ELECTRONICS

ELECTRONICS (ELTN)

DIVISION: Career Technical Education

ELTN 015 COMPUTER AIDED ELECTRONIC DRAFTING
3 unit
Transfer Credit: CSU
Prerequisite(s): *Enrollment in or completion of ELTN 008A and MATH 003*

Computer aided drafting of electronic (CAED) circuits. Standards, electronic rules check, JEDEC specifications. Computer commands necessary to install and operate the CAED program. Practice in using the CAED programs with emphasis on current limitations and decoupling problems. PC board routing. Multilayer boards. Total of 36 hours lecture and 108 hours laboratory.
Grade Mode: *Audit, Letter Grade*

ELTN 025 LOGIC & MICROCOMPUTER ELECTRONICS
4 unit
Transfer Credit: CSU
Prerequisite(s): *ELTN 032*

Introduction to microcomputer systems, functional elements, organization, instruction sets. Preparation of assembly language programs, elements of structure, stack operations, timing analysis of bus operations. Microprocessor system interfacing, time considerations, interrupts. Multiprocessing and bus-sharing applications. Intel microprocessors with emphasis on 8085 and 8086-type microprocessors. Introduction to embedded controllers, interface design, single-chip controllers. Software development systems and diagnostics. Development and maintenance of microcomputer-based systems. No credit if taken after ELTN 125. Total of 54 hours lecture and 54 hours laboratory.
Grade Mode: *Audit, Letter Grade*

ELTN 031 CIRCUIT ANALYSIS
5 unit
Transfer Credit: CSU
Prerequisite(s): *ELTN 009*

Recommended Preparation: *MATH 008*

Field effect and bipolar transistor theory, audio preamplifiers and power amplifiers, coupling and bias stabilization techniques. Analysis of small-signal models, application of Kirchhoff's laws to multi-mesh active circuits, matrix methods. Mathematical analysis of feedback systems, stability considerations, elementary transforms. Applications of electro-optical devices, operational amplifiers. Complex operator in frequency response measurements. Total of 72 hours lecture and 72 hours laboratory.
Grade Mode: *Audit, Letter Grade*

ELTN 032 DIGITAL AND CONTROL ELECTRONICS
4 unit
Transfer Credit: CSU
Prerequisite(s): *ELTN 009 and MATH 008*

Introduction to logic circuit design and microprocessors. Design and analysis of digital, combinatorial logic, and sequential circuits. Minimization techniques using Boolean algebra and Karnaugh maps. Interfacing requirements, truth tables, multiplexers, demultiplexers, A/D converters and DAC's. Computer arithmetic and preparation of assembly language programs. Laboratory experience using digital circuits and microprocessors. Total of 54 hours lecture and 54 hours laboratory.
Grade Mode: *Audit, Letter Grade*

ELTN 109A APPLIED ALGEBRA FOR ELECTRONICS
4 unit
Prerequisite(s): *Enrollment in or completion of ELTN 130 or ELTY 240A*

Application of algebra to the analysis of electronic circuits. Review of measurement accuracy, precision and tolerance, and the use of scientific notation and scientific calculators. Solution of linear algebraic equations, factoring polynomials, rules of exponents, radicals, simultaneous equations and quadratic equations. Direct current network analysis using electronic laws and algebraic principles applied to problems arising in the laboratory. Use of electronic test equipment, measurements, collection of data and preparation of written reports. Recommended high school algebra or MATH 125. Total of 54 hours lecture and 54 hours laboratory.
Grade Mode: *Audit, Letter Grade*

ELTN 109B APPLIED MATHEMATICS FOR ELECTRONICS
3 unit
Prerequisite(s): *ELTN 109A*

Applications of trigonometry, number systems and Boolean algebra in electronics. Right angle trigonometry, identities, vector algebra, imaginary operator, impedance, logarithms, solution of exponential equations and use of a scientific calculator. Number systems and theorems of Boolean algebra. Total of 54 hours lecture.
Grade Mode: *Audit, Letter Grade*

ELTN 115 PRINTED CIRCUIT & ELECTRONIC HARDWARE DESIGN
3 unit
Prerequisite(s): *Enrollment in or completion of ELTN 130 or MIT 101*

Introduction to Electronic Hardware and Printed Circuit Board (PCB) design and manufacturing. Design and fabrication of PCB's with CAD software. Soldering techniques. Group system design. Total of 36 hours lecture and 54 hours laboratory.
Grade Mode: *Audit, Letter Grade*

ELTN 117 INTRODUCTION TO MICROCONTROLLERS AND EMBEDDED DESIGN
3 unit
Introduction to digital circuits including gates, memory circuits, microcontrollers, structured programming concepts and computer numbering systems. Programming microcontrollers and interfacing requirements, A/D and D/A conversion, sensors, user interfaces. Writing and debugging microcontroller programs. Laboratory experiments in the application of embedded microcontrollers and interfacing with digital and analog systems. Total of 36 hours lecture and 54 hours laboratory.
Grade Mode: *Letter Grade*

ELTN 125 LOGIC AND MICROCOMPUTER ELECTRONICS
4 unit
Prerequisite(s): *ELTN 032 or 132*

Introduction to microcomputer systems, functional elements, organization, instruction sets. Preparation of assembly language programs, elements of structure, stack operations, timing analysis of bus operations. Microprocessor system interfacing, time considerations, interrupts. Multiprocessing and bus-sharing applications. Intel microprocessors with emphasis on 8085 and 8086-type microprocessors. Introduction to embedded controllers, interface design, single-chip controllers. Software development systems and diagnostics. Development and maintenance of microprocessor-based systems. No credit if taken after ELTN 025. Total of 54 hours lecture and 54 hours laboratory.
Grade Mode: *Audit, Letter Grade*

ELTN 130 INTRODUCTION TO ELECTRONICS
3 unit
Recommended Preparation: *TECH 107A*

Introduction to the field of electronics including safety, electronics and the environment, atomic structure, electric charge, current, voltage, and resistance. Simple DC circuits including Ohm's law and Kirchoff's laws. Reading schematic diagrams. Use of electronics test equipment for measurement, evaluation and troubleshooting. Simple mathematical formulas, scientific notation, use of scientific calculators. Introduction to AC electricity. Introduction to DC and AC electric motors including some uses of motors in modern vehicles. Introduction to digital circuits. Introduction to microcontrollers. Total of 36 hours lecture and 54 hours laboratory.
Grade Mode: *Letter Grade*

ELTN 131 ANALOG DEVICES AND CIRCUITS
3 unit
Prerequisite(s): *ELTN 130*

Analog devices including diodes, transistors and operational amplifiers. Field effect and bipolar transistor theory, audio amplifiers. Analysis of RC filters, applications of operational amplifiers. Use of function generators and oscilloscopes to analyze circuits. Analog sensors and applications. Simulation and analysis of electronic circuits using software. Total of 36 hours lecture and 54 hours laboratory. No credit if taken after ELTN 031 or 121A or 131A.
Grade Mode: *Letter Grade*

ELTN 132 DIGITAL AND CONTROL ELECTRONICS
4 unit
Prerequisite(s): *ELTN 117*

Logic circuit design and microprocessors. Design and analysis of digital, combinatorial logic, and sequential circuits. Minimization techniques using Boolean algebra and Karnaugh maps. Interfacing requirements, truth tables, multiplexers, demultiplexers, shift registers, FPGAs. Interfacing of circuits with a microcontroller platform. Laboratory experience using digital circuits and microprocessors. Final project. No credit if taken after ELTN 032. Total of 54 hours lecture and 54 hours laboratory.
Grade Mode: *Audit, Letter Grade*

ELTN 150 BASIC ELECTRONICS FOR AUDIO
3 unit
Audio electronics theory and hardware operation for the basic technician. Measurement tools, test equipment, and safety procedures in an electronics laboratory. Hands-on audio electronics projects with emphasis on troubleshooting, maintenance, and repair of analog and digital circuitry in audio systems. Reading schematics, building simple circuits, and basic soldering techniques. Critical thinking and verbal and written communication for professional development and career readiness. Total of 36 hours lecture and 54 hours laboratory.
Grade Mode: *Letter Grade*