Electric Utility Substation and Relay Technology (A50510)

The Electric Utility Substation and Relay Technology curriculum provides the skills to maintain high voltage equipment and protective systems for the electric utility transmission system. Training in operation and maintenance of critical infrastructure associated with the transmission grid is included.

Courses are designed to develop student understanding of maintenance and troubleshooting on transmission equipment, including three phase power theory, protective relaying, power transformers, voltage regulators, capacitors, and power circuit breakers common to electric utility and numerous other industries.

Graduates should qualify for entry-level employment in electric utility, renewable energy, and industrial facilities as technicians who diagnose and service equipment and components used for electrical power transmission.

COURSE REQUIREMENTS

Richmond Community College provides day and evening course sequences for selected programs to enable students to better plan what courses to take to reach their educational goals. However, given the continued increase in the use of technology in instruction and increasing student demand for distance learning courses, the College may offer hybrid, online, web-based and information highway courses in place of traditional courses in any course sequence that is listed. Therefore, students should be aware of this possibility and prepare themselves to successfully function in a hybrid, online, web-based, or information highway course.

				Class	Lab	Work/ Clinical	Credit
A. General Education Courses							
1. Required Courses							
ECO	251	Principles of Microeconomics		3	0	0	3
or							
ECO	252	Principles of Macroeconomics		3	0	0	3
ENG	111	Writing and Inquiry		3	0	0	3
ENG	112	Writing/Research in the Disciplines		3	0	0	3
MAT	171	Precalculus Algebra		3	2	0	4
		Humanities/Fine Arts Elective*		3	0	0	3
B. Major Courses							
1. Core Courses							
To receive a degree, diploma or certificate from RCC, a student must have a grade of "C" or better in all core courses for the program of study.							
EUS	110	Intro to Electric Utility Industry		3	3	0	4
EUS	130	Electric Utility Print Reading		3	2	0	4
EUS	210	Large High Voltage Power Transformer I		2	3	0	3
EUS	215	Large High Voltage Power Transformer II		2	3	0	3
EUS	220	High Voltage Power Circuit Breakers		2	3	0	3
EUS	230	Electric Utility Protective Relaying I		2	3	0	3
EUS	235	Electric Utility Protective Relaying II		2	3	0	3
EUS	240	Substation Ancillary Systems		2	3	0	3
EUS	260	Capstone & Case Studies in EUSRT		0	4	0	2

2.	Other Major Courses					
	ELC	112	DC/AC Electricity	3	6	0	5
	or						
	ELC	131	Circuit Analysis I	3	3	0	4
	ELC	128	Introduction to PLC	2	3	0	3
	ELN	229	Industrial Electronics	3	3	0	4
	EUS	225	Electrical Utility Safety & Human Perf.	2	0	0	2
	EUS	255	Electrical Utility Troubleshooting	1	3	0	2
	MAT	172	Precalculus Trigonometry	3	2	0	4
	PCI	172	SCADA Systems	3	3	0	4
Other Major Choice (1 course required)							
	ELC	117	Motors and Controls	2	6	0	4
	or						
	ELN	231	Industrial Controls	2	3	0	3
C. Other Required Courses							
	ACA	122	College Transfer Success	0	2	0	1

Total Credit Hours **71-73**

*Approved Electives are listed on the page before the Course Descriptions.

SEMESTER SCHEDULE
ELECTRIC UTILITY SUBSTATION AND RELAY TECHNOLOGY

			Class	Lab	Work/ Clinical	Credit
First Year – Fall Semester						
ACA	122	College Transfer Success	0	2	0	1
ECO	251	Principles of Microeconomics	3	0	0	3
or						
ECO	252	Principles of Macroeconomics	3	0	0	3
ELC	131	Circuit Analysis I	3	3	0	4
or						
ELC	112	DC/AC Electricity	3	6	0	5
ENG	111	Writing and Inquiry	3	0	0	3
EUS	110	Intro to Electric Utility Industry	3	3	0	4
MAT	171	Precalculus Algebra	3	2	0	4
			15	10-13	0	19-20
First Year – Spring Semester						
ELC	117	Motors and Controls	2	6	0	4
or						
ELN	231	Industrial Controls	2	3	0	3
ENG	112	Writing/Research in the Disciplines	3	0	0	3
EUS	130	Electric Utility Print Reading	3	2	0	4

EUS	210	Large High Voltage Power Transformers I	2	3	0	3
MAT	172	Precalculus Trigonometry	3	2	0	4
			13	10-13	0	17-18
		Second Year – Fall Semester				
ELN	229	Industrial Electronics	3	3	0	4
EUS	215	Large High Voltage Power Transformers II	2	3	0	3
EUS	225	Electric Utility Safety & Human Performance	2	0	0	2
EUS	230	Electric Utility Protective Relaying I	2	3	0	3
EUS	240	Substation Ancillary Systems	2	3	0	3
		Humanities/Fine Arts Elective*	3	0	0	3
			14	12	0	18
		Second Year – Spring Semester				
ELC	128	Intro to PLC	2	3	0	3
EUS	220	High Voltage Power Circuit Breakers	2	3	0	3
EUS	235	Electric Utility Protective Relaying II	2	3	0	3
EUS	255	Electric Utility Troubleshooting	1	3	0	2
EUS	260	Caps & Case Stud in EUSRT	0	4	0	2
PCI	172	SCADA Systems	3	3	0	4
			10	19	0	17

Total Credit Hours **71-73**

*Approved Electives are listed on the page before the Course Descriptions.

EUSRT: BASIC POWER SYSTEMS (CERTIFICATE) (C50510)
COURSE REQUIREMENTS

			Class	**Lab**	**Work/ Clinical**	**Credit**
ELC	131	Circuit Analysis I	3	3	0	4
EUS	110	Intro to Electric Utility Industry	3	3	0	4
EUS	130	Electric Utility Print Reading	3	2	0	4
EUS	210	Large High Voltage Power Transformers I	2	3	0	3
			11	11	0	15

Total Credit Hours **15**

ELECTRIC UTILITY TRANSFORMER TEST SPECIALIST (DIPLOMA) (D50510)
COURSE REQUIREMENTS

				Class	Lab	Work/ Clinical	Credit
A. General Education Courses							
1. Required Courses							
ENG	111	Writing and Inquiry		3	0	0	3
MAT	171	Precalculus Algebra		3	2	0	4
		*Humanities/Fine Arts Elective		3	0	0	3
B. Major Courses							
1. Core Courses							
To receive a degree, diploma or certificate from RCC, a student must have a grade of "C" or better in all core courses for the program of study.							
EUS	110	Intro to Electric Utility Industry		3	3	0	4
EUS	130	Electric Utility Print Reading		3	2	0	4
EUS	210	Large High Voltage Power Trans I		2	3	0	3
EUS	215	Large High Voltage Power Trans II		2	3	0	3
EUS	240	Substation Ancillary Systems		2	3	0	3
2. Other Major Courses							
ELC	112	DC/AC Electricity		3	6	0	5
or							
ELC	131	Circuit Analysis I		3	3	0	4
ELC	117	Motors and Controls		2	6	0	4
or							
ELN	231	Industrial Controls		2	3	0	3
EUS	225	Electric Utility Safety & Human Perfor.		2	0	0	2
C. Other Required Courses							
ACA	122	College Transfer Success		0	2	0	1
		Total Credit Hours				**37-39**	

*Approved Humanities/Fine Arts Electives are listed on the page before the Course Descriptions.

SEMESTER SCHEDULE
ELECTRIC UTILITY TRANSFORMER TEST SPECIALIST (DIPLOMA) (D50510)

			Class	Lab	Work/ Clinical	Credit
First Year – Fall Semester						
ACA	122	College Transfer Success	0	2	0	1
ELC	112	DC/AC Electricity	3	6	0	5
or						
ELC	131	Circuit Analysis I	3	3	0	4
EUS	110	Intro to Electric Utility Industry	3	3	0	4
			6	8-11	0	9-10

		First Year – Spring Semester				
ELC	117	Motors and Controls	2	6	0	4
or						
ELN	231	Industrial Controls	2	3	0	3
EUS	130	Electric Utility Print Reading	3	2	0	4
EUS	210	Large High Voltage Power Transformers I	2	3	0	3
		Humanities/Fine Arts Elective*	3	0	0	3
			10	8-11	0	13-14
		First Year – Summer Semester				
EUS	215	Large High Voltage Power Transformers II	2	3	0	3
EUS	240	Substation Ancillary Systems	2	3	0	3
			4	6	0	6
		Second Year – Fall Semester				
ENG	111	Writing and Inquiry	3	0	0	3
EUS	225	Electric Util. Safety & Human Performance	2	0	0	2
MAT	171	Precalculus	3	2	0	4
			8	2	0	9
		Total Credit Hours			**37-39**	