UTAH SYSTEM OF HIGHER EDUCATION

Utah System of Higher Education
Electronics Technology
FY2027 / 17 Credits (510 Clock-Hours)

Foundational Courses

TEET 1040 Electronics Assembly and Soldering — 1 Credit / 30 Clock-Hours

In the Electronics Assembly and Soldering course, students develop the ability to solder and desolder connectors, components, and printed circuit boards using industry standards. Topics include component identification, safety practices, soldering, desoldering, anti-static grounding, and surface mount techniques.

Objectives:
• Apply ESD industry safety and handling practices.
• Select the proper hand-tools and materials for an assembly procedure.
• Maintain and utilize soldering equipment.
• Prepare wire for electronic assemblies and complete wire splices.
• Solder wires to various terminals.
• Solder axial-leaded and multi-leaded through-hole components.
• Solder surface-mount components.
• Identify components, hardware, and wires.

TEET 1061 DC Electronics I — 2 Credits / 60 Clock-Hours

The course will cover direct current (DC) basics, electrical safety, components, Ohms law and power calculations, electrical measurements, series circuits, and power supplies. The course is a balance of theory, and hands-on, including measurements, troubleshooting, and circuit construction.

Objectives
• Recognize and describe electronic circuits, systems, and electrical hazards while practicing basic safety protocols.
• Use the relationships between voltage, resistance, and current to analyze DC circuits with Ohm’s and power law equations.
• Use, test, and select various electronic components as needed to prototype circuits using schematic diagrams.
• Analyze the properties of magnetism.
• Utilize different types of multimeters to perform electronic measurements of voltage, current and resistance.
• Perform series circuits calculations and measurements, analyze circuits for faulty components.

TEET 1062 DC Electronics II — 2 Credits / 60 Clock-Hours

The course will cover direct current (DC) basics circuits analysis, electrical safety, components, Ohms law and power calculations, electrical measurements, parallel and complex circuits, and power supplies. The course is a balance of theory, and hands-on, including measurements, troubleshooting, and circuit construction.

Objectives
• Recognize and describe electronic circuits, systems, and electrical hazards while practicing basic safety protocols.
• Use the relationships between voltage, resistance, and current to analyze DC circuits with Ohm’s and power law equations.
• Use, test, and select various electronic components as needed to prototype circuits using schematic diagrams.
• Utilize different types of multimeters to perform electronic measurements of voltage, current and resistance.
• Perform parallel and series-parallel combination circuits calculations and measurements, analyze circuits for faulty components.
• Analyze voltage divider, bridge, maximum power transfer circuits.
• Apply Kirchhoff's voltage and current laws to analyze complex DC circuits using theorem analyses.

TEET 1071 AC Electronics I **2 Credits / 60 Clock-Hours**

The course will cover the principles of alternating current (AC), inductance, capacitance, RL principles and circuits. It also covers passive filters, AC calculations and measurements, troubleshooting, usage of oscilloscopes and function generators.

Objectives
• Apply alternating current fundamentals of voltage, current, resistance and Ohm's law.
• Calculate Peak, Peak-to-Peak, RMS and Average values of sinusoidal signals.
• Apply function generators and oscilloscopes to AC circuits.
• Use schematic diagrams and symbols to prototype AC circuits.
• Explain the use of capacitors and inductors.
• Perform RL series and parallel circuit calculations and measurements and analyze phasor diagrams.
• Analyze the characteristics of series and parallel resistive/reactive RL circuits.

TEET 1072 AC Electronics II **2 Credits / 60 Clock-Hours**

The course will cover the principles of alternating current (AC), inductance, capacitance, transformers, RC, RL, RCL principles and circuits. It also covers passive filters, AC calculations and measurements, troubleshooting, usage of oscilloscopes and function generators.

Objectives
• Apply alternating current fundamentals of voltage, current, resistance and Ohm's law.
• Apply function generators and oscilloscopes to AC circuits.
• Determine values and measure characteristics of transformers.
• Use schematic diagrams and symbols to prototype AC circuits.
• Explain the use of capacitors and inductors.
• Perform RC series and parallel circuit calculations and measurements including filter and time constant circuits, and analyze phasor diagrams.
• Analyze the characteristics of series and parallel resistive/reactive (RCL) circuits.
• Discuss series and parallel resonance circuits.

TEET 1081 Analog Electronics I **2 Credits / 60 Clock-Hours**

The Analog Electronics course covers semiconductor technology and active devices such as diodes and transistors. Students explore power supply circuits, regulators, and transistor amplifiers while performing circuit construction and troubleshooting.

Objectives:
• Identify basic diode applications.
• Design, build, and test basic rectifiers and power supplies.
• Design, build, and test transistor bias circuits.
• Use small-signal, power, and FET amplifiers.
• Demonstrate amplifier frequency response and voltage regulators.

TEET 1082 Analog Electronics II **2 Credits / 60 Clock-Hours**

The Analog Electronics course covers semiconductor technology and active devices such as transistors, thyristors, optoelectronics, and operational amplifiers. Students explore instrumentation operational amplifier circuits, IC characteristics, active filters, and oscillators while performing circuit construction and troubleshooting.

Objectives:
• Use thyristors such as SCRs and Triacs.
• Construct and analyze oscillator circuits.
• Design, prototype, and troubleshoot analog operational amplifier circuits.

TEET 1091 Digital Fundamentals I **2 Credits / 60 Clock-Hours**

The Digital Fundamentals I course covers digital concepts, safety, and digital systems. It covers common digital numbering systems and conversions. It covers the basics of truth tables, logic gates, and combinational logic circuits. Students learn usage of digital test equipment for prototyping, measuring, and troubleshooting digital circuits.

Objectives:
• Apply digital concepts, logic gates, logic functions, datasheets, and truth tables.
• Apply safety precautions, CMOS devices, and ESD/EOS.
• Apply digital schematics, wiring and block diagrams.
• Apply numbering systems, conversions, Boolean algebra.
• Apply digital test equipment and measurements.
• Apply troubleshooting digital circuits and systems.
• Apply programmable logic devices (PLDs).

TEET 1092 Digital Fundamentals II **2 Credits / 60 Clock-Hours**

The Digital Fundamentals II course covers digital concepts, safety, and digital systems. It covers Analog to Digital (A/D) and Digital to Analog (D/A) conversion circuits and interfacing techniques. It also covers the basics of truth tables, counters, shift registers, sequential and combinational logic circuits. Students continue using digital test equipment for prototyping, measuring, and troubleshooting digital circuits.

Objectives:
• Apply digital concepts logic functions, datasheets, and truth tables.
• Apply safety precautions, CMOS devices, and ESD/EOS.
• Apply digital schematics, wiring and block diagrams.
• Apply numbering systems, conversions, Boolean algebra, simplification, and digital coding.
• Apply digital test equipment and measurements.
• Apply sequential and combinational logic circuitry, counters, decoders, and conversion circuits.
• Apply troubleshooting digital circuits and systems.

Supplemental Courses Varies by Institution

Bridgerland

TEET 1030 IPC-A-610 Certification: Acceptability of Electronic Assemblies **1 Credit / 30 Clock-Hours**

The IPC-A-610 Certification: Acceptability of Electronic Assemblies course prepares students to obtain their certification. The Acceptability of Electronic Assemblies certification is the industry standard program for quality assurance/visual acceptance of electronic assemblies based on the world's most widely used electronics assembly acceptability standard. Students become Certified IPC Specialist (CIS) with the IPC-A-610 certification: Acceptability of Electronic Assemblies.

Objectives:
• Discuss the purpose, contents, specifications, and terms contained within the IPC-A-610 specification.
• Recognize proper handling, ESD requirements and cleanliness.
• Recognize acceptability requirements for discrete wiring assembly.
• Identify acceptable mechanical assembly requirements.
• Identify the requirements for soldering assemblies and recognize the acceptability requirements for high voltage.
• Recognize all criteria related to terminal connections.
• Recognize the requirements for component installation including orientation, mounting, lead forming, damage, wire/lead termination.
• Recognize the requirements for surface mount assemblies.

TEET 1100 Microcontrollers I **2 Credits / 60 Clock-Hours**

The Microconrollers I is a study in microcontroller architecture, arithmetic, programming, and interfacing. Emphasis placed on laboratory experiments dealing with microcontroller circuit build, program execution and interfacing. In this project-based course students will be given a platform to work with from several available on the market such as Arduino, Microchip, or others. Students will put together a series of projects that they design, build, program, and test for the instructor’s approval.

Objectives:
• Design and build microcontroller circuits.
• Program and test microcontroller circuits using structured text.
• Apply peripheral interfacing in software and hardware.
• Use interrupt control.
• Use software development tools.
• Use a C based programming language.

TEET 1105 Microcontrollers II **2 Credits / 60 Clock-Hours**

The Microcontroller II course is an advanced study in microcontroller architecture, arithmetic, programming, and interfacing. Emphasis placed on laboratory experiments dealing with microcontroller circuit build, program execution and interfacing. This course includes advanced topics and projects such as communication interfaces, I2C bus, SPI bus, interfacing with liquid crystal displays, hardware and timer interrupts, and data logging with SD cards. An integrated final project is required.

Objectives:
• Design and build advanced microcontroller circuits.
• Program and test advanced microcontroller circuits.
• Apply advanced peripheral interfacing in software and hardware.

TEET 1110 Instrumentation **3 Credits / 90 Clock-Hours**

The Instrumentation course explores scientific data collection systems used for natural resources, agriculture, industry, land survey and other markets. Students learn about various sensors, measurement devices, data communications, mobile data technology, power devices, regulators, software, and control devices.

Objectives:
• Use data acquisition systems.
• Use sensors to measure a broad array of parameters for environmental, water resource, research, and industrial applications.
• Demonstrate various procedures to perform calibration efficiently and effectively.
• Analyze sensors output electrical signals and transmit to data loggers.
• Connect sensors to data loggers and other devices.
• Examine different physical principles used in measurement sensors.
• Identify and connect capacitive, inductive, and resistive type sensors.
• Perform sensor measurements using various transducers.

TEET 1130 IPC-J-STD-001 Certification: Requirements for Electronic Assemblies **1 Credit / 30 Clock-Hours**

The IPC-J-STD-001 Certification course is an industry standard program for hand and machine soldering process and material requirements. Students become Certified IPC Specialist (CIS) with the IPC J-STD-001 certification. The course includes hands-on training and concludes with a qualifying examination. With this portable credential, students receive immediate recognition and value throughout the electronics industry.

Objectives:
• Recognize general safety requirements, necessary tools, and effects of electrostatic discharge (ESD).
• Make acceptable wire and terminal assemblies.
• Make acceptable through hole solder connections.
• Make acceptable surface mount solder connections.
• Identify general soldered connection acceptance requirements.
• Identify machine and reflow soldering process requirements.
• Recognize IPC Test methods and related standards.
• Pass the IPC J-STD-001 written and hands-on exams.

TEET 1140 IPC-WHMA-A-620 Certification: Cable and Wire Harness Assemblies **1 Credit / 30 Clock-Hours**

The IPC-WHMA-A-620 Certification course is an industry standard program for cable and wire harness fabrication and installation. This training familiarizes students with the general requirements of the IPC/WHMA-A-620 Requirements and Acceptance for Cable and Harness Assemblies and concludes with a qualifying examination. Upon successful completion of this training program, participants will be certified as Application Specialists. With this portable credential, students receive immediate recognition and value throughout the electronics industry.

Objectives:
• Perform cable/wire preparation, measuring, and testing of Cable Assemblies.
• Make crimp terminations and insulation displacement connections.
• Make proper soldered terminations and learn about high voltage applications.
• Explain connectorization and Over-Molding/Potting.
• Make professional splices, Coaxial/Biaxial Cable Assemblies, and learn about Ultrasonic Welding.
• Discuss the importance of marking/labeling, wire bundle securing, shielding, and protective coverings.
• Complete common cable assemblies with correct terminations.

TEET 1150 PCB Design and Fabrication **2 Credits / 60 Clock-Hours**

The PCB Design and Fabrication course is an introduction to PCB (Printed Circuit Board) design, schematic capture, layout, and fabrication. Students are taught how to prepare the CAD layout artwork while generating necessary files to run a CNC PCB mill in-house and to send to a 3rd party vendor to fabricate a PCB. This course culminates with a final project where a board is fabricated, stuffed, soldered, and tested.

Objectives:
• Use schematic capture to develop an electronic schematic.
• Show how to use the parts library and how to make parts not found in the library.
• Identify electronic symbols, components, references, and footprints using available libraries.
• Generate a netlist and use it to develop a printed circuit board layout drawing.
• Use design rule checker for signal integrity and proper board layout.
• Generate necessary files to put PCB into production.
• Fabricate a printed circuit board in-house using a CNC PCB router.
• Create Gerber files to send off to a vendor to produce a printed circuit board.

TEET 1160 Electronics Final Project **2 Credits / 60 Clock-Hours**

The Electronics Final Project course challenges students to develop and complete a project that focuses on an advanced industry skill. Students learn how to stay relevant in an evolving industry through identifying gaps in their skillset, setting measurable progress goals, and demonstrating their competency in new skills. Projects must be approved by the instructor.

Objectives:
• Develop schematics for all aspects of the project.
• Develop and submit a required parts list to the instructor.
• Develop a project action plan.
• Develop new skills needed for approved project.
• Meet all project specifications.
• Complete the project within the given time.
• Operate and debug the project to proper operating specifications.
• Log all hours used in course skill development and project-related activities.

TEAM 1060 Motor Controls **3 Credits / 90 Clock-Hours**

The Motor Controls course prepares students with a working knowledge and understanding of real-world motor control operations. Students who complete this course are able to proficiently setup and design motor control circuits utilizing schematics. Students in this course identify components and utilize instrumentation to troubleshoot and maintain systems.

Objectives:
• Demonstrate a working knowledge of safety practices and procedures.
• Operate, install, maintain, and design motor control circuits.
• Demonstrate a working knowledge of commonly used components, devices, and tools.
• Demonstrate a working knowledge of various control systems.
• Apply systems diagnostics and troubleshooting of motor control circuits.

TEAM 1070 Programmable Logic Controllers — 4 Credits / 120 Clock-Hours

The Programmable Logic Controllers course teaches students to interface with programmable logic controllers (PLCs). Programmable logic controllers are the brains of all modern automation technology systems. In this course students develop a working knowledge and skill set in the following competencies: ladder logic, programming standards, hardware selection, various inputs and outputs, communication, troubleshooting, setup and installation.

Objectives:
- Demonstrate a working knowledge of safety practices and procedures.
- Operate, install, maintain, and program programmable logic controller systems.
- Demonstrate working knowledge of ladder logic programming.
- Apply motor control logic within a programmable logic controller system.
- Apply timers and event sequencing within a programmable logic controller system.
- Configure inputs and outputs for various applications.
- Apply systems diagnostics and troubleshooting of programmable logic control circuit.

TEAM 1110 Introduction to Industrial Robotics — 2 Credits / 60 Clock-Hours

In the Introduction to Industrial Robotics course, students are introduced to industrial robot architecture, arithmetic, programming, and simulation. Emphasis is placed on laboratory experiments dealing with simple robot programming, and program execution. In this project□based course, students are given industry□recognized simulation software for lab completion. A hands□on experience with real industrial robots is also required.

Objectives:
- Determine the working specifications and architecture of a robot arm.
- Calculate necessary arithmetic, geometry, and trigonometry relative to robot arms.
- Program a robot arm through industry specific simulation software.
- Test and execute robot arm programs in industry recognized simulators.
- Test and execute a robot arm program with industrial robots.
- Identify what types of robots are available for Industrial and servicing applications.

TEAM 1120 3D Modeling — 2 Credits / 60 Clock-Hours

In the 3D Modeling course, students learn concepts and techniques of 3D, feature□based, parametric modeling using SolidWorks as the modeling tool. Students learn the SolidWorks user interface, menus, toolbars, and commands used to create 2D sketches, 3D parts and assemblies. Learn how to build design intent into models with the use of relations, dimensions, and assembly mates. All concepts covered on the CSWA (Certified SolidWorks Associate) exam are taught. This course covers enough material to allow maintenance technicians to design brackets, tooling, precision fixtures, safety guarding and similar parts to keep existing equipment working and also to make improvements where needed.

Objectives:
- Use the SolidWorks program and user interface.
- Recognize the file formats and document properties used with SolidWorks.
- Customize SolidWorks to fit users' needs.
- Manipulate model views and orientation.
- Practice the fundamentals of fully defining 2D sketches and 3D geometry.
- Perform basic and advanced feature creation to build models.
- Create assemblies from modeled components.
- Create 2D drawings from parts and assemblies.

Salt Lake

TEET 1030 IPC-A-610 Certification: Acceptability of Electronic Assemblies **1 Credit / 30 Clock-Hours**

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• Recognize the requirements for surface mount assemblies.

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Objectives:
• Use data acquisition systems.
• Use sensors to measure a broad array of parameters for environmental, water resource, research, and industrial applications.
• Demonstrate various procedures to perform calibration efficiently and effectively.
• Analyze sensors output electrical signals and transmit to data loggers.
• Connect sensors to data loggers and other devices.
• Examine different physical principles used in measurement sensors.
• Identify and connect capacitive, inductive, and resistive type sensors.
• Perform sensor measurements using various transducers.

TEET 1190 Troubleshooting **3 Credits / 90 Clock-Hours**

This Troubleshooting course covers principles, techniques, and procedures for troubleshooting electronics circuits using test equipment. The course will cover power supplies, DC, AC, analog, and digital systems. Emphasis is on ability to troubleshoot and find faults in common electronic circuits.

Objectives:
- Determine faults for DC circuits by applying troubleshooting techniques.
- Determine faults for AC circuits by applying troubleshooting techniques.
- Determine faults for Analog circuits by applying troubleshooting techniques.
- Determine faults for Digital circuits by applying troubleshooting techniques.
- Use various test equipment in troubleshooting.
- Apply a logical, systematic approach to analyze the circuit's behavior.
- Use schematics, block diagrams, and test instruments to identify defective components and circuits.

TEET 1200 Certified Electronics Technician **1 Credit / 30 Clock-Hours**

The Certified Electronics Technician course prepares students to take the ETA-I Associate Technician Certification exam.

Objectives:
- Demonstrate knowledge of all topics covered in the previous core courses.
- Demonstrate the ability to pass a practice certification exam.
- Pass the actual ISCET or ETA Associate-level Technician exam.