

Wyoming Department of Education Required Virtual Education Course Syllabus

Sheridan County School District # 1

Program Name	Sheridan County School District #1 Virtual School	Content Area	VE
Course ID	AC17109	Grade Level	10 - 12
Course Name	Electrical Technology II	# of Credits	1
SCED Code	17109G1.0022	Curriculum Type	Acellus

COURSE DESCRIPTION

This 3-D course builds on the foundation of Electrical Technology I to give students additional knowledge and skills they will need for a career in an electrical-related field and prepares them for the Electrical Technology certification exam. Acellus Electrical Technology II is A-G Approved through the University of California.

WYOMING CONTENT AND PERFORMANCE STANDARDS

STANDARD#	BENCHMARK (Standard/Indicator) Use the Standards and Benchmarks as Spreadsheets
CV12.1.1	College and career-ready students evaluate current knowledge and interests in order to set career goals.
CV12.1.2	College and career-ready students explore careers including outlook, salary, needed training, duties and lifestyle utilizing all available resources including mentors and industry experts.
CV12.1.4	College and career-ready students demonstrate employability skills that enable them to be responsible and contributing citizens and employees.
CV12.2.1	College and career-ready students communicate clearly, effectively, and with reason.
CV12.2.2	College and career-ready students identify and model integrity, ethical leadership and effective management skills.
CV12.2.4	College and career-ready students apply safe, legal, and responsible use of information and technology as appropriate to the task.
CV12.3.2	College and career-ready students identify trends, forecast possibilities, and explore complex systems and issues.
CV12.3.3	College and career-ready students employ valid and reliable research strategies and apply prior knowledge to solve a problem or complete a project.
CV12.3.4	College and career-ready students demonstrate creativity and innovation while considering the environmental, social, and economic impacts of decisions.
CV12.4.1	College and career-ready students produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (*CCSS W.11.4)
CV12.4.2	College and career-ready students determine the meaning of symbols, key terms, and other content-specific words and phrases as they are used in technical context. (*Adapted from CCSS RL.9.11)
CV12.4.3	College and career-ready students acquire, manipulate, analyze, diagnose, and/or report information, using the appropriate technology.
CV12.5.1	College and career-ready students manage resources to develop, analyze, and implement systems and applications.
CV12.5.2	College and career-ready students productively complete tasks taking constraints, priorities and resources into account.
CV12.5.3	College and career-ready students safely and ethically use current industry-standard tools and emerging technologies.
CV12.5.4	College and career-ready students utilize technology to develop innovative solutions or products.

SCOPE AND SEQUENCE

UNIT OUTLINE	STANDARD#	OUTCOMES OBJECTIVES/STUDENT CENTERED GOALS
Unit 1 – Power - Conductors, Loads, and Conduit Calculations	CV12.1.1; CV12.1.2; CV12.2.4; CV12.4.2; CV12.4.3;	In the introductory unit of this course, students learn about alternating current, single-phase and three-phase power, practical applications of one- and three-phase power, conductor selection and calculations, conductors in conduit systems, de-rating conductors, and voltage drop. Students also learn loading calculations, branch circuits, and feeders, conduit selection and calculations, pull and junction boxes, calculating straight pulls for large enclosures, calculating angle pulls for large enclosures, calculating U pulls, and calculating raceways.
Unit 2 – Lighting, Receptacle, and Motor Loads	CV12.1.4; CV12.2.1; CV12.2.4; CV12.4.2; CV12.4.3; CV12.5.3; CV12.5.4;	In this unit students learn general lighting load calculations, storage area lighting, show window lighting allowances, track lighting uses and calculations, roof/specialty receptacles, and commercial receptacle loads and applications. They also learn sign outlet requirements, motor load calculations overview and steps one through six, and the installation of motors.
Unit 3 – Branch Circuits and Receptacles	CV12.1.4; CV12.2.1; CV12.2.2; CV12.2.4; CV12.4.2; CV12.4.3;	Within this unit students will learn about defining branch circuits, determining the minimum number of branch circuits, continuous loads, non-continuous loads, selecting branch circuit over-current protection, and code rules for commercial receptacles. This unit will also guide students through GFCI receptacles, code rules for GFCI receptacles, AFCI receptacles, and code rules for AFCI receptacles.
Unit 4 – Conduit Systems and Commercial Boxes	CV12.1.4; CV12.2.1; CV12.2.4; CV12.4.2; CV12.4.3; CV12.5.1; CV12.5.2;	In this unit, students learn about rigid metal conduit codes, intermediate metal conduit code rules, electrical metallic tubing code rules, and flexible metal/non-metallic conduit code rules. Students will also learn about commercial boxes in different metallic box types.
Unit 5 – Appliances and Feeders	CV12.1.4; CV12.2.1; CV12.2.4; CV12.4.2; CV12.4.3;	In this unit students learn about appliances as defined by specific articles, appliance branch circuit, over-current protection, appliance grounding, appliance disconnection means, the basic components of motor circuits, disconnect rules for motor circuits, feeder ampacity rules, feeder over-current protection rules, feeder temperature limitations 110.14c, feeder conductor selection, feeder component selection, and feeder conductor selection step 1. Students also learn minimum feeder conductor selection step 2, feeder conductor selection step 3, feeder neutral conductor selection, harmonic loads, and surface metal raceways, as well as multi outlet assemblies, communication systems, and floor outlets.
Unit 6 – Transformers and Commercial Service	CV12.1.4; CV12.2.1; CV12.2.4; CV12.4.1; CV12.4.2; CV12.4.3;	In this unit students learn about the transformer, transformer construction and theory transformer, over-current protection, transformer connections, connecting single phase transformers, connecting three phase transformers, the open delta system, three wire delta systems, three phase, and four wire way systems. They also learn about the commercial service entrance, commercial metering systems, the commercial electrical service, the commercial service entrance conductor size, working space around equipment considerations, and the grounding system.

Unit 7 – Lighting	CV12.1.4; CV12.2.1; CV12.2.4; CV12.4.2; CV12.4.3;	In this unit students will gain knowledge regarding incandescent lighting, fluorescent lighting, HID lighting, LED lighting, lighting circuit design, and lighting over-current protection, as well as types of luminaries, luminaire listing and labeling, code requirements for installing recessed luminaries, and emergency and legally required standby power systems.
Unit 8 – Overcurrent Protection, Fuses and Breakers	CV12.1.4; CV12.2.1; CV12.2.4; CV12.4.2; CV12.4.3;	Students begin this unit learning about overcurrent protection overview, disconnect switch coordination, fuses and circuit breakers, dual element time delay fuses, non-time delay fuses, cartridge fuses, plug fuses, and testing fuses. Students will also learn about circuit breakers, thermal magnetic circuit breakers, circuit breaker coordination, HACR circuit breakers, and low voltage lighting systems.
Unit 9 – Refrigeration Systems	CV12.1.4; CV12.2.1; CV12.2.4; CV12.3.2; CV12.4.2; CV12.4.3;	In this unit students will learn about refrigeration system components, cooling system controls in a commercial setting, electrical system requirement, wall rough in with MC cable, wall rough in with EMT, building a conduit rack system with unistrut, the building grounding system, pulling wire for office lighting, pulling wire for office power, installing stranded wire on a lighting circuit, and installing stranded wire on three way switches. They will also learn about installing communication conduit systems, installing cat 5 cable systems, grounding the transformer, installing fluorescent lighting, installing outdoor lighting systems.
Unit 10 – Electrical Motors	CV12.1.4; CV12.2.1; CV12.2.4; CV12.3.4; CV12.4.2; CV12.4.3; CV12.5.1; CV12.5.2;	Within this unit students will gain an understanding of basic motor control components, installing a motor controller, the basic start-stop system, the forward reverse system, multiple e-stop locations, wiring the contactor for start-stop motor operation, wiring the contactor for forward-reverse operation, wiring a basic start-stop with the motor in operation, and wiring a basic forward-reverse with motor in operation. Students will also gain understanding of a relay and how to wire a relay, using a timing relay to turn on a single light, and using a timing relay to turn on a run/stop light.
Unit 11 – Troubleshooting	CV12.1.4; CV12.2.1; CV12.2.4; CV12.3.3; CV12.4.2; CV12.4.3; CV12.5.1; CV12.5.2; CV12.5.4;	In the concluding unit of this course students will learn about troubleshooting a bad coil, determining the health of a motor, thermal overload rules. They will also learn troubleshooting a bad push button, troubleshooting a bad wire, troubleshooting a bad switch, troubleshooting a bad light fixture, and troubleshooting rules and practices.