
CAREER AND TECHNOLOGY STUDIES

A. PROGRAM RATIONALE AND PHILOSOPHY

Through Career and Technology Studies (CTS), secondary education in Alberta is responding to the many challenges of modern society, helping young people develop daily living skills and nurturing a flexible, well-qualified work force.

In Canada's information society, characterized by rapid change in the social and economic environment, students must be confident in their ability to respond to change and successfully meet the challenges they face in their own personal and work lives. In particular, they make decisions about what they will do when they finish high school. Many students will enter the work force, others will continue their education. All students face the challenges of growing independence and responsibility, and of entering post-secondary programs and/or the highly competitive workplace.

Secondary schools also face challenges. They must deliver, on a consistent basis, high quality, cost-effective programs that students, parents and the community find credible and relevant.

CTS helps schools and students meet these challenges. Schools can respond more efficiently and effectively to student and community needs and expectations by taking advantage of the opportunities in the CTS curriculum to design courses and access school, community and distance learning resources. Students can develop the confidence they need as they move into adult roles by assuming increased responsibility for their

learning; cultivating their individual talents, interests and abilities; and by defining and acting on their goals.

As an important component of education in Alberta secondary schools, CTS promotes student achievement by setting clear expectations and recognizing student success. Students in CTS develop competencies—the knowledge, skills and attitudes they are expected to demonstrate, that is, what they know and what they are able to do.

Acquired competencies can be applied now and in the future as students make a smooth transition into adult roles in the family, community, workplace and/or further education. To facilitate this transition, clearly stated expectations and standards have been defined in cooperation with teachers, business and industry representatives and post-secondary educators.

CTS offers all students important learning opportunities. Regardless of the particular area of study chosen, *students in CTS will:*

- develop skills that can be applied in their daily lives, now and in the future
- refine career-planning skills
- develop technology-related skills
- enhance employability skills
- apply and reinforce learnings developed in other subject areas.

In CTS, students build skills they can apply in their everyday lives. For example, in the CTS program, particularly at the introductory levels, students have the opportunity to improve their ability to make sound consumer decisions and to appreciate environmental and safety precautions.



A career encompasses more than activities just related to a person's job or occupation; it involves one's personal life in both local and global contexts; e.g., as a family member, a friend, a community volunteer, a citizen of the world.

The integration of careers throughout the CTS program helps students to make effective career decisions and to target their efforts. CTS students will have the opportunity to expand their knowledge about careers, occupations and job opportunities, as well as the education and/or training requirements involved. Also, students come to recognize the need for lifelong learning.

Students in CTS have the opportunity to use and apply technology and systems effectively and efficiently. This involves:

- a decision regarding which processes and procedures best suit the task at hand
- the appropriate selection and skilled use of the tools and/or resources available
- an assessment of and management of the impact the use of the technology may have on themselves, on others and on the environment.



Integrated throughout CTS are employability skills, those basic competencies that help students develop their personal management and social skills. Personal management skills are improved as students take increased responsibility for their learning, design innovative solutions to problems and challenges, and manage resources effectively and efficiently. Social skills improve through learning experiences that require students to work effectively with others, demonstrate teamwork and leadership, and maintain high standards in safety and accountability.

As well as honing employability skills, CTS reinforces and enhances learnings developed in core and other optional courses. The curriculum emphasizes, as appropriate, the effective application of communication and numeracy skills.

In addition to the common outcomes described above, students focusing on a particular area of study will develop career-specific competencies that support entry into the workplace and/or related post-secondary programs. Career-specific competencies can involve understanding and applying appropriate terminology, processes and technologies related to a specific career, occupation or job.

PROGRAM OUTCOMES

The program outcomes describe the basic competencies integrated throughout the CTS program.

Within an applied context relevant to personal goals, aptitudes and abilities; *the student* in CTS will:

- demonstrate the basic knowledge, skills and attitudes necessary for achievement and fulfillment in personal life
- develop an action plan that relates personal interests, abilities and aptitudes to career opportunities and requirements
- use technology effectively to link and apply appropriate tools, management and processes to produce a desired outcome
- develop basic competencies (employability skills), by:
 - selecting relevant, goal-related activities, ranking them in order of importance, allocating necessary time, and preparing and following schedules (managing learning)
 - linking theory and practice, using resources, tools, technology and processes responsibly and efficiently (managing resources)
 - applying effective and innovative decision-making and problem-solving strategies in the design, production, marketing and consumption of goods and services (problem solving and innovation)
 - demonstrating appropriate written and verbal skills, such as composition, summarization and presentation (communicating effectively)
 - participating as a team member by working cooperatively with others and contributing to the group with ideas, suggestions and effort (working with others)

- maintaining high standards of ethics, diligence, attendance and punctuality, following safe procedures consistently, and recognizing and eliminating potential hazards (demonstrating responsibility).

PROGRAM ORGANIZATION

CURRICULUM STRUCTURE

Career and Technology Studies is organized into **strands** and **courses**.

Strands in CTS define competencies that help students:

- build daily living skills
- investigate career options
- use technology (managing, processes, tools) effectively and efficiently
- prepare for entry into the workplace and/or related post-secondary programs.

In general, strands relate to selected industry sectors offering positive occupational opportunities for students. Some occupational opportunities require further education after high school, and some allow direct entry into the workplace. Industry sectors encompass goods-producing industries, such as agriculture, manufacturing and construction; and service-producing industries, such as business, health, finance and insurance.

Courses are the building blocks for each strand. They define what a student is expected to know and be able to do (exit-level *competencies*). Courses also specify prerequisites. Recommendations for course parameters, such as instructional qualifications, facilities and equipment can be found in the guides to implementation.

The competencies a student must demonstrate to achieve success in a course are defined through *general outcomes*. Senior high school students who can demonstrate the general outcomes defined for a CTS course; i.e., who have the designated competencies, will qualify for 1 credit toward their high school diploma.

Specific outcomes provide a more detailed framework for instruction. Within the context of the general outcomes, the specific outcomes further define the knowledge, skills and attitudes the student should acquire.

The following chart shows the 22 strands that comprise the CTS program and the number of 1-credit courses available in each strand.

| Strand | No. of Courses |
|-------------------------------|----------------|
| 1. Agriculture | 33 |
| 2. Career Transitions | 30 |
| 3. Communication Technology | 33 |
| 4. Community Health | 31 |
| 5. Construction Technologies | 46 |
| 6. Cosmetology Studies | 58 |
| 7. Design Studies | 31 |
| 8. Electro-Technologies | 47 |
| 9. Energy and Mines | 26 |
| 10. Enterprise and Innovation | 8 |
| 11. Fabrication Studies | 44 |
| 12. Fashion Studies | 29 |
| 13. Financial Management | 16 |
| 14. Foods | 37 |
| 15. Forestry | 21 |
| 16. Information Processing | 53 |
| 17. Legal Studies | 13 |
| 18. Logistics | 12 |
| 19. Management and Marketing | 23 |
| 20. Mechanics | 54 |
| 21. Tourism Studies | 24 |
| 22. Wildlife | 17 |

LEVELS OF ACHIEVEMENT

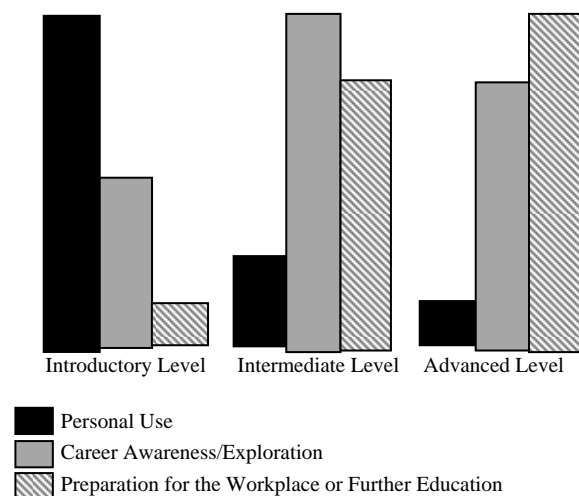
Courses are organized into three levels of achievement: **introductory**, **intermediate** and **advanced**. As students progress through the levels, they will be expected to meet higher standards and demonstrate an increased degree of competence, in both the program outcomes and the general outcomes defined for individual courses.

Introductory level courses help students build daily living skills and form the basis for further learning. Introductory courses are for students who have no previous experience in the strand.

Intermediate level courses build on the competencies developed at the introductory level. They provide a broader perspective, helping students recognize the wide range of related career opportunities available within the strand.

Advanced level courses refine expertise and help prepare students for entry into the workplace or a related post-secondary program.

The graph below illustrates the relative emphasis on the aspects of career planning at each of the levels.



CURRICULUM AND ASSESSMENT STANDARDS

Curriculum standards in CTS define what students must know and be able to do. Curriculum standards are expressed through the program outcomes for CTS, and through general and specific outcomes defined for individual courses within each strand.

Assessment standards define how student performance is to be judged. In CTS, each assessment standard defines the conditions and criteria to be used for assessing the competencies associated with each general outcome. To receive credit for a course, students must demonstrate competency at the level specified by the conditions and criteria defined for each general outcome.

Students throughout the province receive a fair and reliable assessment as they use the standards to guide their efforts, thus ensuring they participate more effectively and successfully in the learning and assessment process. Standards at advanced levels are, as much as possible, linked to workplace and post-secondary entry-level requirements.

TYPES OF COMPETENCIES

Two types of competencies are defined within the CTS program: basic and career-specific.

Basic competencies are generic to any career area and are developed within each course. Basic competencies include:

- personal management; e.g., managing learning, being innovative, ethics, managing resources
- social; e.g., communication, teamwork, leadership and service, demonstrating responsibility (safety and accountability).

Career-specific competencies relate to a particular strand. These competencies build daily living skills at the introductory levels and support the smooth transition to the workplace and/or post-secondary programs at the intermediate and advanced levels.

The model below shows the relationship of the two types of competencies within the 22 strands of the CTS program.












BASIC COMPETENCIES REFERENCE GUIDE

The chart below outlines basic competencies that students endeavour to develop and enhance in each of the CTS strands and courses. Students' basic competencies should be assessed through observations involving the student, teacher(s), peers and others as they complete the requirements for each course. In general, there is a progression of task complexity and student initiative as outlined in the Developmental Framework★. **As students progress through Stages 1, 2, 3 and 4 of this reference guide, they build on the competencies gained in earlier stages.** Students leaving high school should set themselves a goal of being able to demonstrate Stage 3 performance.

Suggested strategies for classroom use include:

- having students rate themselves and each other
- using in reflective conversation between teacher and student
- highlighting areas of strength
- tracking growth in various CTS strands
- highlighting areas upon which to focus
- maintaining a student portfolio.

| Stage 1— <i>The student:</i> | Stage 2— <i>The student:</i> | Stage 3— <i>The student:</i> | Stage 4— <i>The student:</i> |
|---|---|--|--|
| <p>Managing Learning</p> <ul style="list-style-type: none"> <input type="checkbox"/> comes to class prepared for learning <input type="checkbox"/> follows basic instructions, as directed <input type="checkbox"/> acquires specialized knowledge, skills and attitudes <input type="checkbox"/> identifies criteria for evaluating choices and making decisions <input type="checkbox"/> uses a variety of learning strategies | <p><input type="checkbox"/> </p> <ul style="list-style-type: none"> <input type="checkbox"/> follows instructions, with limited direction <input type="checkbox"/> sets goals and establishes steps to achieve them, with direction <input type="checkbox"/> applies specialized knowledge, skills and attitudes in practical situations <input type="checkbox"/> identifies and applies a range of effective strategies for solving problems and making decisions <input type="checkbox"/> explores and uses a variety of learning strategies, with limited direction | <p><input type="checkbox"/> </p> <ul style="list-style-type: none"> <input type="checkbox"/> follows detailed instructions on an independent basis <input type="checkbox"/> sets clear goals and establishes steps to achieve them <input type="checkbox"/> transfers and applies specialized knowledge, skills and attitudes in a variety of situations <input type="checkbox"/> uses a range of critical thinking skills to evaluate situations, solve problems and make decisions <input type="checkbox"/> selects and uses effective learning strategies <input type="checkbox"/> cooperates with others in the effective use of learning strategies | <p><input type="checkbox"/> </p> <p><input type="checkbox"/> </p> <ul style="list-style-type: none"> <input type="checkbox"/> demonstrates self-direction in learning, goal setting and goal achievement <input type="checkbox"/> transfers and applies learning in new situations; demonstrates commitment to lifelong learning <input type="checkbox"/> thinks critically and acts logically to evaluate situations, solve problems and make decisions <input type="checkbox"/> <input type="checkbox"/> provides leadership in the effective use of learning strategies |
| <p>Managing Resources</p> <ul style="list-style-type: none"> <input type="checkbox"/> adheres to established timelines; uses time/schedules/planners effectively <input type="checkbox"/> uses information (material and human resources), as directed <input type="checkbox"/> uses technology (facilities, equipment, supplies), as directed, to perform a task or provide a service <input type="checkbox"/> maintains, stores and/or disposes of equipment and materials, as directed | <ul style="list-style-type: none"> <input type="checkbox"/> creates and adheres to timelines, with limited direction; uses time/schedules/planners effectively <input type="checkbox"/> accesses and uses a range of relevant information (material and human resources), with limited direction <input type="checkbox"/> uses technology (facilities, equipment, supplies), as appropriate, to perform a task or provide a service, with minimal assistance and supervision <input type="checkbox"/> maintains, stores and/or disposes of equipment and materials, with limited assistance | <ul style="list-style-type: none"> <input type="checkbox"/> creates and adheres to detailed timelines on an independent basis; prioritizes task; uses time/schedules/planners effectively <input type="checkbox"/> accesses a range of information (material and human resources), and recognizes when additional resources are required <input type="checkbox"/> selects and uses appropriate technology (facilities, equipment, supplies) to perform a task or provide a service on an independent basis <input type="checkbox"/> maintains, stores and/or disposes of equipment and materials on an independent basis | <ul style="list-style-type: none"> <input type="checkbox"/> creates and adheres to detailed timelines; uses time/schedules/planners effectively; prioritizes tasks on a consistent basis <input type="checkbox"/> uses a wide range of information (material and human resources) in order to support and enhance the basic requirement <input type="checkbox"/> recognizes the monetary and intrinsic value of managing technology (facilities, equipment, supplies) <input type="checkbox"/> demonstrates effective techniques for managing facilities, equipment and supplies |
| <p>Problem Solving and Innovation</p> <ul style="list-style-type: none"> <input type="checkbox"/> participates in problem solving as a process <input type="checkbox"/> learns a range of problem-solving skills and approaches <input type="checkbox"/> practices problem-solving skills by responding appropriately to a clearly defined problem, specified goals and constraints, by: <ul style="list-style-type: none"> – generating alternatives – evaluating alternatives – selecting appropriate alternative(s) – taking action | <ul style="list-style-type: none"> <input type="checkbox"/> identifies the problem and selects an appropriate problem-solving approach, responding appropriately to specified goals and constraints <input type="checkbox"/> applies problem-solving skills to a directed or a self-directed activity, by: <ul style="list-style-type: none"> – generating alternatives – evaluating alternatives – selecting appropriate alternative(s) – taking action | <ul style="list-style-type: none"> <input type="checkbox"/> thinks critically and acts logically in the context of problem solving <input type="checkbox"/> transfers problem-solving skills to real-life situations, by generating new possibilities <input type="checkbox"/> prepares implementation plans <input type="checkbox"/> recognizes risks | <ul style="list-style-type: none"> <input type="checkbox"/> identifies and resolves problems efficiently and effectively <input type="checkbox"/> identifies and suggests new ideas to get the job done creatively, by: <ul style="list-style-type: none"> – combining ideas or information in new ways – making connections among seemingly unrelated ideas – seeking out opportunities in an active manner |

| Stage 1— <i>The student:</i> | Stage 2— <i>The student:</i> | Stage 3— <i>The student:</i> | Stage 4— <i>The student:</i> |
|--|---|---|--|
| <p>Communicating Effectively</p> <ul style="list-style-type: none"> <input type="checkbox"/> uses communication skills; e.g., reading, writing, illustrating, speaking <input type="checkbox"/> uses language in appropriate context <input type="checkbox"/> listens to understand and learn <input type="checkbox"/> demonstrates positive interpersonal skills in selected contexts | <ul style="list-style-type: none"> <input type="checkbox"/> communicates thoughts, feelings and ideas to justify or challenge a position, using written, oral and/or visual means <input type="checkbox"/> uses technical language appropriately <input type="checkbox"/> listens and responds to understand and learn <input type="checkbox"/> demonstrates positive interpersonal skills in many contexts | <ul style="list-style-type: none"> <input type="checkbox"/> prepares and effectively presents accurate, concise, written, visual and/or oral reports providing reasoned arguments <input type="checkbox"/> encourages, persuades, convinces or otherwise motivates individuals <input type="checkbox"/> listens and responds to understand, learn and teach <input type="checkbox"/> demonstrates positive interpersonal skills in most contexts | <ul style="list-style-type: none"> <input type="checkbox"/> negotiates effectively, by working toward an agreement that may involve exchanging specific resources or resolving divergent interests <input type="checkbox"/> negotiates and works toward a consensus <input type="checkbox"/> listens and responds to understand, learn, teach and evaluate <input type="checkbox"/> promotes positive interpersonal skills among others |
| <p>Working with Others</p> <ul style="list-style-type: none"> <input type="checkbox"/> fulfills responsibility in a group project <input type="checkbox"/> works collaboratively in structured situations with peer members <input type="checkbox"/> acknowledges the opinions and contributions of others in the group | <ul style="list-style-type: none"> <input type="checkbox"/>  <input type="checkbox"/> cooperates to achieve group results <input type="checkbox"/> maintains a balance between speaking, listening and responding in group discussions <input type="checkbox"/> respects the feelings and views of others | <ul style="list-style-type: none"> <input type="checkbox"/> seeks a team approach, as appropriate, based on group needs and benefits; e.g., idea potential, variety of strengths, sharing of workload <input type="checkbox"/> works in a team or group: <ul style="list-style-type: none"> – encourages and supports team members – helps others in a positive manner – provides leadership/followership as required – negotiates and works toward consensus as required | <ul style="list-style-type: none"> <input type="checkbox"/> leads, where appropriate, mobilizing the group for high performance <input type="checkbox"/> understands and works within the context of the group <input type="checkbox"/> prepares, validates and implements plans that reveal new possibilities |
| <p>Demonstrating Responsibility</p> <p>Attendance</p> <ul style="list-style-type: none"> <input type="checkbox"/> demonstrates responsibility in attendance, punctuality and task completion <p>Safety</p> <ul style="list-style-type: none"> <input type="checkbox"/> follows personal and environmental health and safety procedures <input type="checkbox"/> identifies immediate hazards and their impact on self, others and the environment <input type="checkbox"/> follows appropriate/emergency response procedures <p>Ethics</p> <ul style="list-style-type: none"> <input type="checkbox"/> makes personal judgements about whether or not certain behaviours/actions are right or wrong | <ul style="list-style-type: none"> <input type="checkbox"/>  <input type="checkbox"/> recognizes and follows personal and environmental health and safety procedures <input type="checkbox"/> identifies immediate and potential hazards and their impact on self, others and the environment <input type="checkbox"/>  <input type="checkbox"/> assesses how personal judgements affect other peer members and/or family; e.g., home and school | <ul style="list-style-type: none"> <input type="checkbox"/>  <input type="checkbox"/> establishes and follows personal and environmental health and safety procedures <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/> assesses the implications of personal/group actions within the broader community; e.g., workplace | <ul style="list-style-type: none"> <input type="checkbox"/>  <input type="checkbox"/> transfers and applies personal and environmental health and safety procedures to a variety of environments and situations <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/> demonstrates accountability for actions taken to address immediate and potential hazards <input type="checkbox"/> analyzes the implications of personal/group actions within the global context <input type="checkbox"/> states and defends a personal code of ethics as required |
| <p>★Developmental Framework</p> <ul style="list-style-type: none"> • <i>Simple task</i> • <i>Structured environment</i> • <i>Directed learning</i> | <ul style="list-style-type: none"> • <i>Task with limited variables</i> • <i>Less structured environment</i> • <i>Limited direction</i> | <ul style="list-style-type: none"> • <i>Task with multiple variables</i> • <i>Flexible environment</i> • <i>Self-directed learning, seeking assistance as required</i> | <ul style="list-style-type: none"> • <i>Complex task</i> • <i>Open environment</i> • <i>Self-directed/self-motivated</i> |

ELECTRO- TECHNOLOGIES

B. STRAND RATIONALE AND PHILOSOPHY

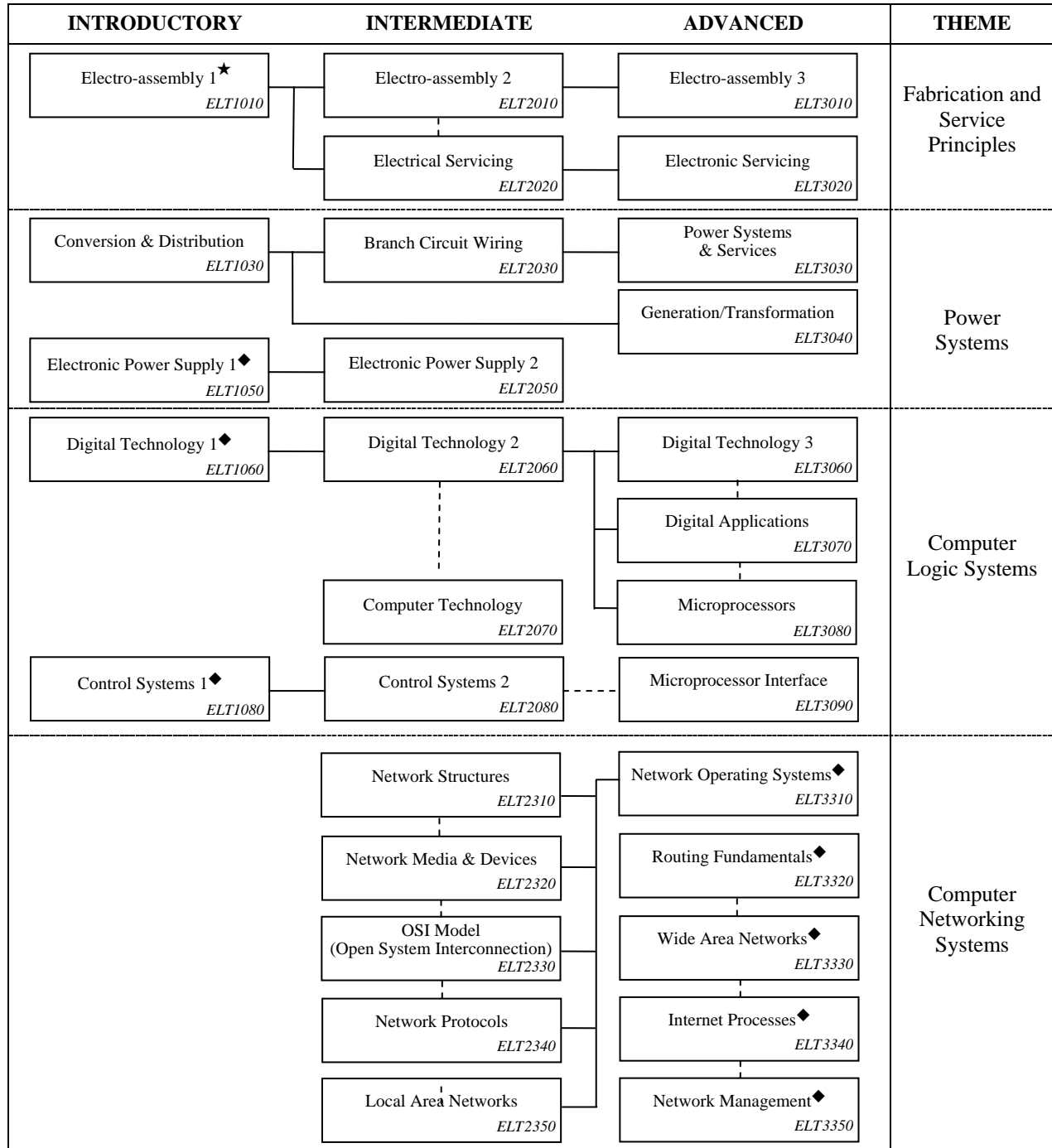
Electro-Technologies, a strand in Career and Technology Studies, focuses on having students gain an understanding of electrical/electronic systems and subsystems. Students are motivated to learn by studying electrical/electronic systems in an activity-oriented environment. The strand is an excellent vehicle for students to acquire knowledge, skills and attitudes needed to adapt to a rapidly changing and expanding technological world.

Electro-Technologies enables students to problem solve system applications by working at a systems level before focusing on specific fundamentals. Once the concepts are established, the ideas are integrated and contextualized to create real applications.

The Electro-Technologies strand provides students with practical experiences related to the electrical/electronics industry. Within the philosophy of Career and Technology Studies, *students in Electro-Technologies will:*

- exercise safe work and environmental practices
- develop electro-technology literacy
- demonstrate the ability to interface various electrical/electronic components and systems
- develop problem-solving, design and decision-making skills
- develop relevant applied mathematics skills, using algebra, trigonometry and geometry
- use scientific calculators and engineering notations
- demonstrate established procedures of operation as practised in the electrical/electronics industry
- demonstrate understanding of the use of software and hardware in the study of electrical/electronic systems
- develop the necessary skills and techniques to fabricate, modify and troubleshoot electrical/electronic systems and components
- demonstrate proficient use of test equipment
- demonstrate the differences between power, control, audio and digital systems
- develop basic competencies and skills that transfer to daily lives and career options
- develop leadership and teamwork skills
- develop knowledge, skills and attitudes required for the workplace and further education.

SCOPE AND SEQUENCE



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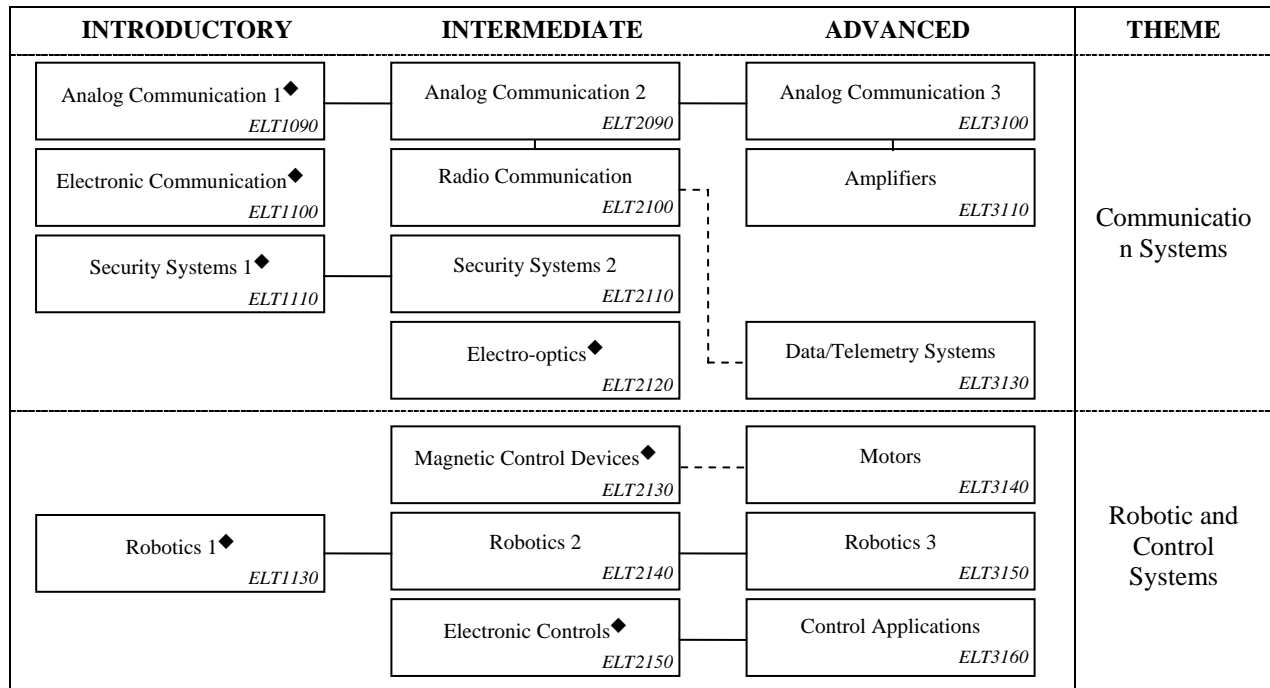
—— Prerequisite

----- Recommended sequence

★ Course provides a strong foundation for further learning in this strand.

◆ Refer to specific courses for additional prerequisites.

SCOPE AND SEQUENCE (continued)



Prerequisite

 Recommended sequence

★ Course provides a strong foundation for further learning in this strand.

♦ Refer to specific courses for additional prerequisites.

GENERAL OUTCOMES: INTRODUCTORY LEVEL

COURSE ELT1010: ELECTRO-ASSEMBLY 1

Level: Introductory

Theme: Fabrication and Service Principles

Prerequisite: None

Description: Students apply basic fabricating and servicing techniques to construct and test electronic and electromagnetic devices and cables.

General Outcomes: *The student will:*

- apply the appropriate fabrication techniques, including proper soldering and component assembly procedures, to construct and test a simple electronic circuit
- apply the appropriate fabrication techniques to construct and test an electromagnetic device
- identify and assemble common electrical/electronic cables and connectors used in power, audio and video connections
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT1030: CONVERSION & DISTRIBUTION

Level: Introductory

Theme: Power Systems

Prerequisite: None

Description: Students experiment and work with principles of electrical energy conversion and distribution.

General Outcomes: *The student will:*

- identify and describe methods of converting nonrenewable and renewable sources of energy into electricity
- construct an electrical distribution system
- demonstrate how mechanical, chemical, light and heat energy can be converted into electrical energy
- determine the cost efficiency, practicality and environmental impact of producing electricity from various sources of energy
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT1050: ELECTRONIC POWER SUPPLY 1

Level: Introductory

Theme: Power Systems

Prerequisite: ELT1010 Electro-assembly 1

Description: Students construct different types of alternating and direct current power supplies, and demonstrate their application in electrical/electronic systems.

General Outcomes: *The student will:*

- identify and describe various types of alternating and direct current power supplies
- construct a simple power supply
- test a regulated, filtered power supply for output characteristics
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT1060: DIGITAL TECHNOLOGY 1

Level: Introductory

Theme: Computer Logic Systems

Prerequisite: ELT1010 Electro-assembly 1

Description: Students construct and demonstrate logic systems and their unique functions.

General Outcomes: *The student will:*

- describe the binary numbering system and logic gates
- construct and verify basic logic gates
- construct a simple logic circuit, and explain its functions
- identify the major integrated circuit (IC) families, and describe their unique functions
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT1080: CONTROL SYSTEMS 1

Level: Introductory

Theme: Computer Logic Systems

Prerequisite: ELT1010 Electro-assembly 1

Description: Students construct process control systems, demonstrate their basic operation, and demonstrate procedures for testing them.

General Outcomes: *The student will:*

- identify how control systems are used in residential and commercial applications
- identify basic process control systems, and explain how they function
- construct basic process control circuits, using passive devices
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT1090: ANALOG COMMUNICATION 1

Level: Introductory

Theme: Communication Systems

Prerequisite: ELT1010 Electro-assembly 1

Description: Students install and demonstrate the fundamentals of various consumer audio integrated systems.

General Outcomes: *The student will:*

- distinguish the difference between terms and specifications used in analog audio systems
- install a functional audio system according to a given set of specifications
- service and maintain a consumer audio system
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT1100: ELECTRONIC COMMUNICATION

Level: Introductory

Theme: Communication Systems

Prerequisite: ELT1010 Electro-assembly 1

Description: Students demonstrate the fundamentals of video systems, and describe their uses.

General Outcomes: *The student will:*

- describe and compare the operating principles of coaxial cable television (CCTV) and cable television (CATV) video systems
- describe and compare various video formats
- assemble and install connectors associated with video cable network and video electronic systems
- explain the operation of an analog-modulated video system
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT1110: SECURITY SYSTEMS 1

Level: Introductory

Theme: Communication Systems

Prerequisite: ELT1010 Electro-assembly 1

Description: Students install and demonstrate the fundamentals of sensors, control units and warning devices used in security systems.

General Outcomes: *The student will:*

- identify and compare different electronic systems used to secure people, property and information
- describe and compare hardwired sensors
- install and test a security system, evaluate circuit performance, and identify possible maintenance requirements
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT1130: ROBOTICS 1

Level: Introductory

Theme: Robotic and Control Systems

Prerequisite: ELT1010 Electro-assembly 1

Description: Students apply the fundamentals of robotic systems and basic robotic functions.

General Outcomes: *The student will:*

- describe the evolution and applications of robotic systems
- identify and classify robotic systems and subsystems
- design and build a direct control robotic system
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

GENERAL OUTCOMES: INTERMEDIATE LEVEL

COURSE ELT2010: ELECTRO-ASSEMBLY 2

Level: Intermediate

Theme: Fabrication and Service Principles

Prerequisite: ELT1010 Electro-assembly 1

Description: Students apply electro-assembly technology to manufacture circuit boards.

General Outcomes: *The student will:*

- identify appropriate construction methods to fabricate a circuit board
- lay out and construct a simple electronic circuit board, using approved construction techniques
- use a PC board and proper fabrication techniques to assemble a project
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT2020: ELECTRICAL SERVICING

Level: Intermediate

Theme: Fabrication and Service Principles

Prerequisite: ELT1010 Electro-assembly 1

Description: Students demonstrate the fundamental concepts of repairing, servicing and maintaining electrical and electronic equipment.

General Outcomes: *The student will:*

- develop a basic repair and maintenance schedule for an electrical/electronic device
- identify faults in an electrical/electronic device, and propose solutions for repair
- use appropriate testing procedures to assess/repair an electrical/electronic device
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT2030: BRANCH CIRCUIT WIRING

Level: Intermediate

Theme: Power Systems

Prerequisite: ELT1030 Conversion & Distribution

Description: Students demonstrate the fundamentals of branch circuit wiring used in residential/commercial buildings.

General Outcomes: *The student will:*

- identify and describe various branch wiring systems used in residential and commercial applications
- apply Canadian Electrical Code (CEC) standards to various branch wiring system designs
- wire a branch circuit for a residential application
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT2050: ELECTRONIC POWER SUPPLY 2

Level: Intermediate

Theme: Power Systems

Prerequisite: ELT1050 Electronic Power Supply 1

Description: Students construct and demonstrate the fundamentals of electronic power supply technology.

General Outcomes: *The student will:*

- construct, analyze and evaluate single-phase rectifiers
- observe and test the voltage and waveform of a switching power supply
- build and analyze the characteristics of a power supply regulated by a zener transistor
- build, test and analyze filtering circuits used in electronic power supplies
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT2060: DIGITAL TECHNOLOGY 2

Level: Intermediate

Theme: Computer Logic Systems

Prerequisite: ELT1060 Digital Technology 1

Description: Students demonstrate knowledge of digital principles, by using small-scale transistor–transistor logic (TTL) and complementary metal oxide semiconductor (CMOS) integrated technology.

General Outcomes: *The student will:*

- identify and interface components with TTL and CMOS small-scale integrated circuit (IC) families
- identify components and construct a prototype of typical small-scale and complex logic networks, using TTL and CMOS families of ICs
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT2070: COMPUTER TECHNOLOGY

Level: Intermediate

Theme: Computer Logic Systems

Prerequisite: None

Description: Students develop the knowledge and skills required to install and configure a disc operating system and to set up a computer network.

General Outcomes: *The student will:*

- disassemble/assemble a working computer, and perform basic troubleshooting procedures
- identify and explain computer system components
- install and configure a disk operating system
- set up a computer network
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT2080: CONTROL SYSTEMS 2

Level: Intermediate

Theme: Computer Logic Systems

Prerequisite: ELT1080 Control Systems 1

Description: Students demonstrate how process control technology is used in real-world applications.

General Outcomes: *The student will:*

- identify discrete components used in process control
- identify and describe analog and sensor components used in process control
- construct a process control device, using analog and sensor components
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT2090: ANALOG COMMUNICATION 2

Level: Intermediate

Theme: Communication Systems

Prerequisite: ELT1090 Analog Communication 1

Description: Students demonstrate the fundamental concepts of electronic analog communication systems.

General Outcomes: *The student will:*

- identify characteristics of analog communication systems
- explain analog communication technology through project design, construction, experimentation, circuit analysis and electronic component identification
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT2100: RADIO COMMUNICATION

Level: Intermediate

Theme: Communication Systems

Prerequisite: ELT2090 Analog Communication 2

Description: Students demonstrate the fundamental concepts of electromagnetic communication systems.

General Outcomes: *The student will:*

- describe the principles of electromagnetic communication systems
- construct and test electromagnetic communication systems
- explain wireless communication technology through project construction, experimentation, circuit analysis and electronic component identification of oscillation amplification and detection
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT2110: SECURITY SYSTEMS 2

Level: Intermediate

Theme: Communication Systems

Prerequisite: ELT1110 Security Systems 1

Description: Students demonstrate the fundamentals of security technology used in homes, businesses and transportation systems.

General Outcomes: *The student will:*

- identify and describe elements of a security system
- identify detection and notification devices
- fabricate and operate a detection and notification alarm system for home or car use
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT2120: ELECTRO-OPTICS

Level: Intermediate

Theme: Communication Systems

Prerequisite: ELT2100 Radio Communication

Description: Students demonstrate basic knowledge of lasers and other light wave communication applications in various electronic systems.

General Outcomes: *The student will:*

- identify common types and classes of lasers
- explain the operation of laser, fibre optic, infrared and hologram light wave technology
- construct an electro-optical project
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT2130: MAGNETIC CONTROL DEVICES

Level: Intermediate

Theme: Robotic and Control Systems

Prerequisite: ELT1010 Electro-assembly 1

Description: Students demonstrate the fundamentals of electromagnetic control devices.

General Outcomes: *The student will:*

- identify and state the function of electromagnetic control devices
- explain the operation of electromagnetically controlled systems
- design and construct electromagnetic circuits, using ladder logic systems and wiring diagrams
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT2140: ROBOTICS 2

Level: Intermediate

Theme: Robotic and Control Systems

Prerequisite: ELT1130 Robotics 1

Description: Students demonstrate the fundamental concepts of sensor devices and control systems, by building an electronic circuit to control a direct wire or mobile robot.

General Outcomes: *The student will:*

- design and build a sensor device and control system for the robotic system
- identify sensor control systems and subsystems used in robotic systems
- explain sensory control circuits and components used in the robotic control system
- operate and demonstrate the capabilities of a robotic system equipped with sensor controls
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT2150: ELECTRONIC CONTROLS

Level: Intermediate

Theme: Robotic and Control Systems

Prerequisite: ELT2130 Magnetic Control Devices

Description: Students demonstrate the fundamentals of ladder/relay logic programming, and demonstrate how the program's logic controller system operates.

General Outcomes: *The student will:*

- explain basic input and output hardware and fundamentals of basic programming in programmable logic controller systems
- write a basic programming logic code, through real or programmed inputs on a programmable logic system, to operate and control electromagnetic devices
- wire, operate and test a programmable electromagnetic device
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT2310: NETWORK STRUCTURES

Level: Intermediate

Theme: Computer Networking Systems

Prerequisite: None

Description: Students acquire an understanding of network infrastructure and assess the advantages and disadvantages of different types of networks. They also develop knowledge of data transmission principles in a computer network and compare features of different network topologies and transmission methods.

General Outcomes: *The student will:*

- describe and explain the evolution of computer networks, and the general structure and function of:
 - peer-to-peer and server-based networks
 - local area networks and wide area networks
- describe and demonstrate basic principles of data transmission in a computer network
- describe and compare the features of:
 - bus, star, ring, mesh, wireless and hybrid topologies
 - Ethernet, token ring, Fibre Distributed Data Interface (FDDI) and wireless transmission methods
- demonstrate established laboratory procedures and safe work practices
- identify career paths in computer networking
- demonstrate basic competencies.

COURSE ELT2320: NETWORK MEDIA & DEVICES

Level: Intermediate

Theme: Computer Networking Systems

Prerequisite: None

Description: Students develop an understanding of different connectivity strategies for linking computers and other devices in a local area network (LAN). They acquire knowledge of industry standards for network cables and gain practical experience through installing cabling, connectors and other hardware components.

General Outcomes: *The student will:*

- identify and describe the characteristics, standard names and applications for common network media and connectors
- identify and explain the purpose, features and basic operation of network hardware components
- demonstrate knowledge of cabling tools; and demonstrate ability to install network cabling, connectors and hardware components
- demonstrate established laboratory procedures and safe work practices
- identify and describe career paths and employment opportunities in network infrastructure design and installation
- demonstrate basic competencies.

COURSE ELT2330: OSI MODEL (Open System Interconnection)

Level: Intermediate

Theme: Computer Networking Systems

Prerequisite: None

Description: Students develop knowledge of the Open System Interconnection (OSI) reference model and its use as a conceptual framework for analyzing network communication tasks. They examine OSI reference model characteristics, the functions of each of its seven layers, and how data moves between layers of the reference model when computers establish a network connection.

General Outcomes: *The student will:*

- describe the general purpose and structure of the OSI reference model as a conceptual framework for network communication
- explain and illustrate how hardware components, network protocols and encapsulation defined in lower layers of the OSI reference model move data across the network; i.e.:
 - physical layer
 - data link layer
 - network layer
 - transport layer
- explain the function of upper layers of the OSI reference model in providing client support; i.e.:
 - session layer
 - presentation layer
 - application layer
- demonstrate established laboratory procedures and safe work practices
- identify and describe information and communication technology careers within the context of the OSI reference model
- demonstrate basic competencies.

COURSE ELT2340: NETWORK PROTOCOLS

Level: Intermediate

Theme: Computer Networking Systems

Prerequisite: None

Description: Students acquire basic knowledge of upper-layer protocol suites that permit the networking of computers. They examine reasons for the extensive use of the Transmission Control Protocol/Internet Protocol (TCP/IP) in computer networks, and develop knowledge and skills relevant to installing, configuring and maintaining a TCP/IP client on a network.

General Outcomes: *The student will:*

- describe and compare standard networking protocol suites with respect to function, addressing requirements, interoperability and naming conventions
- identify and explain reasons for the extensive use of the TCP/IP suite in computer networks, and identify and explain major protocols that operate within the TCP/IP suite
- demonstrate basic knowledge of logical addressing, and the use of subnets and subnet masks to maximize address utilization
- demonstrate ability to:
 - install and configure TCP/IP on a user work station
 - validate, troubleshoot and manage a network connection using TCP/IP utilities
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT2350: LOCAL AREA NETWORKS

Level: Intermediate

Theme: Computer Networking Systems

Prerequisite: None

Description: Students extend their understanding of technologies used in a local area network (LAN) and examine specifications for an Ethernet LAN. They develop knowledge of a general strategy for network design and apply the strategy to design, implement and troubleshoot a small LAN.

General Outcomes: *The student will:*

- describe and explain the nature and evolution of LAN technologies and the specific features that differentiate one LAN from another
- explain and demonstrate characteristics of an Ethernet LAN and strategies for improving network performance
- describe the characteristics, function and benefits of a virtual local area network (VLAN)
- design and implement a small LAN
- analyze and troubleshoot basic problems related to LAN design and implementation
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

GENERAL OUTCOMES: ADVANCED LEVEL

COURSE ELT3010: ELECTRO-ASSEMBLY 3

Level: Advanced

Theme: Fabrication and Service Principles

Prerequisite: ELT2010 Electro-assembly 2

Description: Students apply photographic processes to construct a printed circuit for an electronic project.

General Outcomes: *The student will:*

- identify three photographic printed circuit (PC) board construction methods
- design or modify a board layout to be used for photographic PC board construction
- construct a PC board, using a photographic method
- assemble a project, using a PC board
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT3020: ELECTRONIC SERVICING

Level: Advanced

Theme: Fabrication and Service Principles

Prerequisite: ELT2020 Electrical Servicing

Description: Students develop and apply basic processes and skills to service and repair consumer-based electronic products.

General Outcomes: *The student will:*

- use a block diagram to show the function and the stages of operation of an electronic device
- identify system faults, and propose solutions to service and repair various digital and analog consumer products
- use standard, safe practices to service/repair an electronic component or device
- create a profile of a trade or occupation within the field of electronic servicing
- demonstrate basic competencies.

COURSE ELT3030: POWER SYSTEMS & SERVICES**Level:** Advanced**Theme:** Power Systems**Prerequisite:** ELT2030 Branch Circuit Wiring**Description:** Students construct, operate, analyze and evaluate various single-phase and three-phase power systems and services.**General Outcomes:** *The student will:*

- follow established, safe laboratory procedures and practices when working with three-phase systems
- construct and analyze a three-wire, single-phase electrical system
- analyze common reluctance inductance (RLC) vector diagrams
- construct and analyze three-wire, three-phase and four-wire, three-phase wye systems
- construct and analyze three-wire, three-phase delta systems
- create a profile of a trade or occupation within the field of power systems and services
- demonstrate basic competencies.

COURSE ELT3040: GENERATION/TRANSFORMATION**Level:** Advanced**Theme:** Power Systems**Prerequisite:** ELT1030 Conversion & Distribution**Description:** Students operate, experiment with and analyze alternators and transformers used in power generation and distribution.**General Outcomes:** *The student will:*

- explain the principles of operation of electrical components used in safety devices
- set up and operate three-phase low voltage alternators in no load and load conditions
- explain the operational and loading parameters for alternators
- operate a low voltage alternator in parallel with another alternator(s)
- describe the operating principles of single-phase transformers
- identify fundamental loading characteristics of single-phase transformers
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT3060: DIGITAL TECHNOLOGY 3

Level: Advanced

Theme: Computer Logic Systems

Prerequisite: ELT2060 Digital Technology 2

Description: Students demonstrate knowledge of digital principles by using medium-scale transistor–transistor logic (TTL) and complementary metal oxide semiconductor (CMOS) integrated technology.

General Outcomes: *The student will:*

- identify, interface and experiment with medium-scale integrated circuit (IC) families
- identify components, construct a prototype and experiment with typical medium-scale logic networks
- demonstrate established laboratory procedures and safe work practices
- create a profile of a trade or occupation within the field of digital technology
- demonstrate basic competencies.

COURSE ELT3070: DIGITAL APPLICATIONS

Level: Advanced

Theme: Computer Logic Systems

Prerequisite: ELT2060 Digital Technology 2

Description: Students experiment with large-scale and very large-scale integrated circuits, and demonstrate their applications to practical situations.

General Outcomes: *The student will:*

- identify applications and develop prototypes of large-scale integrated circuits
- troubleshoot a digital system or prototype with digital equipment
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT3080: MICROPROCESSORS

Level: Advanced

Theme: Computer Logic Systems

Prerequisite: ELT2060 Digital Technology 2

Description: Students compare the internal architecture of microprocessors and program them, using instruction sets.

General Outcomes: *The student will:*

- compare the internal architecture of various families of microprocessors
- program a microprocessor, using instruction sets
- describe input/output operations in microprocessors
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT3090: MICROPROCESSOR INTERFACE

Level: Advanced

Theme: Computer Logic Systems

Prerequisite: ELT3080 Microprocessors

Description: Students demonstrate how to interface microprocessors/microcontrollers with real-world applications.

General Outcomes: *The student will:*

- describe microprocessor interface output and input circuits
- explain the operation of a serial interface device
- interface a digital-to-analog (D/A) and analog-to-digital (A/D) converter to a microprocessor
- connect a microprocessor to a sensor device used in home, industrial and/or transportation applications
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT3100: ANALOG COMMUNICATION 3

Level: Advanced

Theme: Communication Systems

Prerequisite: ELT2090 Analog Communication 2

Description: Students demonstrate the principal concepts of electronic analog communication systems.

General Outcomes: *The student will:*

- identify and demonstrate applications of analog communication
- explain differences between analog communication circuit applications used in telephone systems and consumer audio equipment
- demonstrate established laboratory procedures and safe work practices
- create a profile of a trade or occupation within the field of analog communication
- demonstrate basic competencies.

COURSE ELT3110: AMPLIFIERS

Level: Advanced

Theme: Communication Systems

Prerequisite: ELT3100 Analog Communication 3

Description: Students demonstrate knowledge of various types and classes of amplifiers.

General Outcomes: *The student will:*

- explain the differences among various types and classes of amplifiers
- construct, analyze and test amplifier circuits and components
- maintain, test and troubleshoot a power amplifier
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT3130: DATA/TELEMETRY SYSTEMS

Level: Advanced

Theme: Communication Systems

Prerequisite: None

Description: Students demonstrate the fundamentals of various data/telemetry systems, and demonstrate their applications to the real world.

General Outcomes: *The student will:*

- distinguish the difference between analog and digital carriers with voice or data transmission
- explain data/telemetry communication through experimentation, circuit analysis and project work
- construct a voice or data transmission network
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT3140: MOTORS

Level: Advanced

Theme: Robotic and Control Systems

Prerequisite: None

Description: Students demonstrate knowledge of electric motor operation and loading characteristics.

General Outcomes: *The student will:*

- explain electromotive principles as applied to direct current (DC) and single-phase alternating current (AC) motors
- explain the operational characteristics of common DC and AC motors
- set up selected DC and AC motors, and demonstrate their loading characteristics
- demonstrate established laboratory procedures and safe work practices
- create a profile of a trade or occupation within the field of electric motors
- demonstrate basic competencies.

COURSE ELT3150: ROBOTICS 3

Level: Advanced

Theme: Robotic and Control Systems

Prerequisite: ELT2140 Robotics 2

Description: Students demonstrate remote/autonomous control systems, by constructing circuits to control robotic behaviour.

General Outcomes: *The student will:*

- identify and assemble the required components to build a frequency remote control or microprocessor control for a robotic unit
- identify various microprocessor control systems and subsystems used in robotic units
- explain frequency control or microprocessor control circuits and components in robotic units
- operate a robotic system that has various feedback controls
- demonstrate established laboratory procedures and safe work practices
- create a profile of a trade or occupation within the field of robotics
- demonstrate basic competencies.

COURSE ELT3160: CONTROL APPLICATIONS

Level: Advanced

Theme: Robotic and Control Systems

Prerequisite: ELT2150 Electronic Controls

Description: Students demonstrate the fundamentals of programmed controls, and demonstrate how sensing devices are integrated to control output devices.

General Outcomes: *The student will:*

- identify and describe input and output hardware components and the methods of programming
- use programming logic, including real or programmed inputs, to control electromagnetic devices
- use various instruction codes to operate and control electromagnetic devices
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT3310: NETWORK OPERATING SYSTEMS

Level: Advanced

Theme: Computer Networking Systems

Prerequisite: ELT2310: Network Structures
ELT2320: Network Media & Devices
ELT2330: OSI Model (Open System Interconnection)
ELT2340: Network Protocols
ELT2350: Local Area Networks

Description: Students examine the features, advantages and disadvantages of major network operating systems, and the criteria involved in selecting network operating systems that are appropriate in specific networking environments. They develop knowledge and skills required to install and configure different network and client operating systems, and develop a strategy for troubleshooting problems resulting from the installation of operating system software.

General Outcomes: *The student will:*

- identify the generic functions and administrative tasks common to all network operating systems
- describe and compare specific capabilities and functions of current versions of network operating systems in common use
- identify and analyze criteria relevant to planning for, selecting and implementing a network operating system
- demonstrate ability to install and configure two or more network operating systems and compatible network clients
- demonstrate ability to analyze and troubleshoot connectivity problems related to the installation of operating system software
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT3320: ROUTING FUNDAMENTALS

Level: Advanced

Theme: Computer Networking Systems

Prerequisite: ELT2310: Network Structures
ELT2320: Network Media & Devices
ELT2330: OSI Model (Open System Interconnection)
ELT2340: Network Protocols
ELT2350: Local Area Networks

Description: Students extend their knowledge of wide area networks (WANs) by examining the process by which information is routed through an internetwork. They examine the major functions and components of a router, develop knowledge of common routing protocols, and gain practical experience in basic router configuration.

General Outcomes: *The student will:*

- describe the process of routing data through an internetwork, and describe the major functions of a router
- explain and analyze the addressing and routing function of protocols operating at the network layer of the Open System Interconnection (OSI) reference model
- demonstrate knowledge of router components, commands and configuration processes
- describe and explain methods used to manage and monitor network routing
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT3330: WIDE AREA NETWORKS

Level: Advanced

Theme: Computer Networking Systems

Prerequisite: ELT2310: Network Structures
ELT2320: Network Media & Devices
ELT2330: OSI Model (Open System Interconnection)
ELT2340: Network Protocols
ELT2350: Local Area Networks

Description: Students develop basic knowledge of the technologies employed in a wide area network (WAN) and of how a WAN may be used to connect local area networks (LANs) at different locations. They gain practical experience in using WAN technologies to establish remote network access, and they analyze emerging WAN technologies with respect to impact on global networking.

General Outcomes: *The student will:*

- describe the general structure, function and communication services provided by a WAN
- explain and illustrate basic concepts of circuit switching and packet switching and their application in a WAN
- demonstrate applications of WAN technology in providing network users with remote access
- identify and describe security issues in a WAN and the function of network security protocols and methods
- analyze emerging WAN technologies with respect to design, evolution and impact on global networking
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT3340: INTERNET PROCESSES

Level: Advanced

Theme: Computer Networking Systems

Prerequisite: ELT2310: Network Structures
ELT2320: Network Media & Devices
ELT2330: OSI Model (Open System Interconnection)
ELT2340: Network Protocols
ELT2350: Local Area Networks

Description: Students apply their knowledge of wide area network (WAN) technologies to an Internet environment. Course content focuses on the significance and utility of Internet Protocol (IP) addressing schemes in Internet communication and on the function of WAN protocols and services in providing Internet access. Students develop knowledge of internetworking career paths and related educational opportunities.

General Outcomes: *The student will:*

- describe and analyze the historical roots, basic architecture and functions of the Internet in global communication
- develop a rationale for, and demonstrate the use of, IP addressing schemes, subnets and subnet masks in Internet communication
- explain and compare the function of selected WAN protocols and services, and their utility in providing access to the Internet
- identify and assess methods for connecting a local network infrastructure with the Internet
- identify and describe internetworking career paths and employment opportunities, as well as related education and certification requirements
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

COURSE ELT3350: NETWORK MANAGEMENT

Level: Advanced

Theme: Computer Networking Systems

Prerequisite: ELT2310: Network Structures
ELT2320: Network Media & Devices
ELT2330: OSI Model (Open System Interconnection)
ELT2340: Network Protocols
ELT2350: Local Area Networks

Description: Students acquire knowledge of internal and external risks to a network and develop strategies for protecting network data and securing a network. They also develop and apply a general strategy for troubleshooting network problems and acquire knowledge of the basic roles and responsibilities associated with network maintenance and support.

General Outcomes: *The student will:*

- provide a rationale for protecting network data, and describe major components of a data backup strategy
- analyze security risks in a local area network (LAN), and describe steps that can be taken to secure a network
- demonstrate an understanding of the functions and key roles of network maintenance and support in an organization
- use appropriate strategies, tools and commands to troubleshoot common network problems
- identify and describe career paths and employment opportunities in network maintenance and support
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.