

...Student Skills and Abilities

	WORK TERM 1	WORK TERM 2	GRAD
ACTIVE DISCRETE COMPONENT CIRCUITS			
Troubleshoot power supply and transistor amplifier circuits	•	•	•
LINEAR IC CIRCUITS			
Troubleshoot operational amplifiers, integrated circuit timers, integrated circuit regulators, voltage controlled oscillators, tone decoders/encoders, phase locked loops, comparators, audio amplifiers, integrators, differentiators	•	•	•
DIGITAL IC CIRCUITS			
Interpret numbering systems	•	•	•
Measure fundamental digital gates	•	•	•
Identify device "family" characteristics	•	•	•
Troubleshoot advanced digital circuits, flip-flop, display, arithmetic, converter, data conversion and transmission circuits, DAC and ADC circuits	•	•	•
SIMPLE MICROPROCESSOR-BASED SYSTEMS			
Troubleshoot components of a microcomputer	•	•	•
Write 8-bit machine language programs	•	•	•
Write I/O drivers for 8-bit microprocessor systems	•	•	•
Install and program 8-bit support ICs	•	•	•
PERSONAL COMPUTERS			
Use DOS Operating System, application software packages	•	•	•
Install a personal computer system	•	•	•
TECHNICAL DOCUMENTS			
Keep records, documentation	•	•	•
Write technical reports	•	•	•
AUTOMATED SYSTEMS FUNDAMENTALS			
Use pneumatic actuators and pneumatic logic, hydraulic actuators and logic, AC and DC actuators		•	•
Use gears, linkages and transmissions		•	•
Use tactile and non-tactile sensors		•	•
Design, install, and maintain automated systems		•	•
PROGRAMMABLE LOGIC CONTROLLERS			
Use and program Allan Bradley-based systems		•	•
Install and troubleshoot PLCs, configure PLC systems		•	•
Network PLCs		•	•
Program PLCs via programming terminal or via DOS environment		•	•
Program relay instructions, timers and counters, data manipulation, arithmetic, jumps and sub routines, files and data monitor mode programming, data transfer file instructions, sequencers, peripheral instructions		•	•
Troubleshooting techniques in software		•	•
INTERPRET DRAWINGS			
Interpret mechanical, electrical, architectural drawings		•	•
Interpret circuit diagrams of automated systems		•	•
Interpret pneumatic and hydraulic circuit diagrams		•	•
Produce drawings on CAD			•
PROGRAM ROBOTS			
Program ASEA IRb robots			•
COMMISSIONING AUTOMATED SYSTEMS			
Use specialized test equipment, digital storage oscilloscope, logic analyzers, diagnostics			•
Interface sensors and devices			•
Troubleshoot control systems			•
Troubleshoot and interface machine vision systems			•
Program machine vision systems			•
Use GPIB for data acquisition into a PC			•
Manufacture and design system tooling and fixturing			•
Maintain inventories of spare parts			•
Use common business practices			•
Estimate project time-lines, project costing			•

Placement Process

Employers participating in the program supply a job description to the Co-op Centre. The position is posted, and qualified students submit their resumés to the Co-operative Education Coordinator, who forwards them to employers and arranges interviews. Students are chosen for work placement by the employer, who sets the terms of employment, salary and benefits.

For Further Information

For specific information about Co-op Ed programs contact the Co-operative Education Centre at: Tel (604) 828-5276 or (604) 828-5494 Fax (604)828-5014

What Employers Say About Our Students...

"Worked diligently with minimal supervision. Was a pleasure to have on staff."

Allied Controls Ltd., Burnaby, B.C.

"Reliable, steady, good thinking skills"

System Directions Ltd., Burnaby, B.C.

"Quality of work and job knowledge are above average."

Weyerhaeuser Canada Ltd., Kamloops, B.C.

"...very capable in user support/ training function"

BC Lottery Corp. Kamloops, B.C.

Student Information

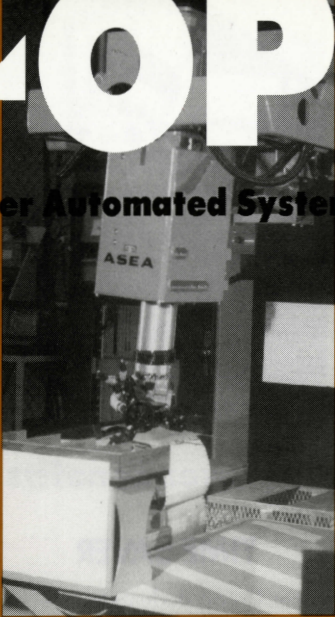
ADMISSION REQUIREMENTS

- a) Educational Requirements
- Successful completion of College pretest
 - B.C. Grade 12 or equivalent
 - B.C. Algebra 11 and Physics 11
 - B.C. Algebra 12 or Physics 12 or Chemistry 11 or Electronics 12 are strongly recommended
 - Adults may substitute appropriate related experience for regular admission requirements
- b) General Requirements
- Interview with counsellor
 - Interview with program coordinator
- c) Co-op Education Option
- minimum GPA of B- to participate in the Co-op option

MOBILITY

Work term placements will be available throughout British Columbia, Alberta and other Canadian locations. Co-operative education offers the opportunity to combine travel with work experience.

CO-OP ED Electronics - Computer Automated Systems Technician (CAST)



The Program

CAST provides the student with a working knowledge of industrial automation and the skills necessary to support, install and commission programmable logic controllers, industrial robots, sensors, data acquisition and operating systems. Other topics investigated include process planning, machine and work cell design, pneumatics, hydraulics, and mechanical linkages.

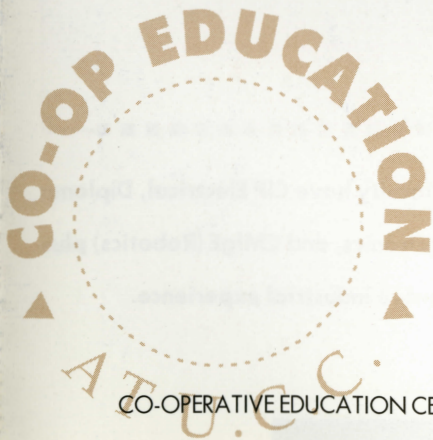
Before starting the first Work Term, students complete the 8-month provincial Core Electronics program in Academic Semesters 1 and 2.

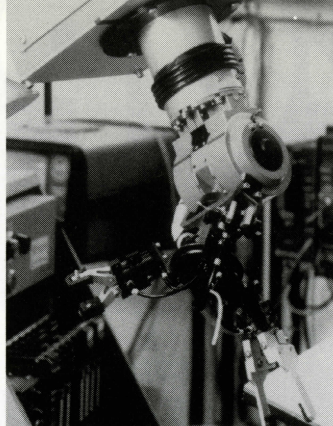
Academic Semesters are a combination of theory and supervised practice. Students spend 50% to 60% of their time working on current equipment under simulated industrial conditions.

Throughout the program good work habits, production, quality and efficiency are stressed. The program includes training in WHMIS and safe shop practices. Students also produce numerous technical reports.

What is Co-operative Education?

Co-op Education is the integration of theory and practical experience. Students alternate between specific periods of paid employment (Work Terms) and periods of on-campus study (Academic Semesters).





Employer Benefits

TIME SAVER

We pre-screen Co-op students to meet your needs.

SKILLED EMPLOYEES

Co-op students are skilled and ready to contribute to the day-to-day operation of your organization.

TEMPORARY SUPPORT

Co-op students provide temporary help during peak periods and can assist permanent personnel to concentrate on other tasks.

TEAM BUILDING

Co-op students are motivated, capable individuals with new ideas that can have a positive effect on permanent staff.

COST EFFECTIVE

Co-op affords you a low-risk opportunity to recruit permanent employees. You can select from a group of Co-op students who have demonstrated competence and interest in your organization.

UP-TO-DATE PROGRAMS

Co-op gives you an opportunity to provide feedback to UCC and help keep programs and courses relevant to your needs.

Co-op Time Pattern

	Year 1	Year 2
SEPT-DEC	ACADEMIC SEMESTER 1	ACADEMIC SEMESTER 3
JAN-APRIL	ACADEMIC SEMESTER 2	CO-OP WORK TERM 2
MAY- AUG	CO-OP WORK TERM 1	ACADEMIC SEMESTER 4*

* Graduation: August

Program Outline

ACADEMIC SEMESTER 1

September to December (4 months)

ELEC 152

BASIC ELECTRONICS THEORY introduces component identification, soldering, Ohm's Law, Kirchhoff's Laws, series and parallel circuits, batteries, function generators, oscilloscopes, magnetism, capacitance, capacitive reactance, inductance, inductive reactance, AC circuits, resonance, filters, and basic semiconductors.

ELEC 153

BASIC ELECTRONICS LAB verifies the theory of Electronics 152 and includes the correct use of hand tools and electronic test equipment. Special emphasis is placed on logical troubleshooting.

ACADEMIC SEMESTER 2

January to April (4 months)

ELEC 162

INTERMEDIATE ELECTRONICS THEORY is a study of basic semiconductors, semiconductor power supplies, transistor amplifiers, transistor oscillators, thyristors, optoelectronic devices and linear, digital and basic microprocessor circuits.

ELEC 163

INTERMEDIATE ELECTRONICS LAB verifies the theory of Electronics 162 and includes experiments using digital and microprocessor trainers. Test equipment and logical troubleshooting are emphasized.

CO-OP WORK TERM 1

May to August (4 months)

As bench technicians, Co-op students could be assigned to program at machine level language, design and troubleshoot computer interfaces and logic circuits, troubleshoot discrete and integrated circuits, install application software and peripheral devices for IBMPCs, operating within a DOS environment.

ACADEMIC SEMESTER 3

September to December (4 months)

CAST 152

INDUSTRIAL AUTOMATION 1, THEORY is a study of digital logic with an emphasis on real-time applications. Automation principles including FMS, CIM, pneumatics, hydraulics, AC and DC actuators, positional and velocity transducers, various sensors, mechanics and linkages, PLCs, mechanical and electrical print interpretation, and interfacing are studied.

CAST 153

INDUSTRIAL AUTOMATION 1, LAB emphasizes the devices studied concurrently in Industrial Automation Theory 1.

UCC faculty have CIP Electrical, Diploma in Electronics, and CMfgE (Robotics) plus extensive industrial experience.

CO-OP WORK TERM 2

January to April (4 months)

As systems technicians, Co-op students could be assigned to install and troubleshoot hydraulic and pneumatic systems, tactile and non-tactile sensors, and to program on line/off line, interface and troubleshoot PLC systems.

ACADEMIC SEMESTER 4

May to August (4 months)

CAST 162

INDUSTRIAL AUTOMATION 2, THEORY includes advanced robot programming and operation, tooling design, 16-bit microprocessors, commissioning, service and maintenance. Robots are used as real-time models to understand how computer automated systems operate. PC-based machine vision and data acquisition systems are studied. The use of appropriate test equipment and troubleshooting is also investigated.

CAST 163

INDUSTRIAL AUTOMATION 2, LAB allows the student hands-on experience with industrial grade equipment. The focus is on real-time work cell development and the necessary skills to support the various devices studied concurrently in CAST 162. A major design project using the equipment studied is a part of this course.

GRADUATION: AUGUST

As automated systems technicians, graduates are prepared to commission automated systems, troubleshoot, interface and program machine vision systems, manufacture and design system tooling. Program, interface and troubleshoot robotic systems. Program and configure data acquisition systems.

Student Skills and Abilities

	WORK TERM 1	WORK TERM 2	GRAD
GENERAL SHOP PRACTICES AND SAFETY			
Use hand and power tools	●	●	●
Solder and desolder	●	●	●
Select and use hardware	●	●	●
Use chemicals and lubricants	●	●	●
Terminate test and install cables	●	●	●
Layout and assemble wire wrap and circuit boards	●	●	●
TEST EQUIPMENT			
Use & maintain analog meters & digital multimeters	●	●	●
Use oscilloscopes to measure AC and DC circuits	●	●	●
Use & maintain function generators, component testers, frequency counters, and logic probes	●	●	●
Use power supplies	●	●	●
PASSIVE ELECTRONIC COMPONENTS			
Select, use and troubleshoot resistive devices, relays, electromagnetic transducers, transformers and inductors, capacitors and batteries	●	●	●
ACTIVE ELECTRONIC COMPONENTS			
Select, use and troubleshoot semiconductor diodes, bipolar transistors, field effect transistors, thyristors and optoelectrical devices	●	●	●
PASSIVE AC CIRCUITS			
Troubleshoot capacitive, inductive, and RLC circuits	●	●	●
Construct and measure time-constant, resonant and filtre circuits	●	●	●

continued...