

ELT ELECTRICITY

Courses

ELT.100 Electrical Fundamentals 2 3 3

This course introduces the fundamentals of electrical and electronic circuits. Calculation and measurement of voltage, current, and resistance are emphasized. Through the use of lab activities, various wiring and testing methods utilizing multimeters are investigated.

Offered: Fall and Spring

Applicable toward graduation at Sandburg where program structure permits:

Degree or Certificate: AAS, AGS and Certificates where applicable (1.2).
General Education -- Not Applicable

ELT.104 Industrial Electrical Control 2 3 3

This course introduces the fundamentals of industrial electrical control. Basic theory including electron flow, Ohm's Law, series parallel circuit characteristics, and electrical power calculations as applied to industrial control applications is covered. Lab work involves the construction and testing of representative industrial electronic control circuitry.

Offered: Spring

Prerequisites: Take ELT.100

Applicable toward graduation at Sandburg where program structure permits:

Degree or Certificate: AAS, AGS and Certificates where applicable (1.2).
General Education -- Not Applicable

ELT.107 Digital Logic & Circuits 2 2 3

This course covers the fundamentals of digital logic. It will also include some of the procedures and tools used for troubleshooting digital circuits. Simple switching circuits will be covered first as a simple but concrete introduction to the concepts of Boolean Algebra. Then modern integrated circuit realizations of digital logic gates will be discussed. Basic principles of analysis and design using these gates will be covered. coverage will include basic combinatorial and sequential circuits. Basic trouble-shooting techniques using a logic probe will be employed.

Offered: Fall

Applicable toward graduation at Sandburg where program structure permits:

Degree or Certificate: AAS, AGS and Certificates where applicable (1.2).
General Education -- Lab Science Not Applicable

ELT.119 Industrial Electronic Control 2 3 3

This course is an in-depth evaluation of industrial electronic control methods and devices. The operating characteristics of various types of solid state controls and sensors, including proximity, photoelectric, thermistors, thermocouples, SCR, triacs, thyristors, transistors, timers, counters, and advanced electronic motor controls are studied. The lab work involves the operation and analysis of industrial electronic circuits and devices.

Offered: Fall

Applicable toward graduation at Sandburg where program structure permits:

Degree or Certificate: AAS, AGS and Certificates where applicable (1.2).
General Education -- Not Applicable

ELT.120 Electrical/Electronics Troubleshooting 2 3 3

This course covers the essential techniques of troubleshooting industrial electrical and electronic circuits and devices. The lab work includes the use of test equipment, instrumentation, and computer simulation to develop the skills necessary to improve troubleshooting accuracy and cut troubleshooting time.

Offered: Fall

Applicable toward graduation at Sandburg where program structure permits:

Degree or Certificate: AAS, AGS and Certificates where applicable (1.2).
General Education -- Not Applicable

ELT.200 National Electrical Code 3 3

Using the National Electrical Code as a reference, students will be trained on how to design and construct electrical systems according to NEL requirements. Residential, industrial, and commercial wiring and power distribution systems will be investigated. Included will be residential/commercial/industrial circuits, lighting requirements, grounding, wiring methods, and hazardous locations.

Offered: Fall

Prerequisites: Take ELT.110

Applicable toward graduation at Sandburg where program structure permits:

Degree or Certificate: AAS, AGS and Certificates where applicable (1.2).
General Education -- Not Applicable

ELT.207 Electrohydra Process Control 2 3 3

This is a course designed to provide the student with a solid background in fluid power control principles and theory, as well as modern techniques for interfacing industrial muscle (hydraulic, pneumatic, vacuum operated devices) with the ubiquitous industrial brain (electronic-microprocessor) generation of controllers. There will be discussions of electric motor drives, solenoid operated devices, pressure switches/transducers, relays, limit switches, programmable controls, servo systems, analog and digital control, open and closed loop control, feedback, symbology, instrumentation, etc. There will be emphasis on demonstration of relevant hardware, as well as class participation in design and troubleshooting of industrial types of circuits.

Offered: Spring

Applicable toward graduation at Sandburg where program structure permits:

Degree or Certificate: AAS, AGS and Certificates where applicable (1.2).
General Education -- Not Applicable

ELT.208 Programmable Controllers 2 2 3

This course will introduce the student to the fundamental concepts of programmable controllers. Through lecture and lab exercises, the student will be exposed to the hardware, troubleshooting, and programming of controllers. Relevant examples of programmable controller types will be covered.

Offered: Spring

Prerequisites: Take ELT.102

Applicable toward graduation at Sandburg where program structure permits:

Degree or Certificate: AAS, AGS and Certificates where applicable (1.2).

General Education -- Not Applicable

ELT.209 AC/DC Drives and Servos 2 2 3

This course investigates modern trends in industrial motor controls. Students will be exposed to the advantages and disadvantages of AC and DC solutions. Discussions will include soft start and servo control. Much emphasis will be on AC Variable Frequency Drives.

Offered: Spring

Prerequisites: Take ELT.104

Applicable toward graduation at Sandburg where program structure permits:

Degree or Certificate: AAS, AGS and Certificates where applicable (1.2).

General Education -- Not Applicable

ELT.212 Industrial Electricity 2 3 3

This course provides a basic overview of various industrial topics such as distribution, wiring methods, and enclosures.

Offered: Spring

Prerequisites: Take ELT.119

Applicable toward graduation at Sandburg where program structure permits:

Degree or Certificate: AAS, AGS and Certificates where applicable (1.2).

General Education -- Not Applicable

ELT.213 Process Control & Instrumentation 2 3 3

This course covers the field of industrial measurement and control. Data acquisition methods, including the sensing, measuring, and transmission of industrial process variables, are introduced. The principles of automatic process control, measurement, programmable controller and distributed control are studied.

Offered: Spring

Prerequisites: Take ELT.100 with a grade of C or better.

Applicable toward graduation at Sandburg where program structure permits:

Degree or Certificate: AAS, AGS and Certificates where applicable (1.2).

General Education -- Not Applicable

ELT.214 Advanced Program Controllers 2 2 3

This course will extend student knowledge of programmable controllers to include proprietary and open networks, automation equipment interfacing, and operator interfaces. Through the use of lab activities, various network protocols, remote I/O and touch screens will be interfaced and programmed.

Offered: Spring

Applicable toward graduation at Sandburg where program structure permits:

Degree or Certificate: AAS, AGS and Certificates where applicable (1.2).

General Education -- Not Applicable

ELT.215 Design of Industrial Control Systems 2 2 3

This is an integration course utilizing knowledge gained in previous courses and applied to the design of a typical industrial control system. Computer-aided design software is introduced and utilized to create drawings required for the construction of a control panel. Lab activities will include generation of control system CAD drawings and the construction of a control panel which includes both electrical and electrohydraulic components. The use of vendor-supplied product configuration software and CAD blocks will be emphasized.

Offered: Fall

Prerequisites: Take ELT.104 and ELT.208

Applicable toward graduation at Sandburg where program structure permits:

Degree or Certificate: AAS, AGS and Certificates where applicable (1.2).

General Education -- Not Applicable

ELT.216 Data Acquisition Systems Program & Apps 2 2 3

This course will emphasize the use and application of Data Acquisition Systems and associated programming software. Instrumentation circuitry and sensors will be interfaced to an industrial data acquisition system.

Offered: Spring

Applicable toward graduation at Sandburg where program structure permits:

Degree or Certificate: AAS, AGS and Certificates where applicable (1.2).

General Education -- Not Applicable

ELT.219 Industrial Automation Applications 1 4 3

This course will explore the integration of modern industrial control systems and instrumentation to automated industrial equipment. Prototype machinery will be constructed in the laboratory and programmed to perform a selected task.

Offered: Fall

Applicable toward graduation at Sandburg where program structure permits:

Degree or Certificate: AAS, AGS and Certificates where applicable (1.2).

General Education -- Not Applicable