmonary function analyzers, laboratory equipment, audiometers, and patient safety. Prerequisites: MP 111, BI 122 or BI 233, EET 113, EET 123 or instructor permission. Prerequisite/concurrent: EET 221. Audit available.

EET 261 Biomedical Equipment II 4.00 Introduction to modern imaging systems, pacemakers, defibrillators, surgical equipment, lasers, physiotherapy and electrotherapy equipment, hemodialysis machines, lithotriptors, anesthesia machines, ventilators, radiotherapy equipment and automated drug delivery systems. Prerequisites: EET 260. Audit available.

EET 269 Wind Mechanics 3.00 Introduces mechanical systems that make up subsystems of today's wind turbine. Basic hydraulics and pneumatics, wind power production as well as other wind power related topics will be covered. Prerequisite: Placement into WR 115. Prerequisite/concurrent: EET 113. Audit available.

EET 271 Robotics 4.00 Introduces foundational concepts in building and programming robots. Programming microcontrollers and configurations of electronic components to enable robotic activity. Projects with operation/maintenance/troubleshooting/repair of industrial robots or using robotics training modules will also be employed. Prerequisites/Concurrent: EET 255, EET 242. Audit available.

EET 272 Motors and Generators 3.00 Covers operating principles and characteristics of AC and DC motors and generators. Single-phase, split-phase, and three phase AC motors. Synchronous and asynchronous generators. Control devices and control circuits, ladder diagrams and PLC's. Prerequisite: EET 221. Audit available.

EET 273 Electronic Control Systems 3.00 Covers electronic control systems, open-loop and closed-loop, proportional, integral, derivative, PI, and PID control modes, power control devices, relays, transistors, thyristors, and sensors. Topics include temperature control, DC motor control, and stepper motor control. Lab exercises include temperature control and motor control circuits. Prerequisite: EET 222. Audit available.

EET 280A Cooperative Education: Electronics Engineering Technology For students employed in an approved cooperative education position within a local electronic industry. Experiences are closely aligned with the student's on-campus educational program. Department permission required.

EET 280C Cooperative Education: BMET Practicum Provides clinical education experience in a biomedical department with a hospital, clinic or other medical facility, a medical equipment repair/manufacturing company, or a laboratory. Variable credit: 30 hours of work experience equals one credit. Prerequisites: Department approval; EET 260 Corequisite: EET 261.