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 will develop an understanding of maintenance/troubleshooting on transmission equipment. Courses include theory in three phase power, protective relaying, power transformers, voltage regulators, capacitors, and power circuit breakers. The skills apply to the electric utility industry and numerous other industries.

Graduates should qualify for entry-level employment in the electric utility industry and industrial power facilities. Employment opportunities include: control systems, instrumentation and control in general industry, electric utility industry, green energy markets, or positions with equipment related to 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						
	DFT	151	Computer-Aided Drafting I	2	3	0	3
	ELC	128	Introduction to PLC	2	3	0	3
	ELC	131	Circuit Analysis I	3	3	0	4
	or						
	ELC	112	DC/AC Electricity	3	6	0	5
	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
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 **70-72**

*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				
DFT	151	Computer-Aided Drafting I	2	3	0	3
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
			13	15	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
		Humanities/Fine Arts Elective*	3	0	0	3
			10	16	0	16

Total Credit Hours **70-72**

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

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

			Class	**Lab**	**Work/ Clinical**	**Credit**
DFT	151	Computer-Aided Drafting I	2	3	0	3
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
			13	14	0	18

Total Credit Hours **18**

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							
DFT	151	Computer-Aided Drafting I		2	3	0	3
ELC	131	Circuit Analysis I		3	3	0	4
or							
ELC	112	DC/AC Electricity		3	6	0	5
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				**37-38**	

*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	131	Circuit Analysis I	3	3	0	4
or						
ELC	112	DC/AC Electricity	3	6	0	5
EUS	110	Intro to Electric Utility Industry	3	3	0	4
			6	8-11	0	9-10
First Year – Spring Semester						
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
			8	5	0	10
		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				
DFT	151	Computer-Aided Drafting I	2	3	0	3
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
			10	4-5	0	12
		Total Credit Hours			**37-38**	