

PLUMBING TECHNOLOGY (CONTINUED)

EVENING PROGRAM CERTIFICATE IN PLUMBING TECHNOLOGY

Evening students can earn a certificate in Plumbing Technology by pursuing this program that is customized to suit individual needs and interests.

These courses combine classroom and shop experience to provide overall instruction, hands-on training and experience in the practices and skills needed by area-wide employers.

To earn a certificate in Plumbing Technology, students must complete two courses that encompass the pipefitting and plumbing systems curriculum.

PROGRAM COURSES		Hours	Prerequisites
PLT0110	Pipefitting Theory and Practice	6	
PLT0100	Plumbing Systems Theory and Practice	6	
Total Technical Credit Hours for Certificate Completion		12	

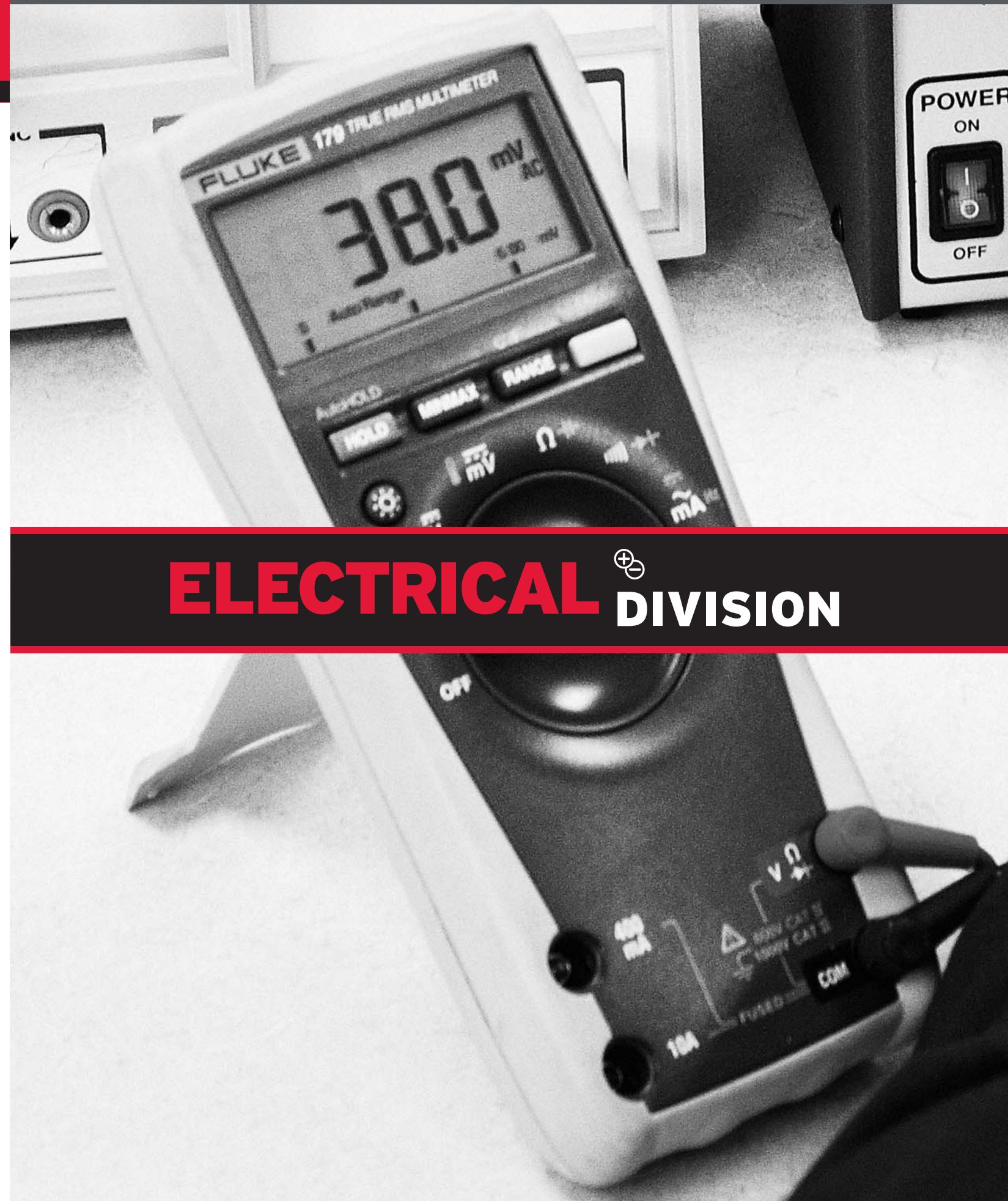
PLT0110 – PIPEFITTING THEORY AND PRACTICE

Covers the use of basic hand and power tools for cutting and threading steel pipe and cutting and joining copper pipe, using both hard and soft soldering methods. The course includes practical mathematics and layout methods as it applies to the piping trade.

Also, the course covers drain waste vent piping systems, the use of copper and cast iron and plastic pipe, along with related fittings. Six credit hours.

PLT0100 – PLUMBING SYSTEMS THEORY AND PRACTICE

Covers plumbing with hands-on application and theories about plumbing safety, drainage, waste, vent systems, plumbing fixtures, plumbing appliances and hot and cold water supply systems. Plumbing system inspections and tests are included. Six credit hours.



ELECTRICAL ^{⊕ ⊖} **DIVISION**

ELECTRICAL TECHNOLOGY

Multiple career options plus tremendous flexibility are just a few of the advantages of the Electrical Technology division. Consisting of three programs – Control Systems Technology, Electrical Automation Technology and Electrical Systems Design Technology – the Electrical Technology division offers students the expertise and hands-on training to meet the growing needs of companies with electronic control and distribution systems. From installing and maintaining basic electrical systems to operating an entire facility through an electronically controlled network, the Electrical Technology division presents students with countless opportunities.

Graduates from Ranken's two-year Electrical Technology division programs are highly valued among area employers.

During their first year, students in each of these programs will develop a solid knowledge of the fundamentals of electricity and electronics by sharing the same curriculum. By having the flexibility to learn more about each of the programs, students are able to make a more informed decision about which career path they would like to pursue.

PROGRAM COURSES				Hours	Prerequisites
First Semester	EEL1100	Introduction to National Electrical Code		3	MTH1110 (Co. Req.)
	EEL1110	DC/AC Electrical Fundamentals Lab		2	
	EEL1111	DC/AC Electrical Fundamentals Theory		5	
	EEL1112	Electrical Wiring Shop		3	
Second Semester	EEL1221	Power Distribution and Commercial Wiring Applications		8	
	EEL1234	Introduction to Control Circuits		8	
Total Technical Credit Hours Required				29	
GENERAL EDUCATION COURSES				Hours	Prerequisites
English/Social Sciences	ENG1101	College Composition I		3	Placement Exam or ENG1099
	ENG2102	College Composition II		3	ENG1101
	COM1105	Oral Communications		3	
	SOC1206	Principles of Sociology or		3	ENG1099 (Co. Req.)
	PSY1206	Introduction to Psychology		3	ENG1099 (Co. Req.)
Mathematics/Science	MTH1110	Elementary Algebra and MTH1111 Intermediate Algebra or		6	Placement Exam or MTH1099
	MTH1100	Elementary/Intermediate Algebra		3	Placement Exam
	MTH2112	College Algebra		3	MTH1100 or MTH1111
	PHY2100	Conceptual Physics		3	MTH1110
Business/Information Technology	CIT1100	Computer Literacy		2	
	WFD1200	Job Search Success		1	MNG1220 or BUS1204 (Co. Req.)
	MNG1204	Introduction to Business and Management		3	ENG1099 (Co. Req.)
Associate of Science	MTH2220	Trigonometry		3	MTH2112
Additional Required Courses	PHY2230	College Physics (Substitute for PHY2100)		3	MTH2220
	MTH2240	Survey of Calculus		3	MTH2112
Important Note: Only courses in which a grade of "C" or higher is earned may be applied toward this Ranken degree.					

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Automotive Division

Construction Division

Electrical Division

Information Technology Division

Manufacturing Division

General Education and Degree Options

COURSE DESCRIPTIONS

EEL1100 INTRODUCTION TO NATIONAL ELECTRICAL CODE (NEC)

Provides insight into the technical aspects of the electrical field and explores various wiring methods and electrical components utilizing basic NEC fundamentals. Three credit hours.

EEL1110 DC/AC ELECTRICAL FUNDAMENTALS LAB

Develops basic hands-on skills using components such as resistors, capacitors, inductors and transformers. Basic troubleshooting is introduced, using both hands-on and computer-generated circuits. Students utilize the following equipment: analog and digital meters, DC/AC power supplies, oscilloscopes and AC signal generators. Two credit hours.

EEL1111 DC/AC ELECTRICAL FUNDAMENTALS THEORY

Introduces the fundamentals of electricity. The course covers basic electrical terms, DC circuit concepts and AC circuit analysis. Electrical components such as resistors, capacitors, inductors and transformers are employed in circuit analysis. Five credit hours.

EEL1112 ELECTRICAL WIRING SHOP

Focuses on tools used in the electrical trade, electrical safety, electrical equipment and the actual wiring of basic electrical circuits. This course also covers blueprint reading for electricians. Three credit hours.

EEL1221 POWER DISTRIBUTION AND COMMERCIAL WIRING APPLICATIONS

Emphasis is focused on applying the NEC for sizing, grounding and over-current protection of single-phase and three-phase feeder circuits. Students will perform various calculations as required by the NEC. Transformer theory and commercial/industrial power distribution systems will also be covered. Students will construct electrical installations utilizing both metal raceway and metal jacketed cabling systems as they are commonly used in commercial wiring projects. Students will design and install commercial circuits utilizing the requirements of the NEC. Safe work practices will also be emphasized. Basic construction documents, electrical plans and estimating procedures are discussed and utilized. Eight credit hours.

EEL1234 INTRODUCTION TO CONTROL CIRCUITS

This course explores in depth, the understanding through lecture and construction of various types of electro-mechanical relay logic control circuits as applied in both the commercial and industrial environment. This course also discusses the concepts and utilization of various common solid-state control devices such as diodes, transistors and digital chips. The student will study ladder logic and component wiring design. The operations these circuits perform are also emphasized through lab exercises. Fundamental motor control is studied from its basic application through advanced instruction sets. Students will be involved in hard wiring of motor control components using ladder logic into functional control circuits. Students will also learn a hands-on approach to maintaining and troubleshooting of various types of control circuits. Eight credit hours.

Control systems influence the speed and efficiency of businesses that rely on highly automated processes and technical systems. Ranging from a few basic instruments to a complex network of personal and industrial computers, electronic controls and "intelligent" instruments, process control systems are often used to monitor and operate an entire manufacturing facility from the convenience of one computer.

ASSOCIATE OF TECHNOLOGY OR ASSOCIATE OF SCIENCE

Ranken's Control Systems Technology program prepares students for a career in the instrumentation and process control industry by providing instruction in mechanical, electrical, thermal and fluid principles, as well as hands-on training in installing, calibrating, troubleshooting and servicing the various parts that comprise a control system.

Graduates typically enter the field as electrical/instrumentation technicians and control system technicians responsible for maintaining instrumentation, electrical controls, motor controls, programmable logic controllers (PLCs) and computer-based systems found in manufacturing plants, food processing plants, utilities, refineries, breweries and chemical plants. Additional job opportunities include positions as drafts persons, lab technicians, technical writers and salespersons in the general field of control systems technology.

Upon completion of the associate degree program, students are eligible for the Bachelor of Science in Applied Management (BSAM) program – and could graduate with a bachelor's degree in as little as two short years.

PROGRAM COURSES			Hours	Prerequisites
Third Semester	ELC2013	Programmable Logic Controllers (PLCs)/ Human Machine Interface (HMI) Theory	7	
	ELC2014	Programmable Logic Controllers (PLCs)/ Human Machine Interface (HMI) Lab	6	
Fourth Semester	CST2213	Instrumentation and Process Control Theory	7	
	CST2214	Instrumentation and Process Control Shop	6	
Total Technical Credit Hours Required			26	

COURSE DESCRIPTIONS

ELC2013 PROGRAMMABLE LOGIC CONTROLLER (PLCS)/HUMAN MACHINE INTERFACE (HMI) THEORY

Extensive in-depth instruction in PLC and HMI applications and development. PLC and HMI are studied from its basic application to intermediate instruction and are extensively practiced in real-world simulations. Seven credit hours.

ELC2014 PROGRAMMABLE LOGIC CONTROLLER (PLCS)/ HUMAN MACHINE INTERFACE (HMI) LAB

Hands-on PLC/HMI hardware setup, programming, process monitoring and troubleshooting are studied. This course also covers PLC project wiring, operation and process control in simulated installations, configuring of motor control circuits and industrial networking. Six credit hours.

CST2213 INSTRUMENTATION AND PROCESS CONTROL THEORY

Includes an introduction to computer hardware and computer operating systems. Principles of temperature, pressure, level and flow are discussed. The course covers fluid properties, conversion factors, piping and instrumentation diagrams, loop diagrams and complex ladder diagrams and schematics. Students learn theory of operation of devices used to measure and control process variables (including sensors, transducers, transmitters, controllers, pumps and valves) and covers control modes, control algorithms and control loop tuning methods – Ultimate, Damped Oscillation, Ziegler-Nichols and Shinskey's. Seven credit hours.

CST2214 INSTRUMENTATION AND PROCESS CONTROL SHOP

Uses AutoCAD® to create piping and instrumentation diagrams, loop diagrams, complex ladder diagrams and schematics. The course also explores calibration and configuration of devices used to measure and control process variables (including sensors, transducers, transmitters, controllers, pumps, valves and variable frequency drives). Students learn application of theory principles to set up and tune PID control loops utilizing various control modes, control algorithms and control loop tuning methods (open and closed loop). Troubleshooting skills are taught and practiced throughout the curriculum. Six credit hours.

EVENING PROGRAM CERTIFICATE IN CONTROL SYSTEMS TECHNOLOGY

This certificate program focuses on the measurement and control of automated processes and technical systems in industrial plants. Emphasis is placed on level, temperature, pressure, flow and the more analytical variables such as pH, viscosity, density and humidity.

Control Systems Technology offers opportunities in the fast-growing petrochemical (refineries), chemical, pharmaceutical, food processing, distilleries and power plant industries.

Because the highly sophisticated equipment encompasses the areas of pneumatics, electricity, analog electronics, programmable controllers and computers, students in the certificate program will leave as control systems technicians with proficiencies in each of those areas.

These classes meet on Mondays and Wednesdays or Tuesdays and Thursdays from 6:00 p.m. to 9:30 p.m.

For students interested in furthering their education, these courses can be credited toward the Bachelor of Science in Applied Management (BSAM) degree.

ASSOCIATE OF APPLIED SCIENCE

Ranken is offering an Associate of Applied Science degree as a part of the evening program curriculum. You can earn your associate degree with a combination of Ranken's standard evening school courses as well as our new online courses. You can also transfer credit from other accredited technical training programs, or have your technical work experience evaluated for possible transfer credit. (30 technical credit hours required for graduation.)

For all General Education course requirements, please turn to page 89. For more information about the BSAM degree, please turn to page 92.

PROGRAM COURSES			Hours	Prerequisites
First Semester	EEL0110	DC & AC Theory and Lab	6	
Second Semester	EEL0120	Basic Solid State and Commercial Wiring Practices	6	EEL0110
Third Semester	CST0230	Principles of Control and Programmable Logic Controllers	6	EEL0120
Fourth Semester	CST0240	Batch Processing, Controls and Communications	6	CST0230
Total Technical Credit Hours for Certificate Completion			24	

COURSE DESCRIPTIONS

EEL0110 DC & AC THEORY AND LAB

Introduces electricity from a fundamental point of view. During the DC portion of study, students are introduced to basic electrical terms and DC circuit concepts and calculations. Study includes hands-on laboratory experiments illustrating principles studied in theory. Students will also acquire competence in using analog and digital measuring and test equipment. During the AC portion of study, students will work with electrical components such as capacitors, inductors and transformers that are employed in circuit analysis. Transformer principles, RL and RC circuits and impedance, resonance and power factor subjects are studied in theory and constructed in the lab. Students use test equipment such as oscilloscopes and signal amplifiers. Six credit hours.

EEL0120 BASIC CONTROL CIRCUITS AND COMMERCIAL WIRING PRACTICES

Offers fundamentals of relay logic control circuits and a basic understanding of control circuits, ladder logic and component wiring design and operation. This topic is covered in both theory and hands-on practice. An overview of electronic control components such as diodes, transistors and integrated circuit chips are explored. The course will also cover an introduction to electrical safety, types of electrical equipment and devices. Students will construct various branch circuit lighting and receptacle wiring systems utilizing different cabling and conduit methods. The National Electrical Code (NEC) will be utilized throughout the course. Six credit hours.

CST0230 PRINCIPLES OF CONTROL AND PROGRAMMABLE LOGIC CONTROLLERS

Includes principles of temperature fluid properties, conversion factors, piping and instrumentation diagrams as well as the theory of devices and their operation used to measure and control variables (including sensors, transducers, transmitters, controllers, pumps and valves). Variable measurement shop focuses on the calibration and configuration of various electronic/digital transmitters and controllers, pressure, level and flow. This course also includes a study of system hardware, number systems, writing and programming ladder logic (including contacts, coils, timers, counters, documentation, data manipulation, math functions, word and file moves, program control); sequential function charts, intelligent I/O modules and troubleshooting. In the lab portion, students learn the application of theory principles to set up, program and troubleshoot programmable logic controllers. Six credit hours.

CST0240 BATCH PROCESSING, CONTROLS AND COMMUNICATIONS

Focuses on basic control concepts and terminology, pneumatic and digital controllers, understanding of PID control and effects of process dynamics. Students also learn basic principles for cascade, ration and dead time control. In addition, this course covers feed forward and multivariable control theory and tuning parameters for control systems. Emphasizes basic principles and operation of variable speed drives and introduces distributed control systems. The course covers hierarchy and communications of computers and introduction to computer networks, data highways and field buses. Batch processing is taught under the guidelines of the International Society of Automation, ISA-88. Six credit hours.

For major manufacturing and commercial industries, electrical power is the lifeline of business. Used to create, distribute and sell their products, companies today operate on complex electronic systems and rely on highly skilled workers to guarantee the strength of their services.

Ranken's Electrical Automation Technology (EAT) program produces skilled electricians. Students enrolled in the program are trained to install, maintain, troubleshoot and repair electrical systems, including:

- Power distribution
- Industrial motor controls/motors
- Switching circuits
- Programmable logic controllers
- Variable frequency motor drives
- Industrial networking
- Servo and motion control

ASSOCIATE OF TECHNOLOGY OR ASSOCIATE OF SCIENCE

Through lecture and shop/lab activities, first year students receive instruction and training in electrical theory, solid-state electronics and logic control, installing electrical systems, power distribution and the National Electric Code (NEC). During the second year, students gain experience with single- and three-phase motors, variable frequency motor drives, motion control, ladder diagrams, advanced control logic, industrial control networking and programmable logic controllers. In addition, EAT graduates are versed in the layout, installation and blueprint reading of commercial and industrial wiring in new construction projects.

Graduates earn an associate of technology or associate of science degree and enter the workforce as maintenance electricians with some of St. Louis' largest companies. Career opportunities in the field include commercial/industrial electricians, electrical control technicians and electrical maintenance/service technicians.

Upon completion of the associate degree program, students are eligible for the Bachelor of Science in Applied Management (BSAM) program – and could graduate with a bachelor's degree in as little as two short years.

PROGRAM COURSES			Hours	Prerequisites
Third or Fourth Semester	ELA2013	AC & DC Machines and Motor Drive Theory	7	
	ELA2014	AC & DC Machines and Motor Drive Shop	6	
Third or Fourth Semester	ELC2013	Programmable Logic Controllers (PLCs)/ Human Machine Interface (HMI) Theory	7	
	ELC2014	Programmable Logic Controllers (PLCs)/ Human Machine Interface (HMI) Lab	6	
Total Technical Credit Hours Required			26	

COURSE DESCRIPTIONS

ELA2013 AC & DC MACHINES AND MOTOR DRIVE THEORY

Covers the theory of both AC & DC machines and how to install, maintain and troubleshoot these machines. Focus is on NEC calculations for single and multiple motor installations. Students will also learn how to set up, maintain and troubleshoot AC & DC motor drive systems and single axis motion control systems. Instruction on AC drives includes both the voltz/hertz and vector modes. Students also learn how to setup a DeviceNet system to monitor and program AC drives. Curriculum adheres to Electrical Work Safety and to the Occupational Safety and Health Administration (OSHA). Seven credit hours.

ELA2014 AC & DC MACHINES AND MOTOR DRIVE SHOP

Reinforces the theory of AC & DC machines via hands-on activities with an emphasis on different types of starting methods for AC motors. Additional hands-on activities involve the installation, programming and troubleshooting of AC & DC motor drive systems

and motion control systems. There are also hands-on activities with DeviceNet to learn how to monitor and program AC drives. Curriculum adheres to Electrical Work Safety requirements. Six credit hours.

ELC2013 PROGRAMMABLE LOGIC CONTROLLER (PLCS)/HUMAN MACHINE INTERFACE (HMI) THEORY

Extensive in-depth instruction in PLC and HMI applications and development. PLC and HMI are studied from its basic application to intermediate instruction and are extensively practiced in real-world simulations. Seven credit hours.

ELC2014 PROGRAMMABLE LOGIC CONTROLLER (PLCS)/HUMAN MACHINE INTERFACE (HMI) LAB

Hands-on PLC/HMI hardware setup, programming, process monitoring and troubleshooting are studied. This course also covers PLC project wiring, operation and process control in simulated installations, configuring of motor control circuits and industrial networking. Six credit hours.

EVENING PROGRAM CERTIFICATE IN ELECTRICAL AUTOMATION TECHNOLOGY

This certificate program offers training in power electricity, the industrial applications of electronics, industrial logic and programmable controllers. The course emphasizes the maintenance, troubleshooting and installation of electrical circuitry and equipment controls.

Graduates will be prepared to enter the work force as apprentices or entry level industrial electricians. Others may gain employment in diverse areas such as research and development laboratories, utilities and manufacturers, electrical equipment distributors (as service and field technicians), electrical sales and estimating.

These classes meet on Mondays and Wednesdays or Tuesdays and Thursdays from 6:00 p.m. to 9:30 p.m.

For students interested in furthering their education, these courses can be credited toward the Bachelor of Science in Applied Management (BSAM) degree.

ASSOCIATE OF APPLIED SCIENCE

Ranken is offering an Associate of Applied Science degree as a part of the evening program curriculum. You can earn your associate degree with a combination of Ranken's standard evening school courses as well as our new online courses. You can also transfer credit from other accredited technical training programs, or have your technical work experience evaluated for possible transfer credit. (30 technical credit hours required for graduation.)

For all General Education course requirements, please turn to page 89. For more information about the BSAM degree, please turn to page 92.

PROGRAM COURSES		Hours	Prerequisites
First Semester	EEL0110 DC & AC Theory and Lab	6	
Second Semester	EEL0120 Basic Control Circuits and Commercial Wiring Practices	6	EEL0110
Third Semester or	ELA0230 Power Distribution and Motors and Drives	6	EEL0120
Fourth Semester	ELA0240 Programmable Logic Controllers (PLCs) and Human Machine Interface (HMI) Control	6	EEL0120
Total Technical Credit Hours for Certificate Completion		24	

COURSE DESCRIPTIONS

EEL0110 DC & AC THEORY AND LAB

Introduces electricity from a fundamental point of view. During the DC portion of study, students are introduced to basic electrical terms and DC circuit concepts and calculations. Study includes hands-on laboratory experiments illustrating principles studied in theory. Students will also acquire competence in using analog and digital measuring and test equipment. During the AC portion of study, students will work with electrical components such as capacitors, inductors and transformers that are employed in circuit analysis. Transformer principles, RL and RC circuits and impedance, resonance and power factor subjects are studied in theory and constructed in the lab. Students use test equipment such as oscilloscopes and signal amplifiers. Six credit hours.

EEL0120 BASIC CONTROL CIRCUITS AND COMMERCIAL WIRING PRACTICES

Offers fundamentals of relay logic control circuits and a basic understanding of control circuits, ladder logic and component wiring design and operation. This topic is covered in both theory and hands-on practice. An overview of electronic control components such as diodes, transistors and integrated circuit chips are also explored. The course will also cover an introduction to electrical safety, types of electrical equipment and devices are also studied. Students will construct various branch circuit lighting and receptacle wiring systems utilizing different cabling and conduit methods. The National Electrical Code (NEC) will be utilized throughout the course. Six credit hours.

ELA0230 POWER DISTRIBUTION AND MOTORS AND DRIVES

Concentrates on single-phase and three-phase transformers and power distribution theory. Students study and construct power distribution for single-phase and three-phase operations. Students will also understand instrument, auto and potential transformers. An understanding of AC & DC motors, various motor starting methods and variable frequency (VFD) motor drives are covered in lecture and lab. Six credit hours.

ELA0240 PROGRAMMABLE LOGIC CONTROLLERS (PLCS) AND HUMAN MACHINE INTERFACE (HMI) CONTROL

Basic PLC instructions and HMI applications are explored in real-world applications. To reinforce class lectures, students perform related lab exercises. Students will learn how field sensors and control components interact with the PLCs. The Allen-Bradley SLC 5/04 controller with Rockwell RSLogix™ 500 software and RSVIEW32™ are used in a Windows NT environment. On-line and off-line programming is covered, along with wiring methods and various troubleshooting techniques. Six credit hours.

In response to a rising demand for skilled technicians who are qualified to work on a day-to-day basis with building engineers, Ranken has developed the Electrical Systems Design Technology (ESDT) program. Unique in the St. Louis region, this program provides two years of training and instruction leading to an associate degree.

ASSOCIATE OF TECHNOLOGY OR ASSOCIATE OF SCIENCE

With an emphasis on electrical distribution systems for modern commercial and industrial buildings, coursework includes:

- Basic electricity theories
- Design and construction of electrical distribution systems
- Computer Aided Drafting (CAD)
- Commercial lighting design
- Electrical estimating

Students enrolled in the ESDT program use campus labs for the study of electrical wiring, industrial controls, circuitry, machinery and power distribution. In the final semester, students are required to complete an electrical design and layout project, including a complete set of drawings, details and other necessary documentation.

Program graduates will have great flexibility in career options and are qualified for employment as junior electrical designers, electrical estimators, insurance inspectors, manufacturers' sales representatives and electrical engineering associates.

Upon completion of the associate degree program, students are eligible for the Bachelor of Science in Applied Management (BSAM) program – and could graduate with a bachelor's degree in as little as two short years.

PROGRAM COURSES		Hours	Prerequisites
Third Semester	ESD2000 Construction Management	2	
	ESD2101 Advanced National Electrical Code I	3	
	ESD2121 AutoCAD and Electrical Design Lab I	4	
	ESD2122 Construction Blueprint Reading and Electrical Estimating Lab	3	
Fourth Semester	ESD2123 Electrical Design Theory I	3	
	ESD2201 Electrical Design Lab II	4	
	ESD2202 Lighting Design Theory	3	
	ESD2210 Computerized Electrical Estimating	3	
	ESD2211 Advanced National Electrical Code II	4	
Total Technical Credit Hours Required		29	

COURSE DESCRIPTIONS

ESD2000 CONSTRUCTION MANAGEMENT

This course will focus on construction project delivery systems, project team members, construction documents, jobsite layout and control, subcontracting and quality management. Two credit hours.

ESD2101 ADVANCED NATIONAL ELECTRICAL CODE

Covers residential and commercial load calculations, motor and transformer protection, three-phase transformer calculations and sizing. Three credit hours.

ESD2121 AUTOCAD AND ELECTRICAL DESIGN LAB I

This course explores many aspects of AutoCAD software. Students will create mechanical and electrical drawings and diagrams. The emphasis is to create working blueprints from basic conceptual drawings. Upon completion of the course, students will have the skills to design a comprehensive electrical system blueprint. Four credit hours.

ESD2122 CONSTRUCTION BLUEPRINT READING AND ELECTRICAL ESTIMATING LAB

Students will read and interpret blueprint drawings for various trades. The course will focus on construction materials, procedures, specifications and the methods of estimating construction costs. Students will also obtain an introduction to electrical estimating by developing electrical estimates by hand and with Excel spread sheets. Three credit hours.

ESD2123 ELECTRICAL DESIGN THEORY I

Students will gain an in-depth understanding of the electrical design process. They will design a residential electrical project in accordance with the National Electrical Code (NEC), by selecting the appropriate materials and completing all of the required documentation. Three credit hours.

ESD2201 ELECTRICAL DESIGN LAB II

Students will develop a commercial and industrial electrical design concept with a local engineering firm. This project will be in accordance with the National Electrical Code (NEC). Four credit hours.

ESD2202 LIGHTING DESIGN THEORY

Students will focus on lighting characteristics, measurements, distribution curves, light sources, calculations and lighting techniques as developed by the Illumination Engineering Society of America. Students will develop a commercial lighting layout design, utilizing computerized lighting layout software. Three credit hours.

ESD2210 COMPUTERIZED ELECTRICAL ESTIMATING

This is an advanced estimating course. Students will gain an in-depth understanding of electrical estimating by using various methods, including the latest versions of cost and estimating software. Three credit hours.

ESD2211 ADVANCED NATIONAL ELECTRICAL CODE II

This course is an in-depth study of special occupancies in accordance to the National Electrical Code (NEC). Special emphasis will be given to articles 500-590 of the NEC. Four credit hours

EVENING PROGRAM CERTIFICATE IN ELECTRICAL CONSTRUCTION DESIGN AND MANAGEMENT

In response to industry demand and feedback from the Electrical Systems Design Technology advisory board, Ranken is pleased to offer a new evening program certificate in Electrical Construction Design and Management (ECDM).

Electrical construction designers and project managers work in multiple phases of electrical construction. Designers create electrical systems for residential, commercial and industrial buildings using computers and Computer Aided Drafting (CAD) software. The designs are then assembled, installed and maintained by electricians and electrical construction workers. Cost estimation, project scheduling and management of the fabrication and installation phase are also key to this career.

Jobs in Electrical Construction Design and Management are professional positions, requiring critical thinking skills and the perseverance to follow up with a project until it is complete. Most work is done in an office setting, but some positions may require travel, on-site supervision and project follow-up. Electrical designers and managers are employed by architectural firms, consulting engineering firms, electrical contractors and product sales and support offices. Graduates

of this program will find entry-level jobs as project designers, project managers, estimators, product specialists and sales representatives.

The program is a one or two year curriculum based on the student's previous knowledge and background. Those students with solid electrical backgrounds or education should be able to complete the program within one year.

For students interested in furthering their education, these courses can be credited toward the Bachelor of Science in Applied Management (BSAM) degree.

ASSOCIATE OF APPLIED SCIENCE

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For all General Education course requirements, please turn to page 89. For more information about the BSAM degree, please turn to page 92.

PROGRAM COURSES			Hours	Prerequisites
First Semester	ESD0110	Residential and Commercial AC & DC Circuits	6	
Second Semester	ESD0120	Single- and Three-Phase Power Distribution	6	ESD0110
Third Semester	ESD0230	Residential and Commercial Lighting Design with AutoCAD	6	ESD0120 (Co. Req.)
Fourth Semester	ESD0240	Construction Management and Estimating	6	ESD0110 (Co. Req.)
Total Technical Credit Hours for Certificate Completion			24	

COURSE DESCRIPTIONS

ESD0110 RESIDENTIAL AND COMMERCIAL AC & DC CIRCUITS

Covers both AC & DC theory and hands-on circuit analysis. Students will utilize various circuit types, components and measuring devices common to the trade. Introduces the student to the National Electrical Code through lecture and hands-on application. Six credit hours.

ESD0120 SINGLE- AND THREE-PHASE POWER DISTRIBUTION

Students will explore various methods used to distribute electrical power common in both residential and commercial applications. Basic motors and controls are also covered through lecture and hands-on practice. Six credit hours.

ESD0230 RESIDENTIAL AND COMMERCIAL LIGHTING DESIGN WITH AUTOCAD

This course covers residential and commercial electrical design requirements while also teaching students to use AutoCAD LT® to draw electrical diagrams and blueprints. Light characteristics and measurements, distribution curves, light sources, calculations, lighting techniques and computerized lighting layout are also covered. Six credit hours.

ESD0240 CONSTRUCTION MANAGEMENT AND ESTIMATING

Covers construction project delivery systems, project team members, construction documents, construction blueprint reading, jobsite layout and control and subcontracting. Electrical estimating by hand, Excel spread sheets and computerized estimating software are also covered. Six credit hours.

ALARM SYSTEMS TECHNOLOGY

EVENING PROGRAM CERTIFICATE IN ALARM SYSTEMS TECHNOLOGY

The Alarm Systems Technology program trains students how to install fire and electronic security monitoring systems and integrate new technology into residential and commercial settings.

Combining the skills of an electrician with those of an information technology specialist, students will receive professional training on the most up-to-date security technologies.

Alarm systems security technicians plan, install and troubleshoot residential and commercial security systems, including closed circuit TV, card access, intercom, video and other related equipment. Alarm Systems Technology has become an active field of employment as people integrate security, computer and telephony technology to better manage their assets.

Upon completion of the two-year certificate, students will be prepared for a career in fields such as communications installation, service technician, fire alarm inspectors, voice and data service technician, in addition to a variety of security and electrical opportunities.

For students interested in furthering their education, these courses are creditable toward our Associate of Applied Science (AAS) and Bachelor of Science in Applied Management (BSAM) degrees. Please see our AAS and BSAM evening program offerings starting on page 90.

PROGRAM COURSES			Hours	Prerequisites
First Semester	ASY101C	Fundamentals of Alarm Systems	6	
Second Semester	ASY102C	Alarm System Electronics and Computer Controls	6	
Third Semester	ASY103C	Design and Integration of Alarm Systems	6	
Fourth Semester	ASY104C	Installation and Commissioning of Alarm Systems	6	
Total Technical Credit Hours for Certificate Completion			24	

Courses should be taken in the order listed.

COURSE DESCRIPTIONS

ASY101C FUNDAMENTALS OF ALARM SYSTEMS

This course is the foundation course for all following coursework in Alarm Systems Technology, including the basics of construction materials and methods, introduction to many types of conduits and wireways used in low-voltage applications, coverage of the hardware and systems used by a low-voltage technician to mount and support boxes, receptacles, and other electrical components. Additionally, students learn safety rules and regulations for electricians, the necessary precautions to take for various electrical hazards found on the job, and the OSHA-mandated lockout/tagout procedure. This course also includes an introduction to conduit bending and installation, and the makeup, identification, and applications of various types of conductors and cables used in telecommunications and security systems. Six credit hours.

ASY102C ALARM SYSTEM ELECTRONICS AND COMPUTER CONTROLS

This course increases the depth and breadth of the student's electrical and electronic knowledge in DC and AC devices and circuitry. Additionally, the course covers diagnosis using electrical test equipment, National Electrical Codes surrounding grounding issues, lightning protection, telecommunications cabling, life safety systems, motor and generator power sets, and uninterrupted power supplies.

The student will interpret electrical drawings, site plans, equipment schedules, and perform take-offs from construction drawings. Since all systems have integrated computer controls, the student will learn how to assemble a PC, how to load application software, and how to perform systems back-up. Six credit hours.

ASY103C DESIGN AND INTEGRATION OF ALARM SYSTEMS

An emphasis in low-voltage cabling installations for a variety of computer-controlled buses and networks, such as fiber-optic cable, CAT 5, and co-axial cable installations. Additionally, the student will learn to install and troubleshoot wireless radio frequency and infrared networked systems. The course teaches all phases of installation, including site survey, project planning, documentation, as well as system maintenance and repair. Six credit hours.

ASY104C INSTALLATION AND COMMISSIONING OF ALARM SYSTEMS

This course integrates all of the prior learning from semesters one, two, and three as the technician learns life safety system applications. The course covers fire alarm, intrusion detection security, audio, hospital nurse call and signaling, closed circuit and broadband TV, and building access control systems. Students learn interconnection and integration protocols as well as system commissioning and user training. Six credit hours.



INFOTECH DIVISION

