
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

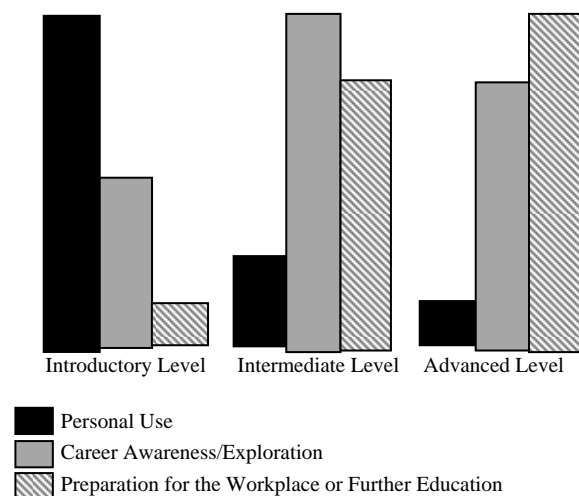
Courses are organized into three levels of achievement: **introductory**, **intermediate** and **advanced**. As students progress through the levels, they will be expected to meet higher standards and demonstrate an increased degree of competence, in both the program outcomes and the general outcomes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

INFORMATION PROCESSING

B. STRAND RATIONALE AND PHILOSOPHY

Information Processing, a strand in Career and Technology Studies, represents the study of electronic technologies as they apply to personal use and the business environment.

As we move more rapidly into the information age, it is crucial that students are able to use electronic technologies to access and manipulate information in an efficient manner. Accurate, timely information is the basis for sound decision making and effective communication.

As students build confidence in their understanding of the various information processing tools and procedures, they will be able to transfer their knowledge and skill to a wide range of contexts. They will also be better able to adapt to the continual changes caused by the evolving technologies.

To understand the shift from the *industrial society* toward the *information age*, it is important that a student understands the significance of the current technological development, of how technology affects an individual's daily life and of the impact that technology has on the world of work. Within this perspective, Information Processing provides for the development of:

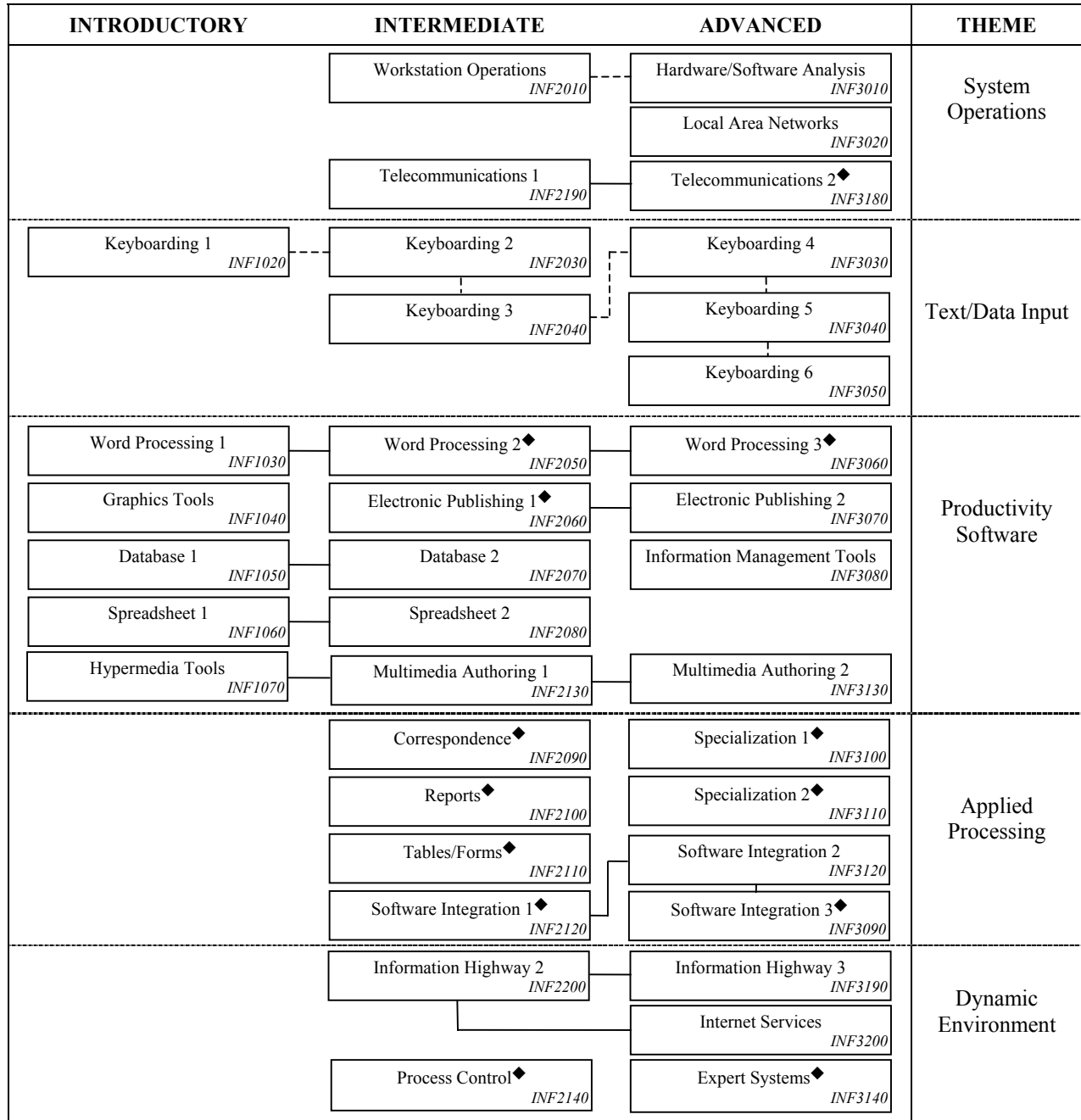
- a meaningful study of technological trends

- an understanding of the systems that relate in whole or in part to the management of information
- an understanding of the ethical and societal issues concerning technological development and its impact on society
- technological skills and knowledge designed for personal use
- technological skills and knowledge that transfer to other curriculum areas
- technological skills and knowledge required for the world of work.

Students will learn to input, process and output information in the following areas:

- system operations
- text/data input
- productivity software
- applied processing
- dynamic environment
- programming (procedure-oriented and object-oriented)
- computer science.

SCOPE AND SEQUENCE



(continued)

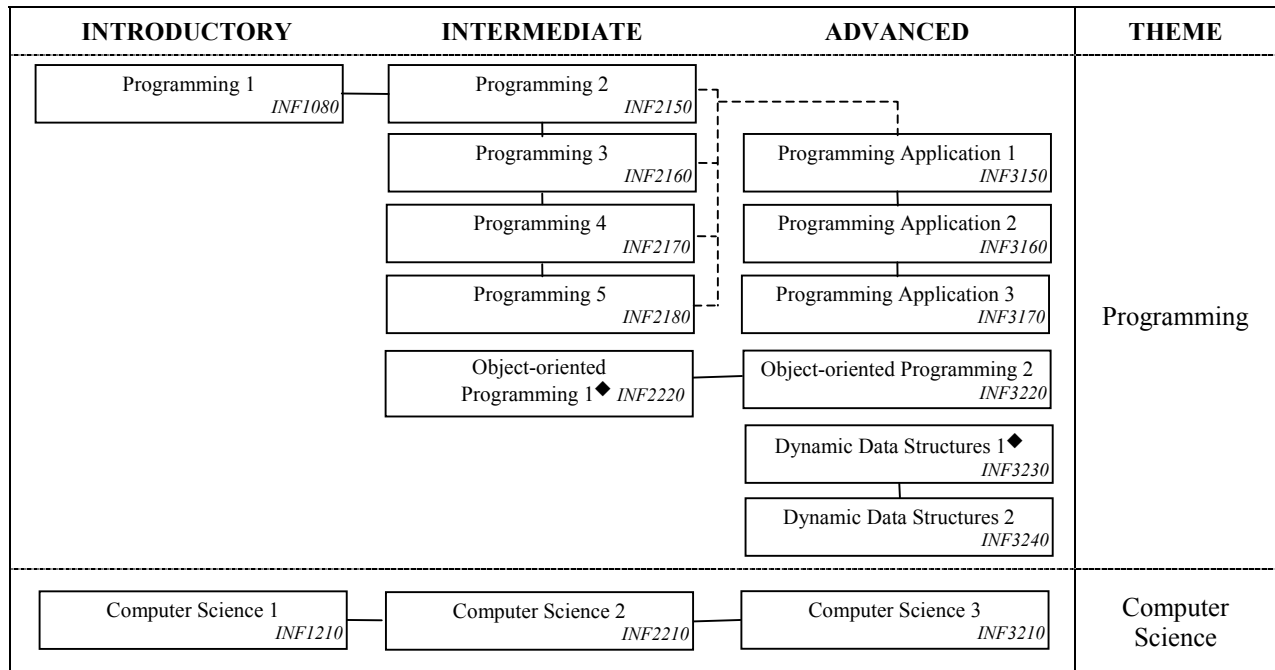
—— Prerequisite

----- Recommended sequence

♦ Refer to specific courses for additional prerequisites.

Note: Computer Operations and Information Highway 1 have been withdrawn effective September 2003.

SCOPE AND SEQUENCE (continued)



—— Prerequisite

----- Recommended sequence

♦ Refer to specific courses for additional prerequisites.

GENERAL OUTCOMES: INTRODUCTORY LEVEL

COURSE INF1020: KEYBOARDING 1

Level: Introductory

Theme: Text/Data Input

Prerequisite: None

Description: Students develop accurate touch keystroking of text and data appropriate to personal use and the application of efficient workstation procedures.

General Outcomes: *The student will:*

- demonstrate keyboarding competence:
 - text entry at 20 words per minute (wpm)
 - numeric entry at 80 keystrokes per minute (kpm)
 - technique
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF1030: WORD PROCESSING 1**Level:** Introductory**Theme:** Productivity Software**Prerequisite:** None**Description:** Students develop skill in using basic commands and functions in word processing software, including document editing, and the formatting and printing of reports, correspondence and tables suitable for personal use applications.**General Outcomes:** *The student will:*

- demonstrate correct use of software functions, by producing mailable, properly formatted:
 - paginated reports with headings and references
 - letters with basic components
 - two-column tables with main headings and subheadings
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF1040: GRAPHICS TOOLS**Level:** Introductory**Theme:** Productivity Software**Prerequisite:** None**Description:** Students learn the basic commands and functions of computer graphics software, including bitmapped graphics (paint program) and vector graphics (draw program). Students also develop basic skills in manipulating existing graphics, as well as in producing their own graphics.**General Outcomes:** *The student will:*

- demonstrate the basic elements and principles of design, by using computer software graphics tools to:
 - duplicate graphics designs
 - create graphics layouts
- demonstrate use of software functions
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF1050: DATABASE 1

Level: Introductory

Theme: Productivity Software

Prerequisite: None

Description: Students are introduced to the basic commands and functions of database software, and demonstrate how this software can be used as a personal tool in data and information management.

General Outcomes: *The student will:*

- demonstrate basic electronic database software competence, by:
 - creating databases
 - manipulating data and preparing reports
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF1060: SPREADSHEET 1

Level: Introductory

Theme: Productivity Software

Prerequisite: None

Description: Students have an opportunity to use basic functions and commands in spreadsheet software for general data manipulation and personal record keeping.

General Outcomes: *The student will:*

- demonstrate basic electronic spreadsheet software competence, by:
 - creating spreadsheets
 - manipulating data and preparing chart graphs
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF1070: HYPERMEDIA TOOLS

Level: Introductory

Theme: Productivity Software

Prerequisite: None

Description: Students develop basic skills with tools used for computerized presentations involving text, data, graphics, sound and animation.

General Outcomes: *The student will:*

- demonstrate basic hypermedia software competence, by:
 - accessing hypermedia tools
 - applying hypermedia tools to produce a short presentation
 - using hypermedia tools to edit a short presentation
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF1080: PROGRAMMING 1

Level: Introductory

Theme: Programming

Prerequisite: None

Description: Students are introduced to computer programming languages and a structured programming environment, and they construct algorithms and code instructions to solve identified problems.

General Outcomes: *The student will:*

- demonstrate basic computer programming skills, by:
 - creating algorithms to solve problems
 - applying introductory, structured computer coding programming skills
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF1210: COMPUTER SCIENCE 1

Level: Introductory

Theme: Computer Science

Prerequisite: None

Description: Students are introduced to the nature, approaches and areas of interest of computer science and its relationship to areas, such as computer engineering and information technology. Students explore concepts associated with hardware, software and processes at an introductory level. There is an emphasis on sequential and structured programming approaches.

General Outcomes: *The student will:*

- identify and describe the nature, approaches and areas of interest of computer science
- explain and demonstrate the nature, developmental process, use of basic algorithms associated with input processing output (IPO) and structured approaches, and application of these idioms to create complex algorithms
- explain and demonstrate the nature, evolution, types and role of programming languages
- explain and demonstrate the rationale, three fundamental control structures and representation of data in sequential and structured programs
- explain the nature, evolution and basic architecture of the von Neumann computer system
- demonstrate basic competencies.

GENERAL OUTCOMES: INTERMEDIATE LEVEL

COURSE INF2010: WORKSTATION OPERATIONS

Level: Intermediate

Theme: System Operations

Prerequisite: None

Description: Students learn computer workstation operations, including computer architecture, peripherals, configurations, operating system environments and platforms, utility software, diagnostic and protection software, hard drive file updating and maintenance, support resource application and troubleshooting activities.

General Outcomes: *The student will:*

- use file management procedures efficiently
- install and use software to support the integrity of workstation hardware
- configure and maintain workstation hardware
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF2030: KEYBOARDING 2

Level: Intermediate

Theme: Text/Data Input

Prerequisite: None

Description: Students enhance their personal use keyboarding competencies by increasing the rate of accurate touch keystroking of the alphabetic, numeric and selected punctuation keys.

General Outcomes: *The student will:*

- demonstrate keyboarding competence:
 - at 30 words per minute (wpm)
 - numeric entry at 100 keystrokes per minute (kpm)
 - technique
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF2040: KEYBOARDING 3

Level: Intermediate

Theme: Text/Data Input

Prerequisite: None

Description: Students enhance their keyboarding competencies, by increasing the rate of accurate touch keystroking of alphabetic, numeric and all punctuation keys to support personal use and limited, entry-level, workplace opportunities.

General Outcomes: *The student will:*

- demonstrate keyboarding competence:
 - text entry at 40 words per minute (wpm)
 - numeric entry at 120 keystrokes per minute (kpm)
 - technique
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF2050: WORD PROCESSING 2

Level: Intermediate

Theme: Productivity Software

Prerequisite: INF1020 Keyboarding 1 (or higher level keyboarding course)
INF1030 Word Processing 1

Description: Students expand their skills in using word processing software commands and functions to produce mailable reports and correspondence, including letters, memorandums and tables, all from rough draft copy.

General Outcomes: *The student will:*

- demonstrate correct use of word processing software functions by producing mailable, well-formatted:
 - paginated reports, with headers, footers and title pages
 - letters with special notations in a designated letter style
 - memorandums
 - multicolumn tables with borders and footnotes
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF2060: ELECTRONIC PUBLISHING 1

Level: Intermediate

Theme: Productivity Software

Prerequisite: INF1030 Word Processing 1

Description: Students develop skill, using electronic/desktop publishing software to create a variety of camera-ready documents.

General Outcomes: *The student will:*

- demonstrate basic electronic publishing software competence, by using page make-up tools and commands to produce camera-ready publications
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF2070: DATABASE 2

Level: Intermediate

Theme: Productivity Software

Prerequisite: INF1050 Database 1

Description: Students use all the commands and functions of electronic database software that support effective and efficient database applications.

General Outcomes: *The student will:*

- demonstrate advanced level electronic database software competence, by:
 - creating hierarchical and relational databases
 - importing and manipulating data and preparing reports
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF2080: SPREADSHEET 2

Level: Intermediate

Theme: Productivity Software

Prerequisite: INF1060 Spreadsheet 1

Description: Students demonstrate advanced level spreadsheet commands and functions to calculate and manipulate data and to prepare appropriate reports and printouts in text and graphic format.

General Outcomes: *The student will:*

- demonstrate advanced level electronic spreadsheet software competence, by:
 - creating spreadsheets, including importing data
 - manipulating data and preparing charts
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF2090: CORRESPONDENCE

Level: Intermediate

Theme: Applied Processing

Prerequisite: INF2030 Keyboarding 2 (or higher level keyboarding course)
INF2050 Word Processing 2

Description: Students expand their rate of document production as they prepare various forms of correspondence in mailable form, using word processing software.

General Outcomes: *The student will:*

- demonstrate efficient word processing of correspondence through the production of:
 - mailable correspondence in a variety of formats under time constraints
 - error-free, well-formatted correspondence
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF2100: REPORTS

Level: Intermediate

Theme: Applied Processing

Prerequisite: INF2030 Keyboarding 2 (or higher level keyboarding course)
INF2050 Word Processing 2

Description: Students expand their rate of production as they prepare various reports and manuscripts in mailable form.

General Outcomes: *The student will:*

- demonstrate efficient word processing of reports/manuscripts through the production of:
 - mailable reports in a variety of formats under time constraints
 - error-free, well-formatted reports
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF2110: TABLES/FORMS

Level: Intermediate

Theme: Applied Processing

Prerequisite: INF2030 Keyboarding 2 (or higher level keyboarding course)
INF2050 Word Processing 2

Description: Students expand their rate of document production as they prepare various tables/forms in mailable form.

General Outcomes: *The student will:*

- demonstrate competence in word processing of tables/forms, by:
 - producing mailable tables in a variety of formats under time constraints
 - designing a mailable form for a specific purpose and audience
 - editing and formatting tables and forms
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF2120: SOFTWARE INTEGRATION 1

Level: Intermediate

Theme: Applied Processing

Prerequisite: INF1020 Keyboarding 1 (or higher level keyboarding course)
INF1030 Word Processing 1
INF1050 Database 1
INF1060 Spreadsheet 1

Description: Students develop document production skills requiring the integration of data, text and graphics.

General Outcomes: *The student will:*

- demonstrate word processing and data management systems/graphics software integration competence, by:
 - producing mailable word processing documents that integrate spreadsheet, database and/or graphics in a variety of specific applications
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF2130: MULTIMEDIA AUTHORIZING 1

Level: Intermediate

Theme: Productivity Software

Prerequisite: INF1070 Hypermedia Tools

Description: Students are introduced to multimedia software and provided with an opportunity to develop basic authoring competence, by accessing and integrating software resident text, video and audio clips.

General Outcomes: *The student will:*

- demonstrate multimedia authoring competence, by using software resident text, video and audio clips to:
 - use software-specific commands to access and manipulate text video and audio
 - develop a multimedia presentation
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF2140: PROCESS CONTROL

Level: Intermediate

Theme: Dynamic Environment

Prerequisite: INF1070 Hypermedia Tools

Description: Students develop skills in robotics/simulation software control by creating, modifying and using programs that incorporate computer-controlled movements and events in robotics/simulation activities and applications.

General Outcomes: *The student will:*

- demonstrate basic electronic process control software competence, by:
 - explaining the theory and processes used to control a robot and/or other simulation
 - constructing a robot or cause a robot to function as intended through computer control
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF2150: PROGRAMMING 2

Level: Intermediate

Theme: Programming

Prerequisite: INF1080 Programming 1

Description: Students increase their programming skills, by designing and generating programming code to handle decision making and repetitive processes.

General Outcomes: *The student will:*

- demonstrate basic computer programming skill, by:
 - creating algorithms to solve problems involving decision making and iteration
 - constructing computer programs involving decision making and iterative processes
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF2160: PROGRAMMING 3

Level: Intermediate

Theme: Programming

Prerequisite: INF2150 Programming 2

Description: Students increase their programming skills, by using subprogram structures.

General Outcomes: *The student will:*

- restructure existing computer programs, by:
 - using subprogram structures
 - revising and constructing computer programs involving subprogram structures
- modify the algorithm to isolate the component operations/processes that were incorporated into the subprogram structure
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF2170: PROGRAMMING 4

Level: Intermediate

Theme: Programming

Prerequisite: INF2160 Programming 3

Description: Students increase their programming skills, by developing and using derived data types.

General Outcomes: *The student will:*

- demonstrate evolving computer programming skill, by:
 - creating algorithms to solve problems supporting derived data types, such as arrays, character strings, records, sets
 - creating structured programs, using derived data types
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF2180: PROGRAMMING 5**Level:** Intermediate**Theme:** Programming**Prerequisite:** INF2170 Programming 4**Description:** Students increase their programming skills, by developing and using recursive, sorting and merging algorithms.**General Outcomes:** *The student will:*

- demonstrate evolving computer programming skills, by:
 - examining/creating different recursive, sorting, searching and merging algorithms
 - revising/creating structured programs containing operations on derived data types
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF2190: TELECOMMUNICATIONS 1**Level:** Intermediate**Theme:** System Operations**Prerequisite:** None**Description:** Students learn how to select and use various wired and wireless telecommunication systems. By using the Internet, they investigate how communication principles, bandwidth, telecommunication infrastructure and wave spectrum affects telecommunication systems.**General Outcomes:** *The student will:*

- use selected communication systems, protocols and techniques to transfer messages and manage research
- describe the principles of wired and wireless communication systems and how telecommunication systems are affected by bandwidth and wave spectrum
- compare and contrast key elements of a telecommunication infrastructure
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF2200: INFORMATION HIGHWAY 2

Level: Intermediate

Theme: Dynamic Environment

Prerequisite: None

Description: Students learn how to produce a web page for the Internet.

General Outcomes: *The student will:*

- research characteristics of an effective web page
- design, create and present a web page
- enhance web page to improve features and functions
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF2220: OBJECT-ORIENTED PROGRAMMING 1

Level: Intermediate

Theme: Programming

Prerequisite: INF2170 Programming 4

Description: Students are introduced to object-based programming (OBP) and object-oriented programming (OOP). They develop algorithms, using introductory object-oriented design techniques, and use these algorithms to write introductory object-based and object-oriented programs.

General Outcomes: *The student will:*

- identify/describe fundamental concepts of object-oriented programming (OOP), including:
 - classes, objects, member functions and instantiation
 - public and private access modifiers
 - data encapsulation
 - class libraries
- demonstrate evolving programming expertise in basic object-oriented programming, by:
 - analyzing/revising/creating algorithms based on introductory object-oriented design techniques that use predefined classes to solve problems
 - analyzing/revising/creating object-based programs, using predefined classes
 - analyzing/revising/creating algorithms based on object-oriented design techniques that use programmer-created classes to solve problems

- analyzing/revising/creating object-oriented programs, using programmer-created classes
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF2210: Computer Science 2

Level: Intermediate

Theme: Computer Science

Prerequisite: INF1210 Computer Science 1

Description: Students extend their knowledge of the discipline of computer science by exploring the modular paradigm and its impact on algorithm development and implementation (programming). Students also add to their understanding by exploring the stylized von Neumann computer system at the machine level, and by examining the impact of computer science and computer technology on society.

General Outcomes: *The student will:*

- identify and describe past, present and future trends in the development of computer technology
- explain and demonstrate the nature, development, structure, use of key algorithms associated with modular approaches and application of these idioms to create complex algorithms
- explain and demonstrate the rationale, use of subprograms, procedural abstraction and treatment of data in modular programs
- explain and demonstrate the rationale, representation and key uses of the fundamental derived data types
- explain and analyze the nature, operation and basic architecture of the von Neumann computer system at the machine level
- demonstrate basic competencies.

GENERAL OUTCOMES: ADVANCED LEVEL

COURSE INF3010: HARDWARE/SOFTWARE ANALYSIS

Level: Advanced

Theme: System Operations

Prerequisite: None

Description: Students analyze, compare and evaluate hardware/software based on user requirements.

General Outcomes: *The student will:*

- analyze and compare computer hardware and software systems
- prepare and present a report recommending hardware and software configurations that meet specified criteria
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF3020: LOCAL AREA NETWORKS

Level: Advanced

Theme: System Operations

Prerequisite: None

Description: Students learn about local area network (LAN) computer systems, including hardware and peripheral configurations, interface protocols and data transmission characteristics.

General Outcomes: *The student will:*

- demonstrate basic LAN competence, as:
 - a user/operator
 - a manager/technician
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF3030: KEYBOARDING 4

Level: Advanced

Theme: Text/Data Input

Prerequisite: None

Description: Students develop their text and data keyboarding skills to entry-level occupational expectations.

General Outcomes: *The student will:*

- demonstrate proficient keyboarding competence:
 - text entry at 50 words per minute (wpm)
 - numeric entry at 150 keystrokes per minute (kpm)
 - technique
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF3040: KEYBOARDING 5

Level: Advanced

Theme: Text/Data Input

Prerequisite: None

Description: Students increase their occupational-level keyboarding competence of text, data and function/service keys, using straight copy and edited material.

General Outcomes: *The student will:*

- demonstrate proficient keyboarding competence:
 - text entry at 60 words per minute (wpm)
 - numeric entry at 180 keystrokes per minute (kpm)
 - technique
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF3050: KEYBOARDING 6

Level: Advanced

Theme: Text/Data Input

Prerequisite: None

Description: Students enhance their occupational-level keyboarding competence of all keystroke functions, using unedited, edited and straight copy material.

General Outcomes: *The student will:*

- demonstrate proficient keyboarding competence:
 - text entry at 70 words per minute (wpm)
 - numeric entry at 200 keystrokes per minute (kpm)
 - technique
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF3060: WORD PROCESSING 3

Level: Advanced

Theme: Productivity Software

Prerequisite: INF2030 Keyboarding 2 (or higher level keyboarding course)
INF2050 Word Processing 2

Description: Students develop occupational-level competence in the use of word processing software commands and functions to produce mailable reports, correspondence and tables, including the importing and merging of text, data and graphics.

General Outcomes: *The student will:*

- demonstrate correct use of word processing software functions, by producing mailable, properly formatted copy of:
 - a multipage report with a title page, table of contents, bibliography and appendices
 - two-page letters in designated letter styles that incorporate special formats
 - memorandums
 - tables
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF3070: ELECTRONIC PUBLISHING 2

Level: Advanced

Theme: Productivity Software

Prerequisite: INF2060 Electronic Publishing 1

Description: Students use the functions and commands of electronic/desktop publishing software as they integrate text composing, editing, typesetting, graphics generation and page layout functions to create customized, professional, quality documents.

General Outcomes: *The student will:*

- demonstrate electronic publishing software competence, by:
 - creating a customized document effectively incorporating text and graphics to communicate an idea or activity
 - applying software make-up tools and commands
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF3080: INFORMATION MANAGEMENT TOOLS

Level: Advanced

Theme: Productivity Software

Prerequisite: None

Description: Students develop competence in using information management systems software, such as project management, schedules and planners for either personal or workplace applications.

General Outcomes: *The student will:*

- demonstrate the ability to use information management software, to:
 - plan projects, including setting goals, timelines and determining resource needs
 - monitor projects, including time and resource management
 - adjust project files, as appropriate
 - prepare project reports
- describe the features of the information management software used
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF3090: SOFTWARE INTEGRATION 3

Level: Advanced

Theme: Applied Processing

Prerequisite: INF2120 Software Integration 1

Description: Students develop high production rates as they process documents from unedited and unformatted copy, using numerous functions/commands to create, revise, format and print a wide range of mailable copy.

General Outcomes: *The student will:*

- demonstrate competence in producing multipage documents and presentations that integrate word processing, spreadsheet, database and graphics files/documents, from:
 - unedited copy
 - unformatted copy
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF3100: SPECIALIZATION 1

Level: Advanced

Theme: Applied Processing

Prerequisite: INF2030 Keyboarding 2 (or higher level keyboarding course)
INF2050 Word Processing 2
INF2120 Software Integration 1

Description: Students specialize in document preparation, terminology application and associated office routine expectations in a specific focus area, such as a medical, legal, petroleum, real estate, insurance, travel/tourism, forestry or agricultural environment.

General Outcomes: *The student will:*

- demonstrate basic competence in a specific focus area, by:
 - using appropriate terminology
 - preparing and producing documents
 - exhibiting professional attributes
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF3110: SPECIALIZATION 2

Level: Advanced

Theme: Applied Processing

Prerequisite: INF3100 Specialization 1
INF3120 Software Integration 2

Description: Students develop workplace competence in a specific focus area, such as medical, legal, petroleum, real estate, insurance, travel/tourism, forestry or agricultural environment, by creating and completing appropriate documents that employ specialized communication skills and conform to workplace expectations and time constraints.

General Outcomes: *The student will:*

- demonstrate entry-level workplace competence in a specific focus area, by:
 - using appropriate terminology
 - preparing and producing documents
 - exhibiting professional attributes
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF3120: SOFTWARE INTEGRATION 2

Level: Advanced

Theme: Applied Processing

Prerequisite: INF2120 Software Integration 1

Description: Students expand their document production skills to workplace standards. Documents could require the importing and integration of word processing, spreadsheet, graphics and database files.

General Outcomes: *The student will:*

- demonstrate competence in producing documents that integrate word processing, spreadsheet, database and graphics files/documents, from:
 - unedited copy
 - unformatted copy
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF3130: MULTIMEDIA AUTHORIZING 2

Level: Advanced

Theme: Productivity Software

Prerequisite: INF2130 Multimedia Authoring 1

Description: Students learn to use a multimedia file or multimedia authoring software based on digitized input of text, video and audio clips.

General Outcomes: *The student will:*

- demonstrate multimedia authoring software and digitized input competence, by:
 - capturing text/images, video and audio information from external sources, and inputting it on a computer
 - using captured text/images, video and audio to create a multimedia presentation
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF3140: EXPERT SYSTEMS

Level: Advanced

Theme: Dynamic Environment

Prerequisite: INF3130 Multimedia Authoring 2

Description: Students acquire knowledge of expert systems, such as artificial intelligence and virtual reality. They gain competence, by developing or modifying programs that incorporate computer-controlled environments and multimedia interactive activities and applications.

General Outcomes: *The student will:*

- develop an information portfolio on expert systems and other advanced technologies
- program an application, using one of these systems and present the results
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF3150: PROGRAMMING APPLICATION 1

Level: Advanced

Theme: Programming

Prerequisite: None

Description: Students create programs that use external files.

General Outcomes: *The student will:*

- create an algorithm to solve problems requiring an external data file
- develop programs that create, retrieve, append and modify text/nontext files
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF3160: PROGRAMMING APPLICATION 2

Level: Advanced

Theme: Programming

Prerequisite: INF3150 Programming Application 1

Description: Students create a program, using a second programming language.

General Outcomes: *The student will:*

- employ existing algorithms to solve programming problems
- create programs to solve problems in a second programming language that include:
 - input/output
 - mathematical functions
 - looping and branching
 - subprogram structures
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF3170: PROGRAMMING APPLICATION 3

Level: Advanced

Theme: Programming

Prerequisite: INF3160 Programming Application 2

Description: Students enhance a program, using a second programming language.

General Outcomes: *The student will:*

- create algorithms to solve programming problems
- create programs to solve problems, in a second programming language that include:
 - one- and two-dimensional arrays
 - character strings
 - sort, search and merge operations
 - external data files
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF3180: TELECOMMUNICATIONS 2

Level: Advanced

Theme: System Operations

Prerequisite: INF2190 Telecommunications 1

Description: Students demonstrate knowledge of telecommunication systems by designing a new system. They use the Internet in researching and developing their design and for comparing and contrasting various telecommunication initiatives. Students analyze the effect this is having on the individual and society.

General Outcomes: *The student will:*

- use appropriate telecommunication systems, protocols and techniques to transfer messages and manage research
- describe how telecommunication systems are evolving, merging and connecting
- design a telecommunication solution that improves communication for an individual, business or society
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF3190: INFORMATION HIGHWAY 3

Level: Advanced

Theme: Dynamic Environment

Prerequisite: INF2200 Information Highway 2

Description: Students develop and maintain an Internet/intranet web site that makes use of advanced features.

General Outcomes: *The student will:*

- develop a multipage web site to be placed on the Internet or a local intranet
- present and describe to a group, the advanced features of a web site
- maintain and enhance a web site to improve features and functions
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF3200: INTERNET SERVICES

Level: Advanced

Theme: Dynamic Environment

Prerequisite: INF2200 Information Highway 2

Description: Students expand their skills from INF2200 Information Highway 2, by learning how to operate, maintain and build an Internet/intranet site that may include computer bulletin boards, forums, electronic mail, Internet list servers, and/or moderated newsgroups. Proper use of hardware, software and liaison with users and clients is emphasized.

General Outcomes: *The student will:*

- demonstrate competencies to access information from existing electronic messaging systems
- design and create an electronic messaging system
- maintain and enhance an electronic messaging system
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF3220: OBJECT-ORIENTED PROGRAMMING 2

Level: Advanced

Theme: Programming

Prerequisite: INF2220 Object-oriented Programming 1

Description: Students extend their knowledge of object-oriented programming (OOP) concepts. They increase their expertise in object-oriented design and programming by developing algorithms and programs that use templated classes, containment and inheritance to promote reusability.

General Outcomes: *The student will:*

- identify/describe concepts of object-oriented programming (OOP), including:
 - controlled class access
 - templated classes
 - class containment or composition
 - derived classes and inheritance
- demonstrate evolving programming expertise in object-oriented programming (OOP), by:
 - analyzing/revising/creating algorithms based on object-oriented design techniques that use templated, base and derived classes
 - analyzing/revising/creating object-oriented programs that use templated, base and derived classes
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF3230: DYNAMIC DATA STRUCTURES 1

Level: Advanced

Theme: Programming

Prerequisite: INF2180 Programming 5

Description: Students are formally introduced to dynamic data structures in general and to linked lists in particular.

General Outcomes: *The student will:*

- identify/describe the concepts of dynamic memory allocation and basic dynamic data structures, and explain their advantages over more static structures
- revise/create algorithms that make effective use of dynamic data structures to solve problems
- revise/create programs that make effective use of linked lists
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF3240: DYNAMIC DATA STRUCTURES 2

Level: Advanced

Theme: Programming

Prerequisite: INF3230 Dynamic Data Structures 1

Description: Students add to their understanding of dynamic data structures by developing introductory algorithms and programs that use stacks, queues and trees.

General Outcomes: *The student will:*

- identify/describe the stack, queue and tree Abstract Data Types
- revise/create algorithms that make effective use of stacks, queues and trees to solve problems
- revise/create programs that make effective use of stacks, queues and trees
- apply, consistently, appropriate workstation routines
- demonstrate basic competencies.

COURSE INF3210: COMPUTER SCIENCE 3

Level: Advanced

Theme: Computer Science

Prerequisite: INF2210 Computer Science 2

Description: Students extend their knowledge of the core concepts of the discipline of computer science by exploring more advanced aspects of the modular programming paradigm and by beginning their examination of the object-oriented programming paradigm. Students also add to their understanding by manipulating a Turing machine and by analyzing the nature of the emerging information society.

General Outcomes: *The student will:*

- describe and analyze the historical roots and general nature of the information revolution and the emerging information society
- explain and demonstrate the nature, development, structure and key algorithms associated with object-oriented approaches, and application of these idioms to create complex algorithms
- explain and demonstrate the rationale, use of classes and objects, encapsulation and procedural abstraction, and treatment of data in object-oriented programs
- explain the rationale and use of recursion and introductory recursive operations
- identify and demonstrate the rationale, creation and manipulation of files and Abstract Data Types
- explain and analyze the nature, operation, basic architecture and utility of a Turing machine
- demonstrate basic competencies.

