

ELECTRONICS AND COMPUTER REPAIR TECHNOLOGY (ELT)

CERTIFICATE - 35 HOURS

A.A.S. DEGREE - 63-65 HOURS

Jobs in electronics-based occupations and computer repair range from bench equipment repairers and technical writers who have little contact with the public, to technicians assisting scientists and engineers, field service technicians and sales positions representing the employer to customers. Students will learn how computers operate from both a hardware and software aspect. Computer courses are intended to aid students in obtaining their A+ certification. Students will assemble a computer from provided components and learn the required skills to function as a computer repair technician. Abstract reasoning abilities, math skills, manual dexterity, attention to detail and safety procedures are practiced in applying classroom concepts to hands-on troubleshooting and analytic skills in the lab. Students may complete a certificate in electronics by completing core courses and required general education courses. Upon completion of the program, students would be able to take the Certified Electronics Technician or Computer Service Technician certification exam offered by the Electronics Technician Association (ETA).

<u>Related Electives</u>		<u>Cr Hrs</u>
ELT	104 BEAM Robotics	3
ELT	225 Programmable Control	4
ELT	246 Advanced Programmable Control	4
ELT	280 Automated Systems/Robotics	4
ENG	150 Technical Writing	3

May choose approved related elective courses from the following program areas: CIS, CST, DDT, EMP, HRA, ICA, MTT, NET, WLD.

Preferred Course Sequence

Certificate = Courses in Shaded Areas

<u>Semester I</u>		
ELT	102 Circuit Analysis I	4
ELT	165 Computer Hardware	4
NET	160 Composition I	3
MTH	125 Technical Mathematics (or MTH 130)	3
	Social Science Elective	3
Total Semester Hours		17

<u>Semester II</u>		
ELT	103 Circuit Analysis II	4
ELT	231 Operating Systems Technology	4
CIS	101 Personal Computer Applications	3
COM	105 Public Speaking	3
PHY	140 Technical Physics	4
Total Semester Hours		18

<u>Semester III</u>		
ELT	152 Linear Electronics	4
ELT	160 Digital Electronics	4
NET	160 Introduction to Networking	4
¹	Social Science Elective	3
Total Semester Hours		15

<u>Semester IV</u>		
ELT	215 Telecommunications Fundamentals	4
ELT	235 Computer Interfacing	4
ELT	275 Certified Electronics Tech Prep	3
ELT	290 Co-op Ed/Intern/Related Elective (or ELT 291)	1-3
TEC	285 Occupational Seminar	1
Total Semester Hours		13-15

<u>Program Specific Courses</u>		<u>Cr Hrs</u>
ELT	102 Circuit Analysis I	4
ELT	103 Circuit Analysis II	4
ELT	152 Linear Electronics	4
ELT	160 Digital Electronics	4
ELT	165 Computer Hardware	4
ELT	215 Telecommunications Fundamentals	4
ELT	231 Operating Systems Technology	4
ELT	235 Computer Interfacing	4
ELT	275 Certified Electronics Tech Prep	3
ELT	290 Co-op Ed/Intern/Related Elective (or ELT 291)	1-3
CIS	101 Personal Computer Applications	3
NET	160 Introduction to Networking	4
TEC	285 Occupational Seminar	1

<u>General Ed Requirements</u>		<u>Cr Hrs</u>
COM	105 Public Speaking	3
ENG	101 Composition I	3
MTH	125 Technical Mathematics I (or MTH 130)	3
PHY	140 Technical Physics	4
	Social Science Elective	3
¹	Social Science Elective	3

¹Must satisfy Missouri law to include instruction in U.S. and State Constitutions. (See page 30)

This program is being revised.

COURSE DESCRIPTIONS

(ELT)

Cr Hrs-Lec-Lab

X = Variable

ELT-225 Programmable Control 4-2-4

This course introduces the basic hardware and programming language of common programmable logic controllers (PLCs) used in industrial process control systems. The student will learn the proper syntax of PLC code, basic commands, and the functioning of the program cycle. Programs will be written around discreet control elements. Students will learn how to use basic programming commands to perform typical industrial processes.

ELT-231 Operating Systems Technology 4-2-4

This course is a continuation of ELT 165 with greater emphasis placed on operating systems, system configuration, system management, and diagnostics. The use of operating system tools/utilities and system troubleshooting are integral to the course. A study of operating system management and navigation will be conducted. Operating system interaction with networks and the Internet are studied. *Prerequisite: ELT 165 or division chair permission.*

ELT-235 Computer Interfacing 4-2-4

Computer connection to the outside world, analog to digital, digital to analog, serial and parallel communications are analyzed. System interfacing skills involving parts ordering, documentation and electrical/mechanical adaptation and conversion are practiced in an embedded controller context. Field and Bench Service troubleshooting to hardware board and component level with diagnostics and test equipment are practiced. Integration and service of computer and peripheral electronics at both block diagram and schematic diagram level are practiced in a lab environment. Integration of hardware, software, and documentation to complete a fully functional embedded system is learned. *Prerequisite: ELT 160.*

ELT-246 Advanced Programmable Control 4-2-4

This course builds on ELT 225, Programmable Control, covering more advanced commands, technologies, and concepts. Industrial sensors are covered in greater detail, including optical, inductive, and capacitive sensors, shaft encoders, ultrasonic sensors, flow meters, pressure sensors, thermocouples and RTDs. Higher level instructions and techniques are introduced including sequencers, first pass instructions, subroutines, jump commands, master control relay, mathematical manipulation of program data, analog inputs and outputs, and display of data on various display panels. The student will be taught to capture and process analog data, display process data to a panel mounted display, and pass a combination of discreet and analog control signals to field devices. Networking of PLCs and their use with robots is also examined in this course. *Prerequisite: ELT 225 or division chair approval.*

ELT-275 Certified Electronics Tech Prep 3-2-2

This course provides a review and study of the terms, components, test equipment use, basic electrical/electronic units, symbols, basic circuit configurations and applications used in the degree program. *Prerequisite: Successful completion of three semesters of Electronics and Computer Repair Technology program.*

ELT-280 Automated Systems / Robotics 4-2-4

This course provides an in-depth study of robotics with an emphasis on industrial robotics applications. Robotics safety, and the economic, technical, social, and ethical issues involved in manufacturing automation and robotics are studied. Various sensors and interface circuitry is applied. Lab experiences include robot programming and operation, and implementation of a personal robotics project. Tours of various manufacturing facilities where robots are at work will be featured.

ELT-290 Co-Operative Ed/Intern/Related Elective Variable 1-3

This course involves supervised work experience in the major field, which provides the opportunity to make practical application of the knowledge and skills attained through coursework. An individualized instructional management plan will determine goals to be accomplished. Seminars may also be required. *Prerequisites: Completion of minimum of 30 hours of program specific courses and 2.0 GPA, or division chair permission.*

COURSE DESCRIPTIONS

(ELT-EMP)

Cr Hrs-Lec-Lab

X = Variable

ELT-291 Computer Clinic Internship Variable 1-3

This course involves supervised work experience in a computer repair facility that performs upgrades, maintenance and repair for customers. While polishing the technical skills learned in the ELT program, students will develop customer service, scheduling, troubleshooting, grooming, personal interaction, and other soft skills necessary to succeed in today's competitive computer repair field. Seminars may also be required. Please see the division chair of specific program area for application. *Prerequisite: This course has selective admission. Completion of 30 credit hours program courses, minimum 2.5 GPA and division chair approval required.*

(EMP) ELECTRONIC MEDIA PRODUCTION

EMP-100 Still Video Production 1-1-0

This course provides intensive hands-on instruction in state of the art image editing, compositing and special effects. Students will complete a variety of projects using backgrounds, image layering and effects.

EMP-101 Video Effects 1-1-0

This course provides intensive hands-on instruction in state of the art video effects, compositing and special effects. Students will complete a variety of projects using backgrounds, image layering and effects.

EMP-102 Introduction to Electronic Media Production 4-2-4

Students will study the history of electronic media from radio broadcast through television to present day media delivery. This course will include an associated lab designed to introduce students to electronic media editing systems available today.

EMP-110 Radio Production 4-2-4

Principles and practice of microphone use, audio mixing board applications, commercial message preparation, news delivery, multilayer recording for radio and audio post-production are covered. Students will perform and record radio music programming, and practice audio post-production.

EMP-115 Studio Television Production 4-2-4

This course provides an introduction to multi-camera studio production. Students will practice camera operation, lighting, audio recording and switching in teams while producing various television formats including news, interviews and commercial messages.

EMP-117 Video Systems 4-2-4

This course focuses on the principles of design and operation of basic video systems. This includes live and studio camera operation and lighting techniques. This course supports voice, video, images incorporated in stage and video, recording and editing production technology. *Prerequisite: EMP 102.*

EMP-127 Audio Engineering 4-2-4

This course explores the aesthetic and practical considerations employed in effective audio design in both studio and live production mixing. Students will study and operate multitrack recorders, digital editors, sound processing equipment and microphone placement. Emphasis will be on developing audio content, producing varied audio and editing the sources into a professional presentation.