

## COURSE CURRICULUM AND ASSESSMENT STANDARDS:

### SECTION F: ADVANCED LEVEL

The following pages define the curriculum and assessment standards for the advanced level of Information Processing.

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

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**COURSE INF3010: HARDWARE/SOFTWARE ANALYSIS****Level:** Advanced**Theme:** Systems Operations**Prerequisite:** None**Course Description:** Students analyze, compare and evaluate hardware/software based on user requirements.**Course Parameters:** Access to two different computer systems, three task-specific software packages, supporting documentation.**Supporting Course:** INF2010 Workstation Operations**Curriculum and Assessment Standards**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"> <li>analyze and compare computer hardware and software systems</li> </ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"> <li>an analysis and comparison of two different computer systems (internal components, peripheral devices).</li> </ul> <i>Assessment Tool</i> <i>Presentation/Reports: Analysis – Hardware (INF3010–1)</i>  <i>Standard</i> <i>Rating of 2 in each applicable task</i>	30
	<ul style="list-style-type: none"> <li>an analysis and comparison of three task-specific software packages on the basis of:               <ul style="list-style-type: none"> <li>hardware/operating system requirements</li> <li>user friendliness</li> <li>training/learning effectiveness</li> <li>instructional support</li> <li>command/function parameters</li> <li>screen/page characteristics</li> <li>intended use/audience</li> <li>intercompatibility with other software.</li> </ul> </li> </ul> <i>Assessment Tool</i> <i>Presentation/Reports: Analysis – Software (INF3010–1)</i>  <i>Standard</i> <i>Rating of 2 in each applicable task</i>	30

**COURSE INF3010: HARDWARE/SOFTWARE ANALYSIS (continued)**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• prepare and present a report recommending hardware and software configurations that meet specified criteria</li> <li>• apply, consistently, appropriate workstation routines</li> <li>• demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• a report that responds to an identified need to provide or upgrade a computer system. The report will provide recommendations and rationale for particular hardware/software components (recommendation and reasons) that address: <ul style="list-style-type: none"> <li>– client needs</li> <li>– information base</li> <li>– implementation timelines</li> <li>– financial costs</li> <li>– workstation requirements</li> <li>– inservice training</li> <li>– support services</li> <li>– warranties</li> <li>– legal restrictions.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Presentation/Reports: Recommending Hardware/Software (INF3010-1)</i></p> <p><i>Standard</i>  <i>Rating of 2 in each applicable task</i></p> <ul style="list-style-type: none"> <li>• demonstrate appropriate workstation routines.</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Checklist: Workstation Routines and Management (INFWRKSTN)</i></p> <p><i>Standard</i>  <i>Rating of:</i>  3 – Workstation Use  3 – File Management  3 – Time Management/Organization  3 – Professionalism</p> <ul style="list-style-type: none"> <li>• observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>30</p> <p>10</p> <p>Integrated throughout</p>

**MODULE INF3010: HARDWARE/SOFTWARE ANALYSIS** (continued)

Concept	Specific Learner Expectations	Notes
Computer Hardware	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• prepare a report that responds to an identified need to provide or upgrade a computer system. The report will provide recommendations and rationale for a particular hardware/software components (recommendation and reasons) that addresses: <ul style="list-style-type: none"> <li>– client needs</li> <li>– information base</li> <li>– implementation timelines</li> <li>– financial costs</li> <li>– workstation requirements</li> <li>– inservice training</li> <li>– support services</li> <li>– warranties</li> <li>– legal restrictions.</li> </ul> </li> </ul>	
Computer Software	<ul style="list-style-type: none"> <li>• assess and compare system software/firmware: <ul style="list-style-type: none"> <li>– hardware specifications</li> <li>– operating system (icon/command, supervisor, etc.)</li> <li>– utility programs</li> <li>– language translators</li> <li>– compilers</li> <li>– interpreters</li> </ul> </li> <li>• assess and compare application software (data, text, graphics): <ul style="list-style-type: none"> <li>– application package, customized program</li> <li>– instructional/presentation focus</li> <li>– independent/integrated</li> <li>– windows</li> <li>– menus/icons</li> <li>– palettes/toolboxes</li> <li>– help screen</li> </ul> </li> <li>• access support manuals/documentation/resources: <ul style="list-style-type: none"> <li>– follow instructions and explanations from help menus/software manuals, other resource support.</li> </ul> </li> </ul>	

**MODULE INF3010: HARDWARE/SOFTWARE ANALYSIS** (continued)

Concept	Specific Learner Expectations	Notes
<p>Analysis Presentation</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• identify computer user needs, timelines</li> <li>• research potential alternatives</li> <li>• identify sources of information</li> <li>• demonstrate “hands-on” experience to compare/ evaluate hardware/software compatibility with identified user needs</li> <li>• make/support recommendation:               <ul style="list-style-type: none"> <li>– use appropriate industry-standard format</li> <li>– acceptable content/description</li> <li>– appropriate terminology.</li> </ul> </li> </ul>	<p>Define user purpose/ requirements.</p> <p>Field test:</p> <ul style="list-style-type: none"> <li>– input components</li> <li>– operating system</li> <li>– output components</li> <li>– other peripherals</li> <li>– software package(s).</li> </ul> <p>Presentation could involve:</p> <ul style="list-style-type: none"> <li>– demonstration</li> <li>– illustrated hard copy</li> <li>– multimedia</li> <li>– combination of above.</li> </ul>
<p>Workstation Management</p>	<ul style="list-style-type: none"> <li>• apply efficient workstation position and routines that encourage:               <ul style="list-style-type: none"> <li>– good health and safety (posture, positioning of hardware and furniture)</li> <li>– security for hardware, software, supplies and personal work</li> </ul> </li> <li>• demonstrate efficient and appropriate use of time and resources:               <ul style="list-style-type: none"> <li>– start-up procedures</li> <li>– organization of work area</li> <li>– closing procedures</li> </ul> </li> <li>• apply effective decision-making strategies in production assignments:               <ul style="list-style-type: none"> <li>– plan activities</li> <li>– organize data, information, resources</li> <li>– consider alternatives</li> <li>– evaluate activities/results</li> </ul> </li> <li>• use related terminology to describe basic processes, procedures and tools.</li> </ul>	

**COURSE INF3020: LOCAL AREA NETWORKS****Level:** Advanced**Theme:** Systems Operations**Prerequisite:** None**Course Description:** Students learn about local area network (LAN) computer systems, including hardware and peripheral configurations, interface protocols and data transmission characteristics.**Course Parameters:** Access to LAN (hardware, software, support resources).**Supporting Course:** INF2010 Workstation Operations**Curriculum and Assessment Standards**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• demonstrate basic LAN competence, as:               <ul style="list-style-type: none"> <li>– a user/operator</li> </ul> </li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• using the LAN – demonstrating ability to:               <ul style="list-style-type: none"> <li>– login, logout, use of password (if necessary)</li> <li>– access information and programs on a LAN</li> <li>– download/upload files or data on a LAN</li> <li>– organize information on a LAN (e.g., directories, naming of files etc.).</li> </ul> </li> <li>• a report or presentation on how networks works including:               <ul style="list-style-type: none"> <li>– LAN’s purpose/capabilities</li> <li>– network topologies</li> <li>– hardware/software configurations for LANs.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Guide: Local Area Networks Project</i>  <i>– Using the Network and How Networks Work</i>  <i>(INF3020–1)</i></p> <p><i>Standard</i>  <i>Rating of 2 in each applicable task</i></p>	<p>10</p> <p>20</p>



**MODULE INF3020: LOCAL AREA NETWORKS (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>LAN User</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>access LAN facilities and download/upload data/information:               <ul style="list-style-type: none"> <li>login, logoff</li> <li>accessing files/programs on all servers/drives</li> <li>organize data on servers and drives</li> <li>demonstrate ability to connect to different printers on the network.</li> </ul> </li> </ul>	<p>A network consists of computers and peripheral devices connected via communication lines so that information available on the file server can be accessed quickly and shared with multi-users within the parameters of the local area network system.</p>
<p>How Networks Work</p>	<ul style="list-style-type: none"> <li>identify the LAN purpose/capabilities:               <ul style="list-style-type: none"> <li>conditions under which a network is established</li> <li>the location of a network configuration</li> </ul> </li> <li>compare network topologies such as:               <ul style="list-style-type: none"> <li>network protocol</li> <li>advantages of diskless terminals</li> </ul> </li> <li>compare network configuration such as:               <ul style="list-style-type: none"> <li>evaluation of interface cards (NIC), servers, cables for compatibility with the operating system</li> <li>analyze various configurations: RAM requirements, hard drive, laser/compact disk, different processors, parallel processing, parallel hard drives</li> <li>compare different types of wiring and cabling designs.</li> </ul> </li> </ul>	

**MODULE INF3020: LOCAL AREA NETWORKS (continued)**

Concept	Specific Learner Expectations	Notes
Installing a Network	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• configure/interface hardware:               <ul style="list-style-type: none"> <li>– arrange/connect peripheral devices</li> <li>– attach other component (e.g., printers)</li> </ul> </li> <li>• install LAN software:               <ul style="list-style-type: none"> <li>– install/backup/restore files</li> <li>– create/use directories/folders</li> <li>– incorporate file protection</li> </ul> </li> <li>• use defaults, supervisor, housekeeping, diagnostic, viral protection software:               <ul style="list-style-type: none"> <li>– set up users, security rights, and manage software</li> <li>– build in defence on the LAN (e.g., protect against viruses, user abuse or hacking)</li> </ul> </li> <li>• perform troubleshooting:               <ul style="list-style-type: none"> <li>– diagnoses</li> <li>– remediation</li> </ul> </li> <li>• demonstrate acceptable LAN performance               <ul style="list-style-type: none"> <li>– apply manager’s responsibilities:                   <ul style="list-style-type: none"> <li>• schedule access</li> <li>• provide assistance</li> <li>• monitor activities</li> <li>• recommend changes</li> <li>• identify issues/trends</li> </ul> </li> </ul> </li> <li>• use support manuals/documentation:               <ul style="list-style-type: none"> <li>– follow hardware/software and educational instructions.</li> </ul> </li> </ul>	<p>Students can be contracted for specific duties and responsibilities (consistent with school/jurisdiction policy and professional/ethical working environment expectations) to work on an existing LAN or have an opportunity to work on a dedicated file server configured specifically to accommodate learning experiences contained in this module.</p> <p>Another option might involve developing community partnerships and have students apprentice on available LAN facilities.</p>
LAN Policy and Procedures	<ul style="list-style-type: none"> <li>• describe network policies:               <ul style="list-style-type: none"> <li>– establish policies for:                   <ul style="list-style-type: none"> <li>• ethical use of software</li> <li>• network access and security</li> <li>• maintaining network data, software integrity</li> <li>• file management and disk management</li> <li>• file backup</li> <li>• job description for the network manager</li> </ul> </li> </ul> </li> </ul>	

**MODULE INF3020: LOCAL AREA NETWORKS** (continued)

Concept	Specific Learner Expectations	Notes
LAN Policy and Procedures (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• define procedures for file management:               <ul style="list-style-type: none"> <li>– internal (floppies, files from server, sub-directories, physical drives, logical drives for copy protected and single user programs)</li> <li>– public drives</li> <li>– DOS drives</li> <li>– search drives</li> </ul> </li> <li>• define the functions of network shell (copying selected drivers, linking programs, establishing connections for user and server, assigning user rights and names [password]).</li> </ul>	
Workstation Management	<ul style="list-style-type: none"> <li>• apply efficient workstation position and routines that encourage:               <ul style="list-style-type: none"> <li>– good health and safety (posture, positioning of hardware and furniture)</li> <li>– security for hardware, software, supplies and personal work</li> </ul> </li> <li>• demonstrate efficient and appropriate use of time and resources:               <ul style="list-style-type: none"> <li>– start-up procedures</li> <li>– organization of work area</li> <li>– closing procedures</li> </ul> </li> <li>• apply effective decision-making strategies in production assignments:               <ul style="list-style-type: none"> <li>– plan activities</li> <li>– organize data, information, resources</li> <li>– consider alternatives</li> <li>– evaluate activities/results</li> </ul> </li> <li>• use related terminology to describe basic processes, procedures and tools.</li> </ul>	



**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.**Parameters:** Computer workstation, disk, word processing software, support resources.**Curriculum and Assessment Standards**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• demonstrate proficient keyboarding competence: <ul style="list-style-type: none"> <li>– text entry at 50 words per minute (wpm)</li> </ul> </li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• three timed writings, each from different straight copy material, over a period of no more than five consecutive class periods, which demonstrates proper touch keyboarding : <ul style="list-style-type: none"> <li>– on alphabetic keys <ul style="list-style-type: none"> <li>• three-minute duration</li> <li>• maximum one uncorrected error</li> <li>• SI 1.3 – 1.4</li> <li>• 50 words per minute</li> </ul> </li> </ul> </li> </ul>	50
<ul style="list-style-type: none"> <li>– numeric entry at 150 keystrokes per minute (kpm)</li> </ul>	<ul style="list-style-type: none"> <li>– on numeric keys: <ul style="list-style-type: none"> <li>• one-minute duration</li> <li>• maximum one uncorrected error</li> <li>• 150 numeric keystrokes a minute on 1 to 5 digit numbers</li> </ul> </li> </ul>	10
<ul style="list-style-type: none"> <li>– technique</li> </ul>	<ul style="list-style-type: none"> <li>– observations over the last quarter of the learning period, during timings and drill work.</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Checklist: Text–Data Entry (INFTDENT)</i></p> <p><i>Standard</i>  <i>Rating of:</i>  3 – Eye Focus  3 – Keystroking  3 – Service Keys  3 – Body Position</p>	30

**COURSE INF3030: KEYBOARDING 4** (continued)

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• apply, consistently, appropriate workstation routines</li>   <li>• demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• demonstrate appropriate workstation routines.</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Checklist: Workstation Routines and Management (INFWRKSTN)</i></p> <p><i>Standard</i>  <i>Rating of:</i>            3 – Workstation Use            3 – File Management            3 – Time Management/Organization            3 – Professionalism</p> <ul style="list-style-type: none"> <li>• observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>10</p> <p>Integrated throughout</p>

Concept	Specific Outcomes	Notes
<p>Text Entry</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• demonstrate increasingly rapid, accurate touch keystroking on straight and draft (edited) copy of:               <ul style="list-style-type: none"> <li>– alphanumeric keys</li> <li>– all punctuation keys</li> <li>– service keys (enter, shift, delete, backspace, tab)</li> </ul> </li> <li>• use function and cursor movement key efficiently</li> <li>• demonstrate correct keystroking technique:               <ul style="list-style-type: none"> <li>– enter text using designated fingers</li> <li>– maintain home-row anchor position</li> <li>– demonstrate correct posture (hands, arms, body)</li> </ul> </li> </ul>	<p>Develop speed and accuracy at the phrase, sentence and short paragraph level using short, repetitive timings (.5 to one minute) with straight copy text of varying SI. (1.2–1.6).</p> <p>Draft copy should include basic spacing, spelling, punctuation and spacing errors (no more than one error per every 10 words).</p>

**MODULE INF3030: KEYBOARDING 4** (continued)

Concept	Specific Learner Expectations	Notes
Text Entry (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• proofread and edit text (screen and hard copy) to ensure text is without error</li> <li>• analyze errors and initiate remediation as appropriate for:               <ul style="list-style-type: none"> <li>– spelling, shifting, punctuation and spacing errors</li> <li>– transposed, repeated, omitted letters.</li> </ul> </li> </ul>	
Data Entry	<ul style="list-style-type: none"> <li>• demonstrate rapid, accurate data entry on keyboard number pad:               <ul style="list-style-type: none"> <li>– using designated fingers</li> <li>– maintaining anchor position.</li> </ul> </li> </ul>	
Workstation Management	<ul style="list-style-type: none"> <li>• apply efficient workstation position and routines that encourage:               <ul style="list-style-type: none"> <li>– good health and safety (posture, positioning of hardware and furniture)</li> <li>– security for hardware, software, supplies and personal work</li> </ul> </li> <li>• demonstrate efficient and appropriate use of time and resources:               <ul style="list-style-type: none"> <li>– start-up procedures</li> <li>– organization of work area</li> <li>– closing procedures</li> </ul> </li> <li>• apply effective decision-making strategies in production assignments:               <ul style="list-style-type: none"> <li>– plan activities</li> <li>– organize data, information, resources</li> <li>– consider alternatives</li> <li>– evaluate activities/results</li> </ul> </li> <li>• use related terminology to describe basic processes, procedures and tools.</li> </ul>	



**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.**Parameters:** Computer workstation, disk, word processing software, support resources.**Curriculum and Assessment Standards**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• demonstrate proficient keyboarding competence: <ul style="list-style-type: none"> <li>– text entry at 60 words per minute (wpm)</li> <li>– numeric entry at 180 keystrokes per minute (kpm)</li> <li>– technique</li> </ul> </li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• three timed writings, each from different straight copy material, over a period of no more than five consecutive class periods, which demonstrates proper touch keyboarding: <ul style="list-style-type: none"> <li>– on alphabetic keys: <ul style="list-style-type: none"> <li>• three-minute duration</li> <li>• maximum one uncorrected error</li> <li>• SI <math>\geq 1.35</math></li> <li>• 60 words per minute</li> </ul> </li> <li>– on numeric keys: <ul style="list-style-type: none"> <li>• one-minute duration</li> <li>• maximum one uncorrected error</li> <li>• 180 numeric keystrokes a minute on 1 to 6 digit numbers</li> </ul> </li> <li>– observations over the last quarter of the learning period, during timings and drill work.</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Checklist: Text–Data Entry (INFTDENT)</i></p> <p><i>Standard</i>  <i>Rating of:</i>  3 – Eye Focus  3 – Keystroking  3 – Service Keys  3 – Body Position</p> </li></ul>	<p>50</p> <p>20</p> <p>20</p>

**COURSE INF3040: KEYBOARDING 5** (continued)

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• apply, consistently, appropriate workstation routines</li>   <li>• demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• demonstrate appropriate workstation routines.</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Checklist: Workstation Routines and Management (INFWRKSTN)</i></p> <p><i>Standard</i>  <i>Rating of:</i>            3 – Workstation Use            3 – File Management            3 – Time Management/Organization            3 – Professionalism</p> <ul style="list-style-type: none"> <li>• observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>10</p> <p>Integrated throughout</p>

Concept	Specific Outcomes	Notes
Text Entry	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• demonstrate increasingly rapid, accurate touch keystroking on straight and draft copy (edited) of:               <ul style="list-style-type: none"> <li>– alphanumeric keys</li> <li>– all punctuation keys</li> <li>– service keys</li> </ul> </li> <li>• use function and cursor movement keys efficiently</li> <li>• demonstrate correct keystroking technique:               <ul style="list-style-type: none"> <li>– enter text using designated fingers</li> <li>– maintain home-row anchor position</li> <li>– demonstrate correct posture (hands, arms, body)</li> </ul> </li> <li>• proofread and edit text (screen and hard copy) to ensure text is without error</li> </ul>	<p>Enter, shift, delete, backspace, tab.</p> <p>Develop speed and accuracy at the phrase, sentence and short paragraph level using short, repetitive timings (.5 to one minute) with straight copy text of varying SI (1.2–1.6).</p> <p>Draft copy should include basic spacing, spelling, punctuation and spacing errors (no more than one error per every 10 words).</p>

**MODULE INF3040: KEYBOARDING 5** (continued)

Concept	Specific Learner Expectations	Notes
Text Entry (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• analyze errors and initiate remediation as appropriate for:               <ul style="list-style-type: none"> <li>– spelling, shifting, punctuation and spacing errors</li> <li>– transposed, repeated, omitted letters.</li> </ul> </li> </ul>	
Data Entry	<ul style="list-style-type: none"> <li>• demonstrate rapid, accurate data entry on keyboard number pad:               <ul style="list-style-type: none"> <li>– using designated fingers</li> <li>– maintaining anchor position.</li> </ul> </li> </ul>	
Workstation Management	<ul style="list-style-type: none"> <li>• apply efficient workstation position and routines that encourage:               <ul style="list-style-type: none"> <li>– good health and safety (posture, positioning of hardware and furniture)</li> <li>– security for hardware, software, supplies and personal work</li> </ul> </li> <li>• demonstrate efficient and appropriate use of time and resources:               <ul style="list-style-type: none"> <li>– start-up procedures</li> <li>– organization of work area</li> <li>– closing procedures</li> </ul> </li> <li>• apply effective decision-making strategies in production assignments:               <ul style="list-style-type: none"> <li>– plan activities</li> <li>– organize data, information, resources</li> <li>– consider alternatives</li> <li>– evaluate activities/results</li> </ul> </li> <li>• use related terminology to describe basic processes, procedures and tools.</li> </ul>	



**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.**Parameters:** Computer workstation, disk, word processing software, support resources.**Curriculum and Assessment Standards**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• demonstrate proficient keyboarding competence:               <ul style="list-style-type: none"> <li>– text entry at 70 words per minute (wpm)</li> <li>– numeric entry at 200 keystrokes per minute (kpm)</li> <li>– technique</li> </ul> </li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• three timed writings each from different straight copy material, over a period of no more than five consecutive class periods, which demonstrates proper touch keyboarding :               <ul style="list-style-type: none"> <li>– on alphabetic keys:                   <ul style="list-style-type: none"> <li>• three-minute duration</li> <li>• maximum one uncorrected error</li> <li>• SI <math>\geq</math> 1.35</li> <li>• 70 words per minute</li> </ul> </li> <li>– on numeric keys:                   <ul style="list-style-type: none"> <li>• one-minute duration</li> <li>• maximum one uncorrected error</li> <li>• 200 numeric keystrokes a minute on 1 to 6 digit numbers</li> </ul> </li> <li>– observations over the last quarter of the learning period, during timings and drill work.</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Checklist: Text–Data Entry (INFTDENT)</i></p> <p><i>Standard</i>  <i>Rating of:</i>            3 – Eye Focus            3 – Keystroking            3 – Service Keys            3 – Body Position</p> </li></ul>	<p>50</p> <p>20</p> <p>20</p>

**COURSE INF3050: KEYBOARDING 6** (continued)

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• apply, consistently, appropriate workstation routines</li>   <li>• demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• demonstrate appropriate workstation routines.</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Checklist: Workstation Routines and Management (INFWRKSTN)</i></p> <p><i>Standard</i>  <i>Rating of:</i>            3 – Workstation Use            3 – File Management            3 – Time Management/Organization            3 – Professionalism</p> <ul style="list-style-type: none"> <li>• observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>10</p> <p>Integrated throughout</p>

Concept	Specific Outcomes	Notes
<p>Text/Data Entry</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• use formatted, straight-copy material as well as unformatted rough-draft material</li> <li>• touch-keystroke alphabetic, numeric, punctuation, service keys</li> <li>• consistently apply:               <ul style="list-style-type: none"> <li>– correct finger/key placement</li> <li>– healthful body position</li> <li>– acceptable eye/copy focus</li> </ul> </li> <li>• use numeric keys and/or number pad.</li> </ul>	<p>A few five-minute timed attempts can be used to prepare for workplace expectations if deemed appropriate.</p>

**MODULE INF3050: KEYBOARDING 6** (continued)

Concept	Specific Learner Expectations	Notes
Proofreading/Editing	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• proofread/edit screen/documents</li> <li>• analyze errors/determine remediation</li> <li>• use spell check features</li> <li>• minimize errors: spelling, keystroking, punctuation, spacing, transposition, repeated, omitted</li> <li>• use appropriate commands, functions</li> <li>• format/output.</li> </ul>	
Workstation Management	<ul style="list-style-type: none"> <li>• apply efficient workstation position and routines that encourage:               <ul style="list-style-type: none"> <li>– good health and safety (posture, positioning of hardware and furniture)</li> <li>– security for hardware, software, supplies and personal work</li> </ul> </li> <li>• demonstrate efficient and appropriate use of time and resources:               <ul style="list-style-type: none"> <li>– start-up procedures</li> <li>– organization of work area</li> <li>– closing procedures</li> </ul> </li> <li>• apply effective decision-making strategies in production assignments:               <ul style="list-style-type: none"> <li>– plan activities</li> <li>– organize data, information, resources</li> <li>– consider alternatives</li> <li>– evaluate activities/results</li> </ul> </li> <li>• use related terminology to describe basic processes, procedures and tools.</li> </ul>	



**MODULE INF3060: WORD PROCESSING 3****Level:** Advanced**Theme:** Productivity Software**Prerequisites:** INF2030 Keyboarding 2  
INF2050 Word Processing 2**Module 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.**Module Parameters:** Computer workstation, disk, word processing software, support resources.**Supporting Module:** INF2040 Keyboarding 3**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• demonstrate correct use of word processing software functions, by producing mailable, properly formatted copy of: <ul style="list-style-type: none"> <li>– a multipage report with a title page, table of contents, bibliography and appendices</li> </ul> </li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• producing mailable documents, based on formatted and unformatted sources, focusing on advanced functions and improved use of previously learned software functions through business applications including a collection of: <ul style="list-style-type: none"> <li>– a multipage report/publication containing: <ul style="list-style-type: none"> <li>• macros/templates/autotext for a variety of formats</li> <li>• title pages, table of contents</li> <li>• headings (sub, side and/or paragraph)</li> <li>• references/bibliography</li> <li>• diagrams using draw features and text boxes</li> <li>• desktop publishing features of word processor</li> <li>• display paragraphs (e.g., enumerations, charts, graphs)</li> <li>• graphics, tables</li> <li>• merge with spreadsheet/database information</li> <li>• appendix, index.</li> </ul> </li> </ul> </li> </ul> <p><i>Assessment Tool</i> <i>Assessment Checklist: Word Processing (INFWP)</i></p> <p><i>Standard</i> <i>Rating of 3 in the production of mailable documents (no errors in text and well formatted)</i></p>	<p>30</p>





**MODULE INF3060: WORD PROCESSING 3** (continued)

Concept	Specific Learner Expectations	Notes
Software Functions and Applications (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>– design and use more detailed macros</li> <li>– merge and sort text</li> <li>– customizing features (e.g., toolbar and menus)</li> </ul> <ul style="list-style-type: none"> <li>• move through document(s) efficiently by using appropriate cursor movement, tools/commands.</li> </ul>	
Document Production	<ul style="list-style-type: none"> <li>• demonstrate appropriate key commands to:               <ul style="list-style-type: none"> <li>– save files (alternative formats)</li> <li>– print documents</li> </ul> </li> <li>• replicate, convert and append files</li> <li>• print documents (alternative formats)</li> <li>• print templates</li> <li>• demonstrate appropriate key commands to produce the following documents in mailable form:               <ul style="list-style-type: none"> <li>– reports:                   <ul style="list-style-type: none"> <li>• headings/subheading</li> <li>• references (footnotes, end notes, bibliography)</li> <li>• headers/footers</li> <li>• title page</li> <li>• table of contents</li> <li>• indexes</li> </ul> </li> <li>– personal and business letters:                   <ul style="list-style-type: none"> <li>• letter parts (date, inside address, salutations, complimentary closing, name/title, references)</li> <li>• letter styles</li> <li>• subject/attention lines</li> <li>• special notations</li> </ul> </li> <li>– tables (single/multicolumn):                   <ul style="list-style-type: none"> <li>• headings</li> <li>• borders/shading</li> <li>• rulers/tabs</li> <li>• sorted.</li> </ul> </li> </ul> </li> </ul>	<p>Use macros as appropriate.</p> <p>Mailable form: document is accurate and correctly formatted.</p> <p>Students should be familiar with various document styles, including:</p> <p>Reports:</p> <ul style="list-style-type: none"> <li>– research reports/papers</li> <li>– manuscripts</li> <li>– articles</li> <li>– brochures</li> <li>– position papers</li> </ul> <p>Correspondence:</p> <ul style="list-style-type: none"> <li>– full block</li> <li>– semi-block</li> <li>– set customized styles used by businesses in the community.</li> </ul>

**MODULE INF3060: WORD PROCESSING 3** (continued)

Concept	Specific Learner Expectations	Notes
Workstation Management	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• apply efficient workstation position and routines that encourage:               <ul style="list-style-type: none"> <li>– good health and safety (posture, positioning of hardware and furniture)</li> <li>– security for hardware, software, supplies and personal work</li> </ul> </li> <li>• demonstrate efficient and appropriate use of time and resources:               <ul style="list-style-type: none"> <li>– start-up procedures</li> <li>– organization of work area</li> <li>– closing procedures</li> </ul> </li> <li>• apply effective decision-making strategies in production assignments:               <ul style="list-style-type: none"> <li>– plan activities</li> <li>– organize data, information, resources</li> <li>– consider alternatives</li> <li>– evaluate activities/results</li> </ul> </li> <li>• use related terminology to describe basic processes, procedures and tools.</li> </ul>	



**MODULE INF3070: ELECTRONIC PUBLISHING 2****Level:** Advanced**Theme:** Productivity Software**Prerequisite:** INF2060 Electronic Publishing 1**Module 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.**Module Parameters:** Computer workstation, disk, electronic/desktop publishing software, support resources.**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• demonstrate electronic publishing software competence, by: <ul style="list-style-type: none"> <li>– creating a customized document effectively incorporating text and graphics to communicate an idea or activity</li> <li>– applying software make-up tools and commands</li> </ul> </li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• production of accurate, well-designed multipage original publications focusing on advanced software functions and continued use of previously learned software functions and layout principles including: <ul style="list-style-type: none"> <li>– multicolumn</li> <li>– text (body and display)</li> <li>– follow copyright laws</li> <li>– layout principles such as optical centre, balance, white space, columns, Z pattern, contrast, rhythm, unity</li> <li>– additional layout principles including colour, proportion, golden section, bleed and trim</li> </ul> </li> <li>• advanced software functions consisting of: <ul style="list-style-type: none"> <li>– style sheet, page masters or templates</li> <li>– graphics and/or artwork (graphic tools, scanning, clip art files)</li> <li>– style palette (captions, headlines, body, text)</li> <li>– story editor</li> <li>– publication enhancements (e.g., pull quotes, sidebars and footnotes, mastheads and banners, two-page spread graphics)</li> <li>– print composite and colour separation.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Checklist: Electronic Publishing Software Functions (INFEPSF)</i>  <i>Assessment Checklist: Electronic Publishing Document Production (INFEPDOC)</i></p> <p><i>Standard</i>  <i>Rating of 3 in the production of accurate, well-designed publications</i></p>	<p>60</p> <p>30</p>



**MODULE INF3070: ELECTRONIC PUBLISHING 2** (continued)

Concept	Specific Learner Expectations	Notes
<p>Software Functions and Applications (continued)</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• demonstrate appropriate key commands to:               <ul style="list-style-type: none"> <li>– open/create files/templates</li> <li>– key, load, import, scan text and graphic files</li> <li>– name files</li> <li>– import ASCII</li> <li>– file conversion</li> <li>– format text/graphics</li> <li>– proofread, edit text, position graphics</li> </ul> </li> <li>• address the factors that affect desktop publishing layout:               <ul style="list-style-type: none"> <li>– identify audience, message</li> <li>– determine budget, resource, time constraints</li> </ul> </li> <li>• establish document layout and specifications</li> <li>• create/import graphics elements:               <ul style="list-style-type: none"> <li>– clip art</li> <li>– art creation</li> <li>– mechanical drawing</li> <li>– animation</li> </ul> </li> <li>• merge graphics and text</li> <li>• use story editor:               <ul style="list-style-type: none"> <li>– back publications</li> <li>– index entry/format</li> <li>– page/cross reference</li> <li>– character codes</li> </ul> </li> <li>• use graphics:               <ul style="list-style-type: none"> <li>– gray scale scans</li> <li>– independent versus inline</li> <li>– image control</li> <li>– lightness/contrast settings</li> <li>– multicolour</li> <li>– overlays</li> <li>– edits</li> </ul> </li> <li>• create page format(s):               <ul style="list-style-type: none"> <li>– import/export and link data charts to other applications</li> </ul> </li> <li>• plan/create customized desktop templates</li> <li>• move through document(s) efficiently by using appropriate cursor movement tools/commands</li> <li>• create objects using special effects</li> <li>• use help functions and references as appropriate.</li> </ul>	<p>Select various desktop publishing applications that combine text and graphics, and incorporate desktop publishing features:</p> <ul style="list-style-type: none"> <li>– personal documents</li> <li>– class assignments</li> <li>– school stationery, newsletter, newspaper, yearbook</li> <li>– signs, announcements</li> <li>– invitations</li> <li>– advertisements</li> <li>– brochures (single-, folded-page)</li> <li>– reports, manuals, booklets</li> <li>– community activities</li> <li>– customer documents</li> <li>– business applications.</li> </ul> <p>Prepare text, illustrations, graphics.</p> <p>Create camera-ready page layouts.</p> <p>Adhere to publishing industry standards.</p>

**MODULE INF3070: ELECTRONIC PUBLISHING 2** (continued)

Concept	Specific Learner Expectations	Notes
Document Production	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• demonstrate appropriate key commands to:               <ul style="list-style-type: none"> <li>– save files</li> <li>– print documents</li> <li>– printer drivers</li> <li>– bitmapped</li> <li>– postscript/non-postscript</li> </ul> </li> <li>• demonstrate appropriate key commands to produce quality desktop publishing documents.</li> </ul>	
Workstation Management	<ul style="list-style-type: none"> <li>• apply efficient workstation position and routines that encourage:               <ul style="list-style-type: none"> <li>– good health and safety (posture, positioning of hardware and furniture)</li> <li>– security for hardware, software, supplies and personal work</li> </ul> </li> <li>• demonstrate efficient and appropriate use of time and resources:               <ul style="list-style-type: none"> <li>– start-up procedures</li> <li>– organization of work area</li> <li>– closing procedures</li> </ul> </li> <li>• apply effective decision-making strategies in production assignments:               <ul style="list-style-type: none"> <li>– plan activities</li> <li>– organize data, information, resources</li> <li>– consider alternatives</li> <li>– evaluate activities/results</li> </ul> </li> <li>• use related terminology to describe basic processes, procedures and tools.</li> </ul>	

**COURSE INF3080: INFORMATION MANAGEMENT TOOLS****Level:** Advanced**Theme:** Productivity Software**Prerequisite:** None**Course Description:** Students develop competence in using information management systems software, such as project management, schedules and planners for either personal or workplace applications.**Course Parameters:** Computer workstation, disk, information management system software, support resources.**Curriculum and Assessment Standards**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• demonstrate the ability to use information management software, to:               <ul style="list-style-type: none"> <li>– plan projects, including setting goals, timelines and determining resource needs</li> <li>– monitor projects, including time and resource management</li> <li>– adjust project files, as appropriate</li> <li>– prepare project reports</li> </ul> </li> <li>• describe the features of the information management software used</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• an information management project using project management software to:               <ul style="list-style-type: none"> <li>– plan an identified project (business or personal)</li> <li>– monitor the project</li> <li>– make adjustments where appropriate</li> <li>– prepare project reports.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Guide: Information Management Project Planning/Monitoring (INF3080-1)</i></p> <p><i>Standard</i>  <i>Rating of 3 in each applicable task</i></p>	70
	<ul style="list-style-type: none"> <li>• present the information management tool to others by demonstrating and discussing its capabilities.</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Guide: Information Management Project Presenting (INF3080-2)</i></p> <p><i>Standard</i>  <i>Rating of 3 in each applicable task</i></p>	20

**COURSE INF3080: INFORMATION MANAGEMENT TOOLS (continued)**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• apply, consistently, appropriate workstation routines</li>   <li>• demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• demonstrate appropriate workstation routines.</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Checklist: Workstation Routines and Management (INFWRKSTN)</i></p> <p><i>Standard</i>  <i>Rating of:</i>            3 – Workstation Use            3 – File Management            3 – Time Management/Organization            3 – Professionalism</p> <ul style="list-style-type: none"> <li>• observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>10</p> <p>Integrated throughout</p>

Concept	Specific Outcomes	Notes
<p>Planning</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• organize relevant data; e.g., building a house, putting on a play, building a multimedia presentation</li> <li>• define basic project information               <ul style="list-style-type: none"> <li>– identify all key tasks</li> <li>– link tasks where appropriate</li> <li>– assign task duration</li> </ul> </li> <li>• organize tasks into an outline and detail each sub-task:               <ul style="list-style-type: none"> <li>– view different levels of task detail (expand/collapse)</li> <li>– set milestones</li> <li>– create a base calendar</li> </ul> </li> <li>• create resources lists:               <ul style="list-style-type: none"> <li>– enter cost information</li> <li>– assign resources</li> <li>– apply appropriate constraints.</li> </ul> </li> </ul>	

**MODULE INF3080: INFORMATION MANAGEMENT TOOLS** (continued)

Concept	Specific Learner Expectations	Notes
Monitoring	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• identify critical issues</li> <li>• resolve time restrictions</li> <li>• resolve resource constraints</li> <li>• sort and filter data</li> <li>• generate project reports.</li> </ul>	
Presentation	<ul style="list-style-type: none"> <li>• demonstrate the information management tool to others</li> <li>• describe the capabilities of the tool</li> <li>• describe how a person or business can benefit from the use of the management tool.</li> </ul>	
Workstation Management	<ul style="list-style-type: none"> <li>• apply efficient workstation position and routines that encourage:               <ul style="list-style-type: none"> <li>– good health and safety (posture, positioning of hardware and furniture)</li> <li>– security for hardware, software, supplies and personal work</li> </ul> </li> <li>• demonstrate efficient and appropriate use of time and resources:               <ul style="list-style-type: none"> <li>– start-up procedures</li> <li>– organization of work area</li> <li>– closing procedures</li> </ul> </li> <li>• apply effective decision-making strategies in production assignments:               <ul style="list-style-type: none"> <li>– plan activities</li> <li>– organize data, information, resources</li> <li>– consider alternatives</li> <li>– evaluate activities/results</li> </ul> </li> <li>• use related terminology to describe basic processes, procedures and tools.</li> </ul>	



**MODULE INF3090: SOFTWARE INTEGRATION 3****Level:** Advanced**Theme:** Applied Processing**Prerequisite:** INF3120 Software Integration 2**Module 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.**Module Parameters:** Computer workstation, disk, word processing software, support resources.**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• demonstrate competence in producing multipage documents and presentations that integrate word processing, spreadsheet, database and graphics files/documents from:               <ul style="list-style-type: none"> <li>– unedited copy</li> <li>– unformatted copy</li> </ul> </li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• create multipage (more than 10 pages) document(s) (enter, edit, format, print) from unedited, unformatted sources that integrate and link (i.e., OLE/subscribe/publish) data text and graphics. Documents should make use of the following types of software: word processing, spreadsheet, database, graphics</li> <li>• edit multipage documents created to produce a presentation that includes word processing, spreadsheet, database and graphics software.</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Checklist: Software Integration 1, 2 and 3 (INFINTEG)</i></p> <p><i>Standard</i>  <i>Rating of 3 in the production of accurate and well-formatted documents</i></p>	<p>70</p> <p>20</p>



**MODULE INF3090: SOFTWARE INTEGRATION 3** (continued)

Concept	Specific Learner Expectations	Notes
Document Editing	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• load, redesign, reformat, or modify existing templates and files containing information from word processing, database, spreadsheet and graphics files to prepare a presentation</li> <li>• revise documents to be aesthetically pleasing and well-formatted.</li> <li>• save and print documents.</li> </ul>	
Workstation Management	<ul style="list-style-type: none"> <li>• apply efficient workstation position and routines that encourage:               <ul style="list-style-type: none"> <li>– good health and safety (posture, positioning of hardware and furniture)</li> <li>– security for hardware, software, supplies and personal work</li> </ul> </li> <li>• demonstrate efficient and appropriate use of time and resources:               <ul style="list-style-type: none"> <li>– start-up procedures</li> <li>– organization of work area</li> <li>– closing procedures</li> </ul> </li> <li>• apply effective decision-making strategies in production assignments:               <ul style="list-style-type: none"> <li>– plan activities</li> <li>– organize data, information, resources</li> <li>– consider alternatives</li> <li>– evaluate activities/results</li> </ul> </li> <li>• use related terminology to describe basic processes, procedures and tools.</li> </ul>	



**MODULE INF3100: SPECIALIZATION 1**

**Level:** Advanced

**Theme:** Applied Processing

**Prerequisites:** INF2030 Keyboarding 2  
INF2050 Word Processing 2  
INF2120 Software Integration 1

**Module 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.

**Module Parameters:** Computer workstation, disk, word processing software, support resources.

**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• demonstrate basic competence in a specific focus area, by:               <ul style="list-style-type: none"> <li>– using appropriate terminology</li> <li>– preparing and producing documents</li> <li>– exhibiting professional attributes</li> </ul> </li> <li>• apply, consistently, appropriate workstation routines</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• appropriate use of terminology in the area of specialization</li> <li>• collection of documents related to the area of specialization consisting of:               <ul style="list-style-type: none"> <li>– prioritizing tasks and producing documents using office routines, practices and communication skills related to the area of specialization</li> <li>– editing documents.</li> </ul> </li> </ul> <p><i>Assessment Tool</i> <i>Assessment Checklist: Specialization 1 &amp; 2 (INFSPEC)</i></p> <p><i>Standard</i> <i>Rating of 2 in all the preparation of accurate, well-formatted specialized documents</i></p> <ul style="list-style-type: none"> <li>• demonstrate appropriate workstation routines.</li> </ul> <p><i>Assessment Tool</i> <i>Assessment Checklist: Workstation Routines and Management (INFWRKSTN)</i></p> <p><i>Standard</i> <i>Rating of:</i> 3 – Workstation Use 3 – File Management 3 – Time Management/Organization 3 – Professionalism</p>	<p></p> <p>10</p> <p>60</p> <p>20</p> <p>10</p>

**MODULE INF3100: SPECIALIZATION 1** (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Specialization Focus</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>identify/research focus area:               <ul style="list-style-type: none"> <li>work environment</li> <li>stakeholder groups</li> <li>routines and practices</li> <li>internal/external characters/parameters</li> <li>existing community offices</li> <li>specialized documents</li> </ul> </li> <li>describe workplace expectations:               <ul style="list-style-type: none"> <li>personnel/duties</li> <li>office layout</li> <li>facilities/equipment</li> <li>resource support</li> </ul> </li> <li>define and use specialized terminology related to area of specialization</li> </ul>	<p>The ability to efficiently apply specific terminology and documentation knowledge in a recognized professional, industrial or business workplace setting enhances opportunities for entry-level employment.</p> <p>This module could consist of a simulation, off-campus experience, student-initiated project, in-basket exercises, or integrated problem requiring specific document preparation, terminology application and workplace environment activities.</p>
<p>Document Production</p>	<ul style="list-style-type: none"> <li>produce and edit a variety of documents in the area of specialization</li> <li>use sample(s) or templates of specialized documents to design well-formatted documents</li> </ul>	

**MODULE INF3100: SPECIALIZATION 1** (continued)

Concept	Specific Learner Expectations	Notes
Document Production (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• establish timelines, priorities, required resources</li> <li>• format/revise output document(s) for internal/external use:               <ul style="list-style-type: none"> <li>– verify content, format and instructions</li> <li>– check reports, forms, documents for mailability</li> <li>– prepare backup/records.</li> </ul> </li> </ul>	
Workstation Management	<ul style="list-style-type: none"> <li>• apply efficient workstation position and routines that encourage:               <ul style="list-style-type: none"> <li>– good health and safety (posture, positioning of hardware and furniture)</li> <li>– security for hardware, software, supplies and personal work</li> </ul> </li> <li>• demonstrate efficient and appropriate use of time and resources:               <ul style="list-style-type: none"> <li>– start-up procedures</li> <li>– organization of work area</li> <li>– closing procedures</li> </ul> </li> <li>• apply effective decision-making strategies in production assignments:               <ul style="list-style-type: none"> <li>– plan activities</li> <li>– organize data, information, resources</li> <li>– consider alternatives</li> <li>– evaluate activities/results</li> </ul> </li> <li>• use related terminology to describe basic processes, procedures and tools.</li> </ul>	



**MODULE INF3110: SPECIALIZATION 2****Level:** Advanced**Theme:** Applied Processing**Prerequisites:** INF3100 Specialization 1  
INF3120 Software Integration 2**Module 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.**Module Parameters:** Computer workstation, disk, word processing software, support resources.**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• demonstrate entry-level workplace competence in a specific focus area, by:               <ul style="list-style-type: none"> <li>– using appropriate terminology</li> <li>– preparing and producing documents</li> <li>– exhibiting professional attributes</li> </ul> </li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• appropriate use of terminology in the area of specialization</li> <li>• collection of documents related to the area of specialization consisting of:               <ul style="list-style-type: none"> <li>– preparation of mailable specialized documents under time constraints appropriate for complexity of task based on unformatted sources</li> <li>– a minimum expected keyboarding competency of 30 wpm based on Keyboarding 2 competency</li> <li>– prioritizing tasks and producing documents</li> <li>– using office routines, practices and communication skills related to the area of specialization</li> <li>– editing documents.</li> </ul> </li> </ul> <p><i>Assessment Tool</i> <i>Assessment Checklist: Specialization 1 &amp; 2 (INFSPEC)</i></p> <p><i>Standard</i> <i>Rating of 3 in the preparation of accurate, well-formatted specialized documents under time constraints</i></p>	<p></p> <p style="text-align: center;">10</p> <p style="text-align: center;">60</p> <p style="text-align: center;">20</p>



**MODULE INF3110: SPECIALIZATION 2** (continued)

Concept	Specific Learner Expectations	Notes
Document Production	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• produce and edit a variety of documents in the area of specialization under time constraints</li> <li>• use sample(s) or templates of specialized documents to design well-formatted documents</li> <li>• create timelines, priorities, required resources</li> <li>• format/revise output document(s) for internal/external use:               <ul style="list-style-type: none"> <li>– verify content, format and instructions</li> <li>– check reports, forms, documents for mailability</li> <li>– prepare backup/records.</li> </ul> </li> </ul>	
Workstation Management	<ul style="list-style-type: none"> <li>• apply efficient workstation position and routines that encourage:               <ul style="list-style-type: none"> <li>– good health and safety (posture, positioning of hardware and furniture)</li> <li>– security for hardware, software, supplies and personal work</li> </ul> </li> <li>• demonstrate efficient and appropriate use of time and resources:               <ul style="list-style-type: none"> <li>– start-up procedures</li> <li>– organization of work area</li> <li>– closing procedures</li> </ul> </li> <li>• apply effective decision-making strategies in production assignments:               <ul style="list-style-type: none"> <li>– plan activities</li> <li>– organize data, information, resources</li> <li>– consider alternatives</li> <li>– evaluate activities/results</li> </ul> </li> <li>• use related terminology to describe basic processes, procedures and tools.</li> </ul>	



## MODULE INF3120: SOFTWARE INTEGRATION 2

**Level:** Advanced

**Theme:** Applied Processing

**Prerequisite:** INF2120 Software Integration 1

**Module 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.

**Module Parameters:** Access to word processing, spreadsheet, database, graphics software.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"><li>demonstrate competence in producing documents that integrate word processing, spreadsheet, database and graphics files/documents from:<ul style="list-style-type: none"><li>unedited copy</li><li>unformatted copy</li></ul></li></ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"><li>create four- to ten-page document(s) (enter, format, edit and print) from unedited, unformatted sources that integrate and link (i.e., OLE/subscribe/publish) data, text, and graphics. Documents should make use of at least three of the following types of software:<ul style="list-style-type: none"><li>word processing</li><li>spreadsheet</li><li>database</li><li>spreadsheets including chart graphing</li><li>graphics (paint and draw, clip art files)</li></ul></li><li>editing to produce error-free, well-formatted document(s).</li></ul>	70
	<i>Assessment Tools</i> <i>Assessment Checklist: Software Integration 1, 2 and 3 (INFINTEG)</i> <i>Standard</i> <i>Rating of 2 in the production of accurate and well-formatted documents</i>	20



**MODULE INF3120: SOFTWARE INTEGRATION 2** (continued)

Concept	Specific Learner Expectations	Notes
Document Editing	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• load, redesign, reformat, or modify existing templates and files containing information from database, spreadsheet, presentation graphics files</li> <li>• revise documents to be aesthetically pleasing and well formatted</li> <li>• save and print documents.</li> </ul>	
Workstation Management	<ul style="list-style-type: none"> <li>• apply efficient workstation position and routines that encourage:               <ul style="list-style-type: none"> <li>– good health and safety (posture, positioning of hardware and furniture)</li> <li>– security for hardware, software, supplies and personal work</li> </ul> </li> <li>• demonstrate efficient and appropriate use of time and resources:               <ul style="list-style-type: none"> <li>– start-up procedures</li> <li>– organization of work area</li> <li>– closing procedures</li> </ul> </li> <li>• apply effective decision-making strategies in production assignments:               <ul style="list-style-type: none"> <li>– plan activities</li> <li>– organize data, information, resources</li> <li>– consider alternatives</li> <li>– evaluate activities/results</li> </ul> </li> <li>• use related terminology to describe basic processes, procedures and tools.</li> </ul>	



**MODULE INF3130: MULTIMEDIA AUTHORING 2****Level:** Advanced**Theme:** Productivity Software**Prerequisite:** INF2130 Multimedia Authoring 1**Module Description:** Students learn to use a multimedia file or multimedia authoring software based on digitized input of text, video and audio clips.**Module Parameters:** Computer workstation, multimedia software, support resources.**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• demonstrate multimedia authoring software and digitized input competence, by:               <ul style="list-style-type: none"> <li>– capturing text/ images, video and audio information from external sources, and inputting it on a computer</li> <li>– using captured text/images, video and audio to create a multimedia presentation</li> </ul> </li> <li>• apply, consistently, appropriate workstation routines</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• planning, producing, editing and testing of a multimedia presentation that includes original text, graphics, video, audio and animation with the individual components supporting a common theme:               <ul style="list-style-type: none"> <li>– create and import textual material</li> <li>– create and import graphics</li> <li>– create and import video clips</li> <li>– create and import audio clips</li> <li>– create and import animation clips.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Checklist: Multimedia Software Functions (INFMMSF)</i>  <i>Assessment Checklist: Multimedia Productions and Presentations (INFMMDOC)</i></p> <p><i>Standard</i>  <i>Rating of 2</i></p> <ul style="list-style-type: none"> <li>• demonstrate appropriate workstation routines.</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Checklist: Workstation Routines and Management (INFWRKSTN)</i></p> <p><i>Standard</i>  <i>Rating of:</i>            3 – Workstation Use            3 – File Management            3 – Time Management/Organization            3 – Professionalism</p>	<p>20</p> <p>70</p> <p>10</p>

**MODULE INF3130: MULTIMEDIA AUTHORING 2** (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Multimedia Software Authoring Skill</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>demonstrate ability to use identified multimedia software in the planning of a presentation that includes creating and importing of: <ul style="list-style-type: none"> <li>text</li> <li>graphics</li> <li>video</li> <li>sound</li> <li>animation</li> </ul> </li> <li>import text/images, video and audio information</li> <li>manipulate text/images and audio information as required.</li> </ul>	
<p>Multimedia Authoring Application</p>	<ul style="list-style-type: none"> <li>plan steps in preparing a multimedia presentation</li> <li>prepare a storyboard, outlining the presentation's content and special effects for a particular theme</li> <li>make decisions regarding text, sound, graphics, video and animation</li> <li>select and use appropriate tools, commands and devices</li> <li>apply software commands</li> </ul>	

**MODULE INF3130: MULTIMEDIA AUTHORING 2** (continued)

Concept	Specific Learner Expectations	Notes
<p>Multimedia Authoring Application (continued)</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• create a customized multimedia authored file/movie (key, import, digitize text, video, audio clips) using software program(s) and external sources by doing all or some of the following: <ul style="list-style-type: none"> <li>– establish windows/screen parameters and characteristics</li> <li>– determine clip considerations</li> <li>– open/import/digitize source clips: <ul style="list-style-type: none"> <li>• still-images</li> <li>• animation</li> <li>• audio clips</li> <li>• window files</li> <li>• special files</li> </ul> </li> <li>– edit windows/screens using: <ul style="list-style-type: none"> <li>• tool kit functions</li> <li>• command options</li> </ul> </li> <li>– edit clips (trim/split/join/align)</li> </ul> </li> <li>• preview segments, tracks, sequence</li> <li>• print/export file; storyboard the window/screen; enhance with visual transitions; apply digital filters; create titles/graphics; superimpose clips</li> <li>• run uncompiled sequence; play compiled movie (videotape recording, edit decision list).</li> </ul>	<p>Multimedia software uses the power of the computer to create presentations that integrate text information, visual images and sound tracks. Sources of input include both software-resident clips as well as externally digitized images from videotape, full-motion video sequences, music segments, computer-generated animation, CD/laser discs and other graphics elements including still images, paintings or photographs.</p>

**MODULE INF3130: MULTIMEDIA AUTHORING 2** (continued)

Concept	Specific Learner Expectations	Notes
Workstation Management	<p><i>The student should:</i></p> <ul style="list-style-type: none"><li>• apply efficient workstation position and routines that encourage:<ul style="list-style-type: none"><li>– good health and safety (posture, positioning of hardware and furniture)</li><li>– security for hardware, software, supplies and personal work</li></ul></li><li>• demonstrate efficient and appropriate use of time and resources:<ul style="list-style-type: none"><li>– start-up procedures</li><li>– organization of work area</li><li>– closing procedures</li></ul></li><li>• apply effective decision-making strategies in production assignments:<ul style="list-style-type: none"><li>– plan activities</li><li>– organize data, information, resources</li><li>– consider alternatives</li><li>– evaluate activities/results</li></ul></li><li>• use related terminology to describe basic processes, procedures and tools.</li></ul>	

**MODULE INF3140: EXPERT SYSTEMS****Level:** Advanced**Theme:** Dynamic Environment**Prerequisites:** INF1070 Hypermedia Tools  
INF3130 Multimedia Authoring 2**Module 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.**Module Parameters:** Computer workstation, software, support resources.**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"> <li>• develop an information portfolio on expert systems and other advanced technologies</li> <li>• program an application, using one of these systems and present the results</li> </ul>	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"> <li>• an artificial intelligence project focusing on expert systems consisting of:               <ul style="list-style-type: none"> <li>– research of an expert system, including what it is, its effects on society and a description of how it is used</li> </ul> </li> </ul>	35
	<ul style="list-style-type: none"> <li>– use of an appropriate programming language/artificial intelligence software package to:               <ul style="list-style-type: none"> <li>• solve a specific problem or</li> <li>• modify an existing application</li> </ul> </li> </ul>	35
	<ul style="list-style-type: none"> <li>– explain/demonstrate expert system principles and application(s).</li> </ul>	20
	<i>Assessment Tools</i> <i>Assessment Guide: Artificial Intelligence (AI) Project (INF3140–1)</i> <i>Artificial Intelligence (AI) Sample Project (INF3140–2)</i>  <i>Standard</i> <i>Rating of 2 in all applicable tasks</i>	



**MODULE INF3140: EXPERT SYSTEMS (continued)**

Concept	Specific Learner Expectations	Notes
<p>Expert Systems Programming and Software (continued)</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• input data:               <ul style="list-style-type: none"> <li>– design/define project parameters:                   <ul style="list-style-type: none"> <li>• flowchart sequence</li> </ul> </li> <li>– enter data:                   <ul style="list-style-type: none"> <li>• key, load data</li> </ul> </li> </ul> </li> <li>• create/import/scan graphic elements access/manipulate data/information:               <ul style="list-style-type: none"> <li>– create background</li> <li>– edit/modify/update data/information</li> <li>– use resident commands</li> <li>– link file(s)</li> <li>– incorporate text (alphabetic, numeric), graphics, motion, sound</li> <li>– demonstrate artificial intelligence/virtual reality/other high technology capability</li> </ul> </li> <li>• output expert system activities               <ul style="list-style-type: none"> <li>– display/print/export                   <ul style="list-style-type: none"> <li>• artificial intelligence file</li> <li>• virtual reality file.</li> </ul> </li> </ul> </li> </ul>	
<p>Workstation Management</p>	<ul style="list-style-type: none"> <li>• apply efficient workstation position and routines that encourage:               <ul style="list-style-type: none"> <li>– good health and safety (posture, positioning of hardware and furniture)</li> <li>– security for hardware, software, supplies and personal work</li> </ul> </li> <li>• demonstrate efficient and appropriate use of time and resources:               <ul style="list-style-type: none"> <li>– start-up procedures</li> <li>– organization of work area</li> <li>– closing procedures</li> </ul> </li> <li>• apply effective decision-making strategies in production assignments:               <ul style="list-style-type: none"> <li>– plan activities</li> <li>– organize data, information, resources</li> <li>– consider alternatives</li> <li>– evaluate activities/results</li> </ul> </li> <li>• use related terminology to describe basic processes, procedures and tools.</li> </ul>	



**COURSE INF3150: PROGRAMMING APPLICATION 1****Level:** Advanced**Theme:** Programming**Prerequisite:** None**Course Description:** Students create programs that use external files.**Course Parameters:** Computer workstation, programming language software, language code manual, support resources.**Supporting Courses:** INF2150 Programming 2; INF2160 Programming 3; INF2170 Programming 4; INF2180 Programming 5**Curriculum and Assessment Standards**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>create an algorithm to solve problems requiring an external data file</li> <li>develop programs that create, retrieve, append and modify text/nontext files</li> <li>apply, consistently, appropriate workstation routines</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>distinguishing programming problems requiring the use of external data files</li> <li>distinguishing programming problems requiring text versus nontext files</li> <li>creating and revising programs that will create, retrieve, append and modify external data files</li> <li>creating and revising programs that will sequentially/randomly access data from external data files.</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Checklist: Advanced Programming Applications (INFPRGM3)</i>  <i>Programming: Sample Assignment: PA1 (INFPSAM3)</i></p> <p><i>Standard</i>  <i>Rating of 3 in the creation and presentation of programs</i></p>	<p>30</p> <p>60</p>
	<ul style="list-style-type: none"> <li>demonstrate appropriate workstation routines.</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Checklist: Workstation Routines and Management (INFWRKSTN)</i></p> <p><i>Standard</i>  <i>Rating of:</i>  3 – Workstation Use  3 – File Management  3 – Time Management/Organization  3 – Professionalism</p>	<p>10</p>

**COURSE INF3150: PROGRAMMING APPLICATION 1 (continued)**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Outcomes	Notes
<p>Algorithms/Classes</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>modify existing/develop new algorithms/classes</li> <li>identify/describe the problem</li> <li>list each step required to solve the problem/list the required components of the data structure</li> <li>demonstrate the appropriate logic/data components required to achieve the solution</li> <li>demonstrate the appropriate methods of creating and accessing data stored in external files</li> <li>compare characteristics and use of text and binary files</li> <li>select appropriate file structure based on problem characteristics</li> <li>apply structured programming constructs to modify/create a schematic/flowchart/pseudocode indicating how the solution will be achieved (IPO/HIPO).</li> </ul>	<p>Programmers design algorithms and use either a procedure-oriented or object-oriented language structure to code instructions for specific and unique computer tasks.</p>
<p>Computer Language Syntax</p>	<ul style="list-style-type: none"> <li>use constants, variables, data structures, operands</li> <li>use reserved words, commands, statements, operators, subroutines, functions</li> <li>use language-specific derived data types</li> </ul>	<p>See notes from Programming 5, if available.</p>

**MODULE INF3150: PROGRAMMING APPLICATION 1** (continued)

Concept	Specific Learner Expectations	Notes
<p>Computer Language Syntax (continued)</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• input data using reserved words or predefined classes: <ul style="list-style-type: none"> <li>– embed/read from external files/enter data</li> <li>– create/assign values/operations to derived data types</li> <li>– open and access contents of text and binary files sequentially/randomly</li> </ul> </li> <li>• process data: <ul style="list-style-type: none"> <li>– calculations/manipulations/decision control/branching/looping/subroutines/functions/classes/objects/methods/files</li> </ul> </li> <li>• edit/modify existing code</li> <li>• output/link program segments/programs using reserved words or predefined classes: <ul style="list-style-type: none"> <li>– text/data/graphics</li> <li>– create and access text and binary files.</li> </ul> </li> </ul>	
<p>Structure Computer Programming Applications</p>	<ul style="list-style-type: none"> <li>• access appropriate computer language resource support</li> <li>• describe the purpose/use of text and binary files</li> <li>• describe the need for/advantages of text and binary files</li> <li>• use/develop program segments that create/open/write to/read from/append to text and binary files</li> <li>• use/develop program segments that access the contents of external files sequentially and randomly</li> <li>• use/develop program segments that access multiple files</li> <li>• identify situations that lend themselves to specific types of file structures</li> <li>• apply appropriate file structures and operations in a program</li> <li>• produce algorithms/classes</li> </ul>	

**MODULE INF3150: PROGRAMMING APPLICATION 1** (continued)

Concept	Specific Learner Expectations	Notes
<p>Structure Computer Programming Applications (continued)</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• produce output format/file structure</li> <li>• key/code the instructions</li> <li>• test run program</li> <li>• debug/edit program</li> <li>• execute program</li> <li>• document program</li> <li>• assess activities/results.</li> </ul>	
<p>Workstation Management</p>	<ul style="list-style-type: none"> <li>• apply efficient workstation position and routines that encourage:               <ul style="list-style-type: none"> <li>– good health and safety (posture, positioning of hardware and furniture)</li> <li>– security for hardware, software, supplies and personal work</li> </ul> </li> <li>• demonstrate efficient and appropriate use of time and resources:               <ul style="list-style-type: none"> <li>– start-up procedures</li> <li>– organization of work area</li> <li>– closing procedures</li> </ul> </li> <li>• apply effective decision-making strategies in production assignments:               <ul style="list-style-type: none"> <li>– plan activities</li> <li>– organize data, information, resources</li> <li>– consider alternatives</li> <li>– evaluate activities/results</li> </ul> </li> <li>• use related terminology to describe basic processes, procedures and tools.</li> </ul>	

**MODULE INF3160: PROGRAMMING APPLICATION 2****Level:** Advanced**Theme:** Programming**Prerequisite:** INF3150 Programming Application 1**Module Description:** Students create a program, using a second programming language.**Module Parameters:** Computer workstation, programming language, language code manual, support resources.**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• employ existing algorithms to solve programming problems</li>   <li>• create programs to solve problems in a second programming language that include: <ul style="list-style-type: none"> <li>– input/output</li> <li>– mathematical functions</li> <li>– looping and branching</li> <li>– subprogram structures</li> </ul> </li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• formulating an algorithm for the solution of the problem</li> <li>• distinguishing generic characteristics of problems and design algorithmic solutions independent of programming language</li> <li>• constructing programs that: <ul style="list-style-type: none"> <li>– use predefined language specific variables</li> <li>– assign values to variables within the program and via the keyboard</li> <li>– use language-specific commands to perform iterative and decision control operations (relational and logic)</li> <li>– use language-specific subprogram structures</li> <li>– use language-specific reserved words/structures for generating and formatting output.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Checklist: Advanced Programming Applications (INFPRGM3)</i>  <i>Programming: Sample Assignment: PA1 (INFPSAM3)</i></p> <p><i>Standard</i>  <i>Rating of 3 in the creation and presentation of programs</i></p>	<p>20</p>         <p>70</p>

**MODULE INF3160: PROGRAMMING APPLICATION 2** (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• apply, consistently, appropriate workstation routines</li> <li>• demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• demonstrate appropriate workstation routines.</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Checklist: Workstation Routines and Management (INFWRKSTN)</i></p> <p><i>Standard</i>  <i>Rating of:</i>            3 – Workstation Use            3 – File Management            3 – Time Management/Organization            3 – Professionalism</p> <ul style="list-style-type: none"> <li>• observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>10</p> <p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Algorithms/Classes</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• modify existing/develop new algorithms/classes</li> <li>• identify/describe the problem</li> <li>• list each step required to solve the problem/list the required components of the data structure</li> <li>• demonstrate the appropriate logic/data components required to achieve the solution</li> <li>• identify generic characteristics of programming languages</li> <li>• identify steps involved in problem solving independent of programming language</li> <li>• apply structured programming constructs to modify/create a schematic/flowchart/ pseudocode indicating how the solution will be achieved (IPO/HIPO).</li> </ul>	<p>Programmers design algorithms and use either a procedure-oriented or object-oriented language structure to code instructions for specific and unique computer tasks. Various computer languages have been developed over the years to improve computer communication efficiency.</p>

**MODULE INF3160: PROGRAMMING APPLICATION 2** (continued)

Concept	Specific Learner Expectations	Notes
<p>Computer Language Syntax</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• use constraints, variables, data structures, operands in a second programming language</li> <li>• use reserved words, commands, statements, operators, subroutines, functions in a second programming language</li> <li>• use second language-specific derived data types</li> <li>• input data using reserved words or predefined classes of a second programming language:               <ul style="list-style-type: none"> <li>– embed/read/enter data</li> <li>– create/assign values/operations to derived data types</li> </ul> </li> <li>• process data using second language constructs:               <ul style="list-style-type: none"> <li>– calculations/manipulations/decision control/branching/looping/subroutines/functions/classes/objects/methods</li> </ul> </li> <li>• output/link program segments/programs using reserved words or predefined classes of a second programming language:               <ul style="list-style-type: none"> <li>– text/data/graphics.</li> </ul> </li> </ul>	<p>See notes from Programming 5.</p>
<p>Structure Computer Programming Applications</p>	<ul style="list-style-type: none"> <li>• access appropriate computer language resource support</li> <li>• describe the parallels/differences between the two programming languages</li> <li>• use/develop program segments using second language constructs to enter/manipulate/output data</li> <li>• recode first language programs using second programming language</li> <li>• apply second language constructs in a program</li> <li>• produce algorithms/classes</li> <li>• produce output format</li> <li>• key/code the instructions</li> <li>• test run programs</li> <li>• debug/edit program</li> <li>• execute program</li> <li>• document program</li> <li>• assess activities/results.</li> </ul>	

**MODULE INF3160: PROGRAMMING APPLICATION 2** (continued)

Concept	Specific Learner Expectations	Notes
Workstation Management	<p><i>The student should:</i></p> <ul style="list-style-type: none"><li>• apply efficient workstation position and routines that encourage:<ul style="list-style-type: none"><li>– good health and safety (posture, positioning of hardware and furniture)</li><li>– security for hardware, software, supplies and personal work</li></ul></li><li>• demonstrate efficient and appropriate use of time and resources:<ul style="list-style-type: none"><li>– start-up procedures</li><li>– organization of work area</li><li>– closing procedures</li></ul></li><li>• apply effective decision-making strategies in production assignments:<ul style="list-style-type: none"><li>– plan activities</li><li>– organize data, information, resources</li><li>– consider alternatives</li><li>– evaluate activities/results</li></ul></li><li>• use related terminology to describe basic processes, procedures and tools.</li></ul>	

**MODULE INF3170: PROGRAMMING APPLICATION 3**

**Level:** Advanced

**Theme:** Programming

**Prerequisite:** INF3160 Programming Application 2

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

**Module Parameters:** Computer workstation, programming language, language code manual, support resources.

**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• create algorithms to solve programming problems</li>   <li>• create programs to solve problems, in a second programming language that include:               <ul style="list-style-type: none"> <li>– one- and two-dimensional arrays</li> <li>– character strings</li> <li>– sort, search and merge operations</li> <li>– external data files</li> </ul> </li>   <li>• apply, consistently, appropriate workstation routines</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• formulating an algorithm for the solution of the problem</li>   <li>• distinguishing generic characteristics of problems and design algorithmic solutions independent of programming language</li>   <li>• constructing programs that               <ul style="list-style-type: none"> <li>– use one- and two-dimensional arrays</li> <li>– perform operations on character strings</li> <li>– sort, search and merge operations</li> <li>– create/access external data files.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Checklist: Advanced Programming Applications (INFPRGM3)</i>  <i>Programming: Sample Assignment: PAI (INFPSAM3)</i></p> <p><i>Standard</i>  <i>Rating of 3 in the creation and presentation of programs</i></p> <ul style="list-style-type: none"> <li>• demonstrate appropriate workstation routines.</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Checklist: Workstation Routines and Management (INFWRKSTN)</i></p> <p><i>Standard</i>  <i>Rating of:</i>            3 – Workstation Use            3 – File Management            3 – Time Management/Organization            3 – Professionalism</p>	<p>20</p> <p>70</p> <p>10</p>

**MODULE INF3170: PROGRAMMING APPLICATION 3** (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Algorithms/Classes</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>modify existing/develop new algorithms/classes</li> <li>identify/describe the problem</li> <li>list each step required to solve the problem/list the required components of the data structure</li> <li>demonstrate the appropriate logic/data components required to achieve the solution</li> <li>identify steps involved in problem solving independent of programming language</li> <li>apply structured programming constructs to modify/create a schematic/flowchart/pseudocode indicating how the solution will be achieved (IPO/HIPO).</li> </ul>	<p>Programmers normally follow a general or specific set of guidelines when developing computer programs for a client. However, when creating their own computer programs they are able to work within the parameters of their own creativity.</p>
<p>Computer Language Syntax</p>	<ul style="list-style-type: none"> <li>use constraints, variables, data structures, operands in an appropriate programming language</li> <li>use reserved words, commands, statements, operators, subroutines, functions in the selected programming language</li> <li>use language-specific derived data types</li> </ul>	<p>See notes from Programming 5.</p>

**MODULE INF3170: PROGRAMMING APPLICATION 3** (continued)

Concept	Specific Learner Expectations	Notes
<p>Computer Language Syntax (continued)</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• input data using reserved words or predefined classes: <ul style="list-style-type: none"> <li>– embed/read/enter data</li> <li>– create/assign values/operations to derived data types</li> </ul> </li> <li>• process data: <ul style="list-style-type: none"> <li>– calculations/manipulations/decision control/branching/looping/subroutines/functions/classes/objects/methods</li> </ul> </li> <li>• output/link program segments/programs using reserved words or predefined classes: <ul style="list-style-type: none"> <li>– text/data/graphics.</li> </ul> </li> </ul>	
<p>Structure Computer Programming Applications</p>	<ul style="list-style-type: none"> <li>• access appropriate computer language resource support</li> <li>• use/develop program segments to enter/manipulate/output data</li> <li>• apply selected language constructs in a program</li> <li>• produce algorithms/classes</li> <li>• produce output format</li> <li>• key/code the instructions</li> <li>• test run programs</li> <li>• debug/edit program</li> <li>• execute program</li> <li>• document program</li> <li>• assess activities/results.</li> </ul>	

**MODULE INF3170: PROGRAMMING APPLICATION 3** (continued)

Concept	Specific Learner Expectations	Notes
Workstation Management	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• apply efficient workstation position and routines that encourage:               <ul style="list-style-type: none"> <li>– good health and safety (posture, positioning of hardware and furniture)</li> <li>– security for hardware, software, supplies and personal work</li> </ul> </li> <li>• demonstrate efficient and appropriate use of time and resources:               <ul style="list-style-type: none"> <li>– start-up procedures</li> <li>– organization of work area</li> <li>– closing procedures</li> </ul> </li> <li>• apply effective decision-making strategies in production assignments:               <ul style="list-style-type: none"> <li>– plan activities</li> <li>– organize data, information, resources</li> <li>– consider alternatives</li> <li>– evaluate activities/results</li> </ul> </li> <li>• use related terminology to describe basic processes, procedures and tools.</li> </ul>	

**COURSE INF3180: TELECOMMUNICATIONS 2****Level:** Advanced**Theme:** System Operations**Prerequisite:** INF2190 Telecommunications 1**Course 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.**Course Parameters:** Computer workstation, utility software, access to Internet, support resources.**Supporting Course:** INF2200 Information Highway 2**Curriculum and Assessment Standards**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>use appropriate telecommunication systems, protocols and techniques to transfer messages and manage research</li> <li>describe how telecommunication systems are evolving, merging and connecting</li> <li>design a telecommunication solution that improves communication for an individual, business, or society</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>demonstrating effective and efficient use of at least two communication systems.</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Checklist: Telecommunication Systems Infrastructure Presentation/Report (INF3180-1)</i></p> <p><i>Standard</i>  <i>Rating of 3 for all applicable tasks</i></p>	15
	<ul style="list-style-type: none"> <li>report or presentation describing two examples of new telecommunication systems: <ul style="list-style-type: none"> <li>target audience</li> <li>benefits and impacts (individual and societal)</li> <li>merging and connecting technologies</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Checklist: Telecommunication Systems Infrastructure Presentation/Report (INF3180-2)</i></p> <p><i>Standard</i>  <i>Rating of 3 in all applicable tasks</i></p>	15
	<ul style="list-style-type: none"> <li>a design project that includes: <ul style="list-style-type: none"> <li>problem being addressed</li> <li>intended benefits</li> <li>projected impacts</li> <li>technical outline (schematic and/or prototype)</li> <li>cost projections.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Checklist: Telecommunication Design Project (INF3180-3)</i></p> <p><i>Standard</i>  <i>Rating of 3 in all applicable tasks</i></p>	60

**COURSE INF3180: TELECOMMUNICATIONS 2** (continued)

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<ul style="list-style-type: none"> <li>• apply, consistently, appropriate workstation routines</li> <li>• demonstrate basic competencies.</li> </ul>	<ul style="list-style-type: none"> <li>• demonstrate appropriate workstation routines. <i>Assessment Tool</i> <i>Assessment Checklist: Workstation Routines and Management (INFWRKSTN)</i>  <i>Standard</i> <i>Rating of:</i> <i>3 – Workstation Use</i> <i>3 – File Management</i> <i>3 – Time Management/Organization</i> <i>3 – Professionalism</i></li> <li>• observations of individual effort and interpersonal interaction during the learning process.  <i>Assessment Tool</i> <i>Basic Competencies Reference Guide and any assessment tool noted above</i></li> </ul>	<p>10</p> <p>Integrated throughout</p>

Concept	Specific Outcomes	Notes
<p>Transmission Forms and Systems</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• create a telecommunications solution that improves communication options for individuals, business and society</li> <li>• compare and contrast various types of transmission systems:               <ul style="list-style-type: none"> <li>– type of information that can be transmitted</li> <li>– present installation base</li> <li>– ability to connect with other systems</li> <li>– future/potential in the telecommunications industry</li> <li>– cost-benefit</li> </ul> </li> <li>• describe how common standards allows telecommunication systems to merge and connect</li> </ul>	

**MODULE INF3180: TELECOMMUNICATIONS 2** (continued)

Concept	Specific Learner Expectations	Notes
Transmission Forms and Systems (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• identify the types of transmission protocols and common languages used in telecommunications systems and describe how and when they are used.</li> </ul>	<ul style="list-style-type: none"> <li>• FTP - file transfer protocol</li> <li>• HTTP - hypertext transfer protocol</li> <li>TCP/IP – Internet transmission control protocol/Internet protocol</li> </ul>
Telecommunication Infrastructures	<ul style="list-style-type: none"> <li>• compare and contrast key elements of an effective computer infrastructure in two or more applications:               <ul style="list-style-type: none"> <li>– transmission systems</li> <li>– information and interactive applications/services</li> <li>– software applications</li> <li>– standards and protocols</li> <li>– people/expertise</li> </ul> </li> <li>• identify and analyze key challenges facing computer mediated communications; e.g.:               <ul style="list-style-type: none"> <li>– regulation versus open systems</li> <li>– equity of access</li> </ul> </li> <li>• describe cost implications to establish and maintain a telecommunication system</li> </ul>	
Impact on the Individual and Society	<ul style="list-style-type: none"> <li>• identify key social challenges in managing telecommunication technologies in our society:               <ul style="list-style-type: none"> <li>– access:                   <ul style="list-style-type: none"> <li>• regulation versus open systems</li> <li>• personal privacy</li> <li>• ease and equity of access (usability, costs)</li> </ul> </li> <li>– use/applications:                   <ul style="list-style-type: none"> <li>• legal/illegal</li> <li>• ethical/unethical</li> <li>• courtesies/protocols</li> <li>• viruses (positive/negative)</li> </ul> </li> </ul> </li> <li>• describe economic challenges and benefits of a growing telecommunications industry</li> </ul>	

**MODULE INF3180: TELECOMMUNICATIONS 2 (continued)**

Concept	Specific Learner Expectations	Notes
Impact on the Individual and Society (continued)	<ul style="list-style-type: none"> <li>• research different career opportunities in the telecommunications sector:               <ul style="list-style-type: none"> <li>– competency requirements</li> <li>– educational requirements</li> <li>– benefits</li> <li>– work environment.</li> </ul> </li> </ul>	
Workstation Management	<ul style="list-style-type: none"> <li>• apply efficient workstation position and routines that encourage:               <ul style="list-style-type: none"> <li>– good health and safety (posture, positioning of hardware and furniture)</li> <li>– security for hardware, software, supplies and personal work</li> </ul> </li> <li>• demonstrate efficient and appropriate use of time and resources:               <ul style="list-style-type: none"> <li>– start-up procedures</li> <li>– organization of work area</li> <li>– closing procedures</li> </ul> </li> <li>• apply effective decision-making strategies in production assignments:               <ul style="list-style-type: none"> <li>– plan activities</li> <li>– organize data, information, resources</li> <li>– consider alternatives</li> <li>– evaluate activities/results</li> </ul> </li> <li>• use related terminology to describe basic processes, procedures and tools.</li> </ul>	

**MODULE INF3190: INFORMATION HIGHWAY 3****Level:** Advanced**Theme:** Dynamic Environment**Prerequisite:** INF2200 Information Highway 2**Module Description:** Students develop and maintain an Internet/intranet web site that makes use of advanced features.**Module Parameters:** Access to networked computer workstation and the Internet.**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• develop a multipage web site to be placed on the Internet or a local intranet</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• developing a multipage web site (on an agreed upon topic), which includes:               <ul style="list-style-type: none"> <li>– evidence of preplanning</li> <li>– a visually pleasing design</li> <li>– a suitably organized layout</li> <li>– appropriate links, text, graphics, anchors, plus advanced feature(s).</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Guide: Information Highway 3 – Researching/Designing/Creating (INF3190–1)</i></p> <p><i>Standard</i>  <i>Rating of 3 for all applicable tasks</i></p>	35
<ul style="list-style-type: none"> <li>• present and describe to a group, the advanced features of a web site</li> </ul>	<ul style="list-style-type: none"> <li>• presentation or report that includes:               <ul style="list-style-type: none"> <li>– demonstrating how the advanced feature(s) works on the page</li> <li>– explain the procedures followed to make the advanced feature(s) work</li> <li>– assist others to include the same advanced feature(s) in their own project.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Guide: Information Highway 3 – Presenting/Documenting (INF3190–1)</i></p>	20

**MODULE INF3190: INFORMATION HIGHWAY 3 (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• maintain and enhance a web site to improve features and functions</li> <li>• apply, consistently, appropriate workstation routines</li> <li>• demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• demonstration of effective and efficient maintenance and enhancement of a web site by:               <ul style="list-style-type: none"> <li>– updating data</li> <li>– editing text, sound, animation, graphics, etc.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Guide: Information Highway 3 – Maintaining/Enhancing (INF3190-1)</i></p> <p><i>Standard</i>  <i>Rating of 3 for all applicable tasks</i></p> <ul style="list-style-type: none"> <li>• demonstration of appropriate workstation routines.</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Checklist: Workstation Routines and Management (INFWRKSTA)</i></p> <p><i>Standard</i>  <i>Rating of</i>  <i>2 – Workstation Use</i>  <i>3 – File Management</i>  <i>2 – Time Management/Organization</i>  <i>3 – Professionalism</i></p> <ul style="list-style-type: none"> <li>• observation of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and assessment tools noted above</i></p>	<p>35</p> <p>10</p> <p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Site Research and Design</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• plan the web site pages using a storyboard or similar tool</li> <li>• research available features of effective web sites and choose which one(s) to include.</li> </ul>	

**MODULE INF3190: INFORMATION HIGHWAY 3 (continued)**

Concept	Specific Learner Expectations	Notes
Site Creation	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• create the web site including:               <ul style="list-style-type: none"> <li>– pages</li> <li>– text</li> <li>– graphics</li> <li>– links/anchors</li> <li>– advanced feature(s) (e.g., sound, animation, 3D graphics, video)</li> </ul> </li> <li>• format information in an acceptable and creative style</li> <li>• test and debug web site.</li> </ul>	
Presentation and Documentation	<ul style="list-style-type: none"> <li>• display the web pages to a group               <ul style="list-style-type: none"> <li>– use available presentation</li> </ul> </li> <li>• describe how the advanced feature(s) function</li> <li>• instruct a group on how to program the feature(s) into their pages</li> <li>• assist others in the use of the feature(s)</li> <li>• properly cite all resources.</li> </ul>	
Maintenance and Enhancement	<ul style="list-style-type: none"> <li>• identify which areas of web pages need monitoring and updating</li> <li>• evaluate the impact of the web site</li> <li>• using a newly created or existing web site:               <ul style="list-style-type: none"> <li>– update data</li> <li>– edit web site (e.g., graphics)</li> <li>– add/modify special feature(s)</li> </ul> </li> </ul>	<p>This page will include at least one of sound, animation, 3D graphics, video, frames, etc.</p>

**MODULE INF3190: INFORMATION HIGHWAY 3 (continued)**

Concept	Specific Learner Expectations	Notes
Workstation Management	<p><i>The student should:</i></p> <ul style="list-style-type: none"><li>• apply efficient workstation positions and routines that encourage:<ul style="list-style-type: none"><li>– good health and safety (posture, positioning of hardware and furniture)</li><li>– security for hardware, software, supplies and personal work</li></ul></li><li>• demonstrate efficient and appropriate use of time and resources:<ul style="list-style-type: none"><li>– start-up procedures</li><li>– organization of work area</li><li>– closing procedures</li></ul></li><li>• apply effective decision-making strategies when using the Internet</li><li>• use related terminology to describe basic protocols, processes and tools.</li></ul>	

**COURSE INF3200: INTERNET SERVICES****Level:** Advanced**Theme:** Dynamic Environment**Prerequisite:** INF2200 Information Highway 2**Course 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.**Course Parameters:** Access to networked computer workstation and the Internet or intranet.**Supporting Course:** INF3190 Information Highway 3**Curriculum and Assessment Standards**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• demonstrate competencies to access information from existing electronic messaging systems</li> <li>• design and create an electronic messaging system</li> <li>• maintain and enhance an electronic messaging system</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• demonstrating ability to access at least two of the following Internet services—newsgroups, electronic mail, Internet list servers, etc.—efficiently, following established netiquette procedures</li> <li>• designing and building at least <u>one of functional specialized</u> web site, electronic mail system, computer bulletin board, FTP site, news server, Internet list server by: <ul style="list-style-type: none"> <li>– configuring hardware</li> <li>– installing software</li> </ul> </li> <li>• maintaining files and user accounts <ul style="list-style-type: none"> <li>– troubleshooting and diagnosing problems</li> <li>– offering user support services</li> <li>– monitoring/updating information and messages.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Guide: Internet Services (INF3200–1)</i></p> <p><i>Standard</i>  <i>Rating of 3 for all applicable tasks</i></p>	<p>20</p> <p>40</p> <p>30</p>



**MODULE INF3200: INTERNET SERVICES (continued)**

Concept	Specific Learner Expectations	Notes
Design/Creation (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• design and assemble a functioning system:               <ul style="list-style-type: none"> <li>– troubleshooting</li> <li>– diagnosis and remediation</li> </ul> </li> <li>• identify basic hardware components and processes necessary to create a functional specialized web site, computer bulletin board, e-mail system, newsgroup, list server, etc.</li> <li>• configure interface/hardware/peripherals</li> <li>• use support manuals/documentation</li> <li>• install appropriate system software</li> <li>• install backup/restore files:               <ul style="list-style-type: none"> <li>– create/use directories/folders</li> <li>– incorporate file protection</li> <li>– create/delete messages and information.</li> </ul> </li> </ul>	
Maintenance/ Enhancement	<ul style="list-style-type: none"> <li>• demonstrate manager’s responsibilities:               <ul style="list-style-type: none"> <li>– update information</li> <li>– monitor access/activities</li> <li>– schedule assistance activities</li> <li>– provide assistance to users and clients</li> <li>– evaluate performance</li> <li>– recommend changes</li> <li>– determine parameters/update messages</li> </ul> </li> <li>• maintain/update application, operating system and utility software on hard drive               <ul style="list-style-type: none"> <li>– use defaults, supervisor housekeeping, diagnostic, viral protection software</li> </ul> </li> <li>• demonstrate acceptable electronic communication system operational performance</li> <li>• use support manuals/documentation</li> <li>• follow hardware/software and school/educational regulations</li> <li>• adhere to legal, professional and ethical expectations</li> <li>• establish policies and procedures; e.g., create an acceptable format policy for web pages.</li> </ul>	<p>Consider apprenticeship or student contract for hands-on experiences.</p> <p>An example of a specialized web site would be a student council survey (i.e., a data collection web site).</p>

**MODULE INF3200: INTERNET SERVICES (continued)**

Concept	Specific Learner Expectations	Notes
Workstation Management	<p><i>The student should:</i></p> <ul style="list-style-type: none"><li>• apply efficient workstation positions and routines that encourage:<ul style="list-style-type: none"><li>– good health and safety (posture, positioning of hardware and furniture)</li><li>– security for hardware, software, supplies and personal work</li></ul></li><li>• demonstrate efficient and appropriate use of time and resources:<ul style="list-style-type: none"><li>– start-up procedures</li><li>– organization of work area</li><li>– closing procedures</li></ul></li><li>• apply effective decision-making strategies when using the Internet</li><li>• use related terminology to describe basic protocols, processes and tools.</li></ul>	

**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.**Parameters:** Access to appropriate computer equipment and software. Specifically, students must have access to an OOP environment that encourages a formal treatment of objects.**Supporting Courses:** INF2180 Programming 5  
INF3150 Programming Application 1**Curriculum and Assessment Standards**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• identify/describe concepts of object-oriented programming (OOP), including:               <ul style="list-style-type: none"> <li>– controlled class access</li> <li>– templated classes</li> <li>– class containment or composition</li> <li>– derived classes and inheritance</li> </ul> </li> <li>• demonstrate evolving programming expertise in object-oriented programming (OOP), by:               <ul style="list-style-type: none"> <li>– analyzing/revising/creating algorithms based on object-oriented design techniques that use templated, base and derived classes</li> </ul> </li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• a teacher-directed evaluation designed to test the student’s ability to:               <ul style="list-style-type: none"> <li>– describe features of OOP, including the use of accessors and modifiers to control class access; the use of constructor and operator overloading to add power; and the use of parameterized types, class containment, polymorphism and inheritance to improve programmer efficiency</li> <li>– illustrate how these features promote reusability, productivity and a “closer-to-real-world” depiction of situations</li> </ul> </li> <li>• a series of student-developed programs that demonstrate the efficient use of object-oriented programming algorithms and language syntax</li> </ul>	20%
	<p>the algorithms should demonstrate the ability to:</p> <ul style="list-style-type: none"> <li>– identify problems that are best solved using objects and classes</li> <li>– identify elements within the problem that can best be viewed as objects</li> <li>– identify the methods and attributes of each object required to solve the problem</li> </ul>	25%

**COURSE INF3220: OBJECT-ORIENTED PROGRAMMING 2 (continued)**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>– analyzing/revising/creating object-oriented programs that use templated, base and derived classes</li> <li>• apply, consistently, appropriate workstation routines</li> <li>• demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>– determine if any of the objects could be instantiated using a templated class or classes</li> <li>– determine if any of the objects form a class hierarchy that could employ composition or inheritance</li> <li>– identify the relationship among objects, with a focus on identifying data access requirements</li> <li>– create a diagram describing the objects and their relationships that can be used to guide program construction.</li> </ul> <p>the programs should demonstrate the ability to code object-oriented programs that use:</p> <ul style="list-style-type: none"> <li>– destructors</li> <li>– constructor and operator overloading</li> <li>– friend functions</li> <li>– templated classes</li> <li>– simple composition and inheritance</li> <li>– simple class hierarchies</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Checklist: Object-oriented Programming 2, INF3220–1</i>  <i>Sample Assignment: Object-oriented Programming 2, INF3220–2</i></p> <p><i>Standard</i>  <i>Rating of 2 for the Problem-solving Phase and a rating of 3 for the Implementation Phase</i></p> <ul style="list-style-type: none"> <li>• demonstrations of appropriate workstation routines</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Checklist: Workstation Routines and Management (INFWRKSTN)</i></p> <p><i>Standard</i>  <i>Rating of:</i>  <i>2 – Workstation Routines</i>  <i>3 – File Management</i>  <i>2 – Time Management/Organization</i>  <i>3 – Professionalism</i></p> <ul style="list-style-type: none"> <li>• observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>45%</p> <p>10%</p> <p>Integrated throughout</p>

**COURSE INF3220: OBJECT-ORIENTED PROGRAMMING 2 (continued)**

Concept	Specific Outcomes	Notes
<p>Nature of Object-oriented Programming (OOP)</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• describe features of OOP, including:               <ul style="list-style-type: none"> <li>– use of private, public and protected members, accessors and modifiers to control access to data</li> <li>– use of templated classes with parameterized data</li> <li>– use of constructor and operator overloading, composition, polymorphism and inheritance to recast existing code to improve production efficiencies</li> <li>– use of objects; client/server relationship between classes; and templated, base and derived classes to more closely model real-world situations</li> </ul> </li> <li>• explain key differences between OOP and procedure-oriented programming in:               <ul style="list-style-type: none"> <li>– designing programs</li> <li>– the storage and access of data</li> <li>– maintenance of programs</li> </ul> </li> <li>• give examples of how OOP facilitates:               <ul style="list-style-type: none"> <li>– real-world modelling</li> <li>– data integrity</li> <li>– code reliability</li> <li>– code maintainability</li> <li>– code reusability.</li> </ul> </li> </ul>	<p>Three reasons why object-oriented programming has come to prominence are improved data security, improved production cycle and an improved ability to write code that more closely corresponds to the real world.</p> <p>Improved data security is primarily delivered through controlled access to data. Improved production cycle is delivered through programming efficiencies resulting from the ability to reuse code. An improved ability to write code is based on the correspondence of the object construct to the real world.</p>
<p>Object-oriented Analysis, Design and Development (OOD)</p> <p>(continued)</p>	<ul style="list-style-type: none"> <li>• continue to use iterative and incremental approaches in the analysis, design and development (architecture) stages of the software development process</li> <li>• identify/describe in some detail the domain in which a specific program will be used; i.e., domain analysis</li> <li>• develop and structure a set of use cases that give a detailed description of how users and other systems will apply the projected program</li> <li>• combine the results of the domain analysis and the use cases to create a general design model; and outline the architecture of the program, using any appropriate notation; e.g., structured diagram, input/processing/output (IPO) chart, Warnier-Orr diagram</li> </ul>	<p>Object-oriented design (OOD) is an evolving process that is still not fully developed. Until recently, analysis and design was dominated by approaches developed when procedure-oriented programming was paramount. In recent years, procedure-oriented approaches—flow charts, hierarchical charts, IPO charts, Warnier-Orr diagrams—are being replaced by OOD specific approaches; e.g., object charts, class diagrams.</p>

**COURSE INF3220: OBJECT-ORIENTED PROGRAMMING 2 (continued)**

Concept	Specific Outcomes	Notes
<p>(continued)</p> <p>Object-oriented Analysis, Design and Development (OOD)</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• identify/describe problems and/or problem components best solved using built-in class libraries—compiler provided libraries—or class libraries provided by other programmers</li> <li>• identify/describe problems and/or problem components best solved using programmer built-in class libraries</li> <li>• identify/describe problems and/or problem components best solved using templated classes</li> <li>• identify/describe problems and/or problem components best solved using composition</li> <li>• identify/describe problems and/or problem components best solved using base and derived classes</li> <li>• create simple class diagrams, describing the attributes and methods of the required classes, and interaction diagrams, showing the interaction among objects</li> <li>• design/define the required member functions, constructors and operators</li> <li>• work in a team with other students to carry out OOD tasks.</li> </ul>	<p>At this point in their learning, students should develop a general approach to analysis and design that combines the modularity associated with procedure-oriented programming and the iterative and incremental processes associated with OOD. A formal understanding of OOD notation, such as that found in the emerging unified modeling language (UML) approach, is not required at this time.</p>
<p>Object-oriented Implementation, Testing and Delivery</p> <p>(continued)</p>	<ul style="list-style-type: none"> <li>• continue to use iterative and incremental approaches in the implementation, testing and delivery of the software development process</li> <li>• modify/create objects, using existing class libraries</li> <li>• modify/create classes and incorporate them in class libraries</li> <li>• modify/create templated classes</li> <li>• use class containment, where appropriate</li> <li>• modify/create base and derived classes</li> <li>• use overloaded constructors and operators where required to recast existing code and provide additional functionality to classes</li> <li>• establish class relationships</li> </ul>	

**COURSE INF3220: OBJECT-ORIENTED PROGRAMMING 2 (continued)**

Concept	Specific Outcomes	Notes
<p>(continued)</p> <p>Object-oriented Implementation, Testing and Delivery</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• create a prototype based on the design, using built-in class libraries—compiler provided libraries—class libraries provided by other programmers, or custom-created classes and objects</li> <li>• test and modify the prototype</li> <li>• repeat the coding/testing cycle; i.e., an iterative coding cycle, to add more features to the prototype</li> <li>• profile and optimize the code for delivery</li> <li>• work in a team with other students to carry out OOD tasks.</li> </ul>	
<p>Object-oriented Computer Language Syntax</p>	<ul style="list-style-type: none"> <li>• apply the structured programming approaches developed in INF1080 Programming 1 and INF2150 Programming 2, the procedure-oriented approaches developed in INF2160 Programming 3 and the introduction to objects provided in Object-oriented Programming 1 to: <ul style="list-style-type: none"> <li>– use accessors and modifiers to control class access</li> <li>– use constructor and operator overloading to add power</li> <li>– use templated classes, composition, inheritance and polymorphism to promote code reusability.</li> </ul> </li> </ul>	<p>Structured programming is a prerequisite to good procedure-oriented programming, just as good procedure-oriented programming is a prerequisite to good object-based programming. Object-based programming must be understood before object-oriented programming can be mastered.</p>
<p>Workstation Management</p> <p>(continued)</p>	<ul style="list-style-type: none"> <li>• apply efficient workstation position and routines that encourage: <ul style="list-style-type: none"> <li>– good health and safety—posture, positioning of hardware and furniture</li> <li>– security for hardware, software, supplies and personal work</li> </ul> </li> <li>• demonstrate efficient and appropriate use of time and resources, including: <ul style="list-style-type: none"> <li>– start-up procedures</li> <li>– organization of work area</li> <li>– closing procedures</li> </ul> </li> </ul>	

**COURSE INF3220: OBJECT-ORIENTED PROGRAMMING 2 (continued)**

Concept	Specific Outcomes	Notes
(continued) Workstation Management	<i>The student should:</i> <ul style="list-style-type: none"><li>• apply effective decision-making strategies in programming assignments, including:<ul style="list-style-type: none"><li>– planning activities</li><li>– organizing data, information, resources</li><li>– considering alternatives</li><li>– evaluating activities/results</li></ul></li><li>• use related terminology to describe basic processes, procedures and tools.</li></ul>	

**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.**Parameters:** Access to appropriate computer equipment and software. Specifically, students must have access to an object-oriented programming (OOP) environment that encourages a formal treatment of objects.**Supporting Courses:** INF3150 Programming Application 1  
INF3220 Object-oriented Programming 2**Curriculum and Assessment Standards**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>identify/describe the concepts of dynamic memory allocation and basic dynamic data structures, and explain their advantages over more static structures</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>a teacher-directed evaluation designed to test the student's ability to describe and illustrate: <ul style="list-style-type: none"> <li>abstract data types (ADTs)</li> <li>the structure of computer memory and the concept of free store (the heap)</li> <li>pointers, nodes and related concepts</li> <li>the advantages of dynamic data structures, such as linked lists, over more static structures</li> </ul> </li> </ul>	20%
<ul style="list-style-type: none"> <li>revise/create algorithms that make effective use of dynamic data structures to solve problems</li> </ul>	<ul style="list-style-type: none"> <li>a series of student-developed programs that demonstrate the efficient use of algorithms and language syntax</li> </ul> <p>the algorithms should demonstrate the ability to:</p> <ul style="list-style-type: none"> <li>identify problems that are best solved using linked lists</li> <li>identify the input, processing and output commands needed to use linked lists</li> <li>create an appropriate diagram/description of the proposed program</li> </ul>	20%



**COURSE INF3230: DYNAMIC DATA STRUCTURES 1 (continued)**

Concept	Specific Outcomes	Notes
Nature of Linked Lists	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• describe/illustrate the general nature of dynamic data structures, including:               <ul style="list-style-type: none"> <li>– the mechanics of dynamic memory allocation:                   <ul style="list-style-type: none"> <li>• the structure of computer memory</li> <li>• the heap—allocating and de-allocating memory</li> <li>• pointers and related concepts</li> <li>• linear and nonlinear data structures</li> </ul> </li> <li>– the advantages and disadvantages of dynamic data structures in relation to static data structures</li> </ul> </li> <li>• describe/illustrate the nature and mechanics of linked lists:               <ul style="list-style-type: none"> <li>– the linked list as an abstract data type</li> <li>– the logical structure of the linked list</li> <li>– nodes, data elements, pointers, head pointers and external pointers.</li> </ul> </li> </ul>	<p>Static data structures, such as ordinary arrays, occupy the same amount of memory every time the program is run. Dynamic data structures are used when data storage requirements are not known at the time the program is coded or when the storage requirements will change over the course of the program.</p> <p>An abstract data type is an abstract description of a data structure with the emphasis on its properties, functionality and use rather than on its specific implementation. It defines an interface or set of access methods to a collection of organized data without providing specifics as to how that data is organized or accessed.</p>
Analysis and Design Using Linked Lists	<ul style="list-style-type: none"> <li>• analyze/modify/create design documents that demonstrate the ability to:               <ul style="list-style-type: none"> <li>– make appropriate use of dynamic program elements and data structures, such as pointers and linked lists</li> <li>– identify the initialization, input, processing, output and termination requirements needed to use linked lists</li> <li>– create an appropriate diagram/description of the proposed program.</li> </ul> </li> </ul>	
Coding Using Linked Lists  (continued)	<ul style="list-style-type: none"> <li>• analyze/modify/create programs that demonstrate the ability to make appropriate use of:               <ul style="list-style-type: none"> <li>– dynamic memory                   <ul style="list-style-type: none"> <li>• memory allocation operators</li> <li>• memory de-allocation operators</li> </ul> </li> <li>– pointers                   <ul style="list-style-type: none"> <li>• de-referencing operators</li> <li>• address-of operators</li> <li>• structure pointer operators</li> </ul> </li> </ul> </li> </ul>	

**COURSE INF3230: DYNAMIC DATA STRUCTURES 1 (continued)**

Concept	Specific Outcomes	Notes
<p>(continued) Coding Using Linked Lists</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>– linked lists               <ul style="list-style-type: none"> <li>• node declaration</li> <li>• pointer declaration</li> <li>• link list initialization</li> <li>• appending nodes</li> <li>• accessing nodes</li> <li>• inserting nodes</li> <li>• deleting individual nodes</li> <li>• displaying the list</li> <li>• disposing of the list</li> <li>• doubly linked list (optional)</li> <li>• circular linked list (optional).</li> </ul> </li> </ul>	
<p>Workstation Management</p>	<ul style="list-style-type: none"> <li>• apply efficient workstation position and routines that encourage:           <ul style="list-style-type: none"> <li>– good health and safety—posture, positioning of hardware and furniture</li> <li>– security for hardware, software, supplies and personal work</li> </ul> </li> <li>• demonstrate efficient and appropriate use of time and resources, including:           <ul style="list-style-type: none"> <li>– start-up procedures</li> <li>– organization of work area</li> <li>– closing procedures</li> </ul> </li> <li>• apply effective decision-making strategies in programming assignments, including:           <ul style="list-style-type: none"> <li>– planning activities</li> <li>– organizing data, information, resources</li> <li>– considering alternatives</li> <li>– evaluating activities/results</li> </ul> </li> <li>• use related terminology to describe basic processes, procedures and tools.</li> </ul>	

**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.**Parameters:** Access to appropriate computer equipment and software. Specifically, students must have access to an object-oriented programming (OOP) environment that encourages a formal treatment of objects.**Supporting Courses:** INF3150 Programming Application 1  
INF2180 Programming 5  
INF3220 Object-oriented Programming 2**Curriculum and Assessment Standards**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>identify/describe the stack, queue and tree Abstract Data Types</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>a teacher-directed evaluation designed to test the student's ability to describe and illustrate: <ul style="list-style-type: none"> <li>stacks</li> <li>queues</li> <li>trees</li> <li>the advantages and disadvantages of each Abstract Data Type (ADT) as a data structure</li> </ul> </li> </ul>	20%
<ul style="list-style-type: none"> <li>revise/create algorithms that make effective use of stacks, queues and trees to solve problems</li> </ul>	<ul style="list-style-type: none"> <li>a series of student-developed programs that demonstrate the efficient use of algorithms and language syntax</li> </ul> <p>the algorithms should demonstrate the ability to:</p> <ul style="list-style-type: none"> <li>identify problems that are best solved using stacks, queues and trees</li> <li>identify the appropriate data structure to be used in a particular problem</li> <li>identify the input, processing and output commands needed to use the data structure</li> <li>create an appropriate diagram/description of the proposed program</li> </ul>	20%

**COURSE INF3240: DYNAMIC DATA STRUCTURES 2 (continued)**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• revise/create programs that make effective use of stacks, queues and trees</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• a series of student developed programs that demonstrate the efficient use of algorithms and language syntax</li> </ul> <p>the programs should demonstrate the ability to make appropriate use of:</p> <ul style="list-style-type: none"> <li>– stacks</li> <li>– queues</li> <li>– trees</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Checklist: Dynamic Data Structures 2, INF3240–1</i>  <i>Sample Assignment: Dynamic Data Structures 2, INF3240–2</i></p> <p><i>Standard</i>  <i>Rating of 2 for the Problem-solving Phase and a rating of 3 for the Implementation Phase</i></p>	<p>50%</p>
<ul style="list-style-type: none"> <li>• apply, consistently, appropriate workstation routines</li> </ul>	<ul style="list-style-type: none"> <li>• demonstrations of appropriate workstation routines</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Checklist: Workstation Routines and Management (INFWRKSTN)</i></p> <p><i>Standard</i>  <i>Rating of:</i>  <i>2 – Workstation Routines</i>  <i>3 – File Management</i>  <i>2 – Time Management/Organization</i>  <i>3 – Professionalism</i></p>	<p>10%</p>
<ul style="list-style-type: none"> <li>• demonstrate basic competencies.</li> </ul>	<ul style="list-style-type: none"> <li>• observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

**COURSE INF3240: DYNAMIC DATA STRUCTURES 2 (continued)**

Concept	Specific Outcomes	Notes
Nature of Stacks, Queues and Trees	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• describe/illustrate the general nature of stacks, queues and trees, including:               <ul style="list-style-type: none"> <li>– the general approach to data storage and manipulation in each structure</li> <li>– the advantages and disadvantages of each data structure</li> </ul> </li> <li>• describe/illustrate the nature and mechanics of:               <ul style="list-style-type: none"> <li>– stacks—last in first out (LIFO)</li> <li>– queues—first in first out (FIFO)</li> <li>– trees—roots, nodes, branch nodes, leaf node or terminal nodes, siblings, parent and child relationships.</li> </ul> </li> </ul>	
Analysis and Design Using Stacks, Queues and Trees	<ul style="list-style-type: none"> <li>• analyze/modify/create design documents that demonstrate the ability to:               <ul style="list-style-type: none"> <li>– make appropriate use of dynamic program elements and data structures, including:                   <ul style="list-style-type: none"> <li>• stacks</li> <li>• queues</li> <li>• trees</li> </ul> </li> <li>– identify the initialization, input, processing, output and termination requirements needed to use the data structure</li> <li>– create an appropriate diagram/description of the proposed program.</li> </ul> </li> </ul>	
Coding Using Stacks, Queues and Trees	<ul style="list-style-type: none"> <li>• analyze/modify/create programs that demonstrate the ability to make appropriate use of:               <ul style="list-style-type: none"> <li>– stacks                   <ul style="list-style-type: none"> <li>• implementing a stack, using an array</li> <li>• implementing a stack, using a linked list</li> <li>• implementing a stack, using a class</li> <li>• pushing and popping a stack—LIFO</li> </ul> </li> <li>– queues                   <ul style="list-style-type: none"> <li>• implementing a queue, using a linked list</li> <li>• implementing a queue, using a class</li> <li>• enqueue and dequeue operations—FIFO</li> </ul> </li> <li>– trees (binary)                   <ul style="list-style-type: none"> <li>• implementing trees, using a class</li> <li>• appending nodes</li> <li>• accessing nodes</li> <li>• inserting nodes</li> <li>• deleting nodes</li> <li>• traversing trees</li> <li>• binary search.</li> </ul> </li> </ul> </li> </ul>	

**COURSE INF3240: DYNAMIC DATA STRUCTURES 2 (continued)**

Concept	Specific Outcomes	Notes
Workstation Management	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• apply efficient workstation position and routines that encourage:               <ul style="list-style-type: none"> <li>– good health and safety—posture, positioning of hardware and furniture</li> <li>– security for hardware, software, supplies and personal work</li> </ul> </li> <li>• demonstrate efficient and appropriate use of time and resources, including:               <ul style="list-style-type: none"> <li>– start-up procedures</li> <li>– organization of work area</li> <li>– closing procedures</li> </ul> </li> <li>• apply effective decision-making strategies in programming assignments, including:               <ul style="list-style-type: none"> <li>– planning activities</li> <li>– organizing data, information, resources</li> <li>– considering alternatives</li> <li>– evaluating activities/results</li> </ul> </li> <li>• use related terminology to describe basic processes, procedures and tools.</li> </ul>	

**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.

**Parameters:** Designed to be taught in conjunction with INF2180 Programming 5, INF2220 Object-oriented Programming 1, INF3150 Programming Application 1 and either INF1090 Information Highway 3 or INF3130 Multimedia Authoring 2 as a Grade 12 course in Computer Science.

**Curriculum and Assessment Standards**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>describe and analyze the historical roots and general nature of the information revolution and the emerging information society</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>a test, presentation or project designed to address the following topics:               <ul style="list-style-type: none"> <li>the broad dynamic or forces and flows of the ongoing cybernetic or information revolution with a general understanding of its relationship with other great revolutions, such as the Neolithic Revolution and the Industrial Revolution</li> <li>the general impact of this revolution on                   <ul style="list-style-type: none"> <li>economic systems</li> <li>social systems</li> <li>political systems</li> </ul> </li> </ul> </li> </ul>	10
<ul style="list-style-type: none"> <li>explain and demonstrate the nature, development, structure and key algorithms associated with object-oriented approaches, and application of these idioms to create complex algorithms</li> </ul>	<ul style="list-style-type: none"> <li>a presentation or project designed to demonstrate:               <ul style="list-style-type: none"> <li>the basic nature of the object-oriented programming paradigm and its impact on algorithm design and development</li> <li>the ability to design, develop and explain algorithms organized in an object-oriented format</li> <li>proficient use of key basic algorithms (idioms) and the ability to use idioms to create other, complex algorithms.</li> </ul> </li> </ul>	20

**COURSE INF3210: COMPUTER SCIENCE 3 (continued)**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• explain and demonstrate the rationale, use of classes and objects, encapsulation and procedural abstraction, and treatment of data in object-oriented programs</li> <li>• explain the rationale and use of recursion and introductory recursive operations</li> <li>• identify and demonstrate the rationale, creation and manipulation of files and Abstract Data Types</li> <li>• explain and analyze the nature, operation, basic architecture and utility of a Turing machine</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• a presentation or project designed to explain and demonstrate:               <ul style="list-style-type: none"> <li>– the basic nature of the object-oriented paradigm and its impact on algorithm implementation or programming</li> <li>– the ability to implement object-oriented algorithms, such as object diagrams using classes and appropriate data-handling techniques</li> <li>– the ability to carry out the testing of individual classes and objects as well as integration testing of the program as a whole</li> </ul> </li> <li>• a presentation or project designed to explain:               <ul style="list-style-type: none"> <li>– rationale for</li> <li>– use of, and</li> <li>– advantages and disadvantages of recursion and recursive processes</li> </ul> </li> <li>• a presentation or project designed to explain and demonstrate:               <ul style="list-style-type: none"> <li>– an understanding of the basic nature, creation and utility of different types of files</li> <li>– the basic nature, creation and utility of Abstract Data Types</li> <li>– an ability to use simpler data structures to create Abstract Data Structures</li> </ul> </li> <li>• a presentation or project explaining and analyzing the nature of a Turing machine in terms of:               <ul style="list-style-type: none"> <li>– a model of a computing agent</li> <li>– the basic configuration</li> <li>– programming</li> <li>– the Church-Turing thesis</li> <li>– unsolvable problems</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Checklist: Computer Science 3 Concepts (Senior), INF3210–1</i>  <i>Sample Assignment: Computer Science 3 Concepts (Senior), INF3210–2</i></p> <p><i>Standard</i>  <i>Rating of 2 for the Problem-solving Phase and a rating of 3 for the Implementation Phase</i></p>	<p>20</p> <p>10</p> <p>20</p> <p>20</p>

**COURSE INF3210: COMPUTER SCIENCE 3 (continued)**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Outcomes	Notes
<p>Aspects of Computer Science</p> <p>(continued)</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>demonstrate the broad sequence of events variously described as the post industrial, the cybernetic and the information revolution. Specifically the student should be able to describe/explain/utilize: <ul style="list-style-type: none"> <li>the equivalency of this revolution with other similar revolutions, such as the Neolithic-Urban Revolution and the Industrial Revolution, with a focus on <ul style="list-style-type: none"> <li>the initiating effect of a technological paradigm shift (i.e., Industrial: shift from animal-powered, human-directed tools to machine-powered, human-directed tools (mechanization); Information: shift from human-directed, machine-powered tools to machine-directed, machine-powered tools—automation)</li> <li>the ripple effect of the paradigm shift through society</li> <li>plotting further change as our societies continue to move through the revolution</li> </ul> </li> <li>the general economic impact <ul style="list-style-type: none"> <li>eclipse of industrial economies</li> <li>emergence of information economy</li> <li>the service economy</li> <li>globalized economies</li> </ul> </li> <li>the social impact <ul style="list-style-type: none"> <li>new class structure</li> <li>pace of life (24–7)</li> <li>mobility</li> <li>demographic shifts</li> </ul> </li> </ul> </li> </ul>	

**COURSE INF3210: COMPUTER SCIENCE 3 (continued)**

Concept	Specific Outcomes	Notes
<p>(continued)</p> <p>Aspects of Computer Science</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• fragmented families</li> <li>• privacy issues</li> <li>– the political impact</li> <li>• decline of the nation–state</li> <li>• transnational corporations</li> <li>• supra-national constellations</li> <li>• local autonomy</li> <li>• remote control war</li> <li>• changes in political ideologies: new forms of democracy and authoritarianism</li> </ul>	
<p>Algorithmic Problem Solving</p> <p>(continued)</p>	<ul style="list-style-type: none"> <li>• carry out the first step of the Systems Development Life Cycle (Analysis) using object-oriented concepts, such as: <ul style="list-style-type: none"> <li>– encapsulation, inheritance and polymorphism</li> <li>– classes, objects, instantiation</li> <li>– member and data functions</li> <li>– public and private access modifiers</li> <li>– class libraries</li> </ul> </li> <li>• design programs that are: <ul style="list-style-type: none"> <li>– correct, reliable, efficient, robust</li> <li>– extendable, scalable</li> <li>– reusable, portable</li> <li>– maintainable</li> </ul> </li> <li>• use object-oriented design techniques, such as: <ul style="list-style-type: none"> <li>– requirement analysis <ul style="list-style-type: none"> <li>• use cases</li> <li>• domain analysis</li> <li>• object diagrams</li> </ul> </li> <li>– iterative class design <ul style="list-style-type: none"> <li>• principal classes</li> <li>• elaborate object diagrams</li> <li>• CRC cards</li> <li>• prototype</li> </ul> </li> </ul> </li> <li>• employ appropriate relationships: <ul style="list-style-type: none"> <li>– dependency</li> <li>– association</li> <li>– aggregation</li> <li>– composition</li> </ul> </li> </ul>	

**COURSE INF3210: COMPUTER SCIENCE 3 (continued)**

Concept	Specific Outcomes	Notes
<p>(continued) Algorithmic Problem Solving</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• add additional tools to the algorithm development toolkit, such as:               <ul style="list-style-type: none"> <li>– object diagrams                   <ul style="list-style-type: none"> <li>• class</li> <li>• activity</li> <li>• iteration diagrams</li> </ul> </li> </ul> </li> <li>• demonstrate a number of core recursive idioms, such as:               <ul style="list-style-type: none"> <li>– accumulation (keeping a running total)</li> <li>– calculating factorials</li> <li>– determining minimums and maximums</li> <li>– searches</li> <li>– sorts</li> </ul> </li> </ul>	
<p>Implementing the Algorithm (Software and Software Development)</p>	<ul style="list-style-type: none"> <li>• demonstrate the third step of the Systems Development Life Cycle (Development or Coding) using object-oriented approaches:               <ul style="list-style-type: none"> <li>– use of classes and objects</li> <li>– implementation of the user interface</li> <li>– prototyping</li> <li>– elaborate the hierarchy</li> <li>– develop libraries</li> </ul> </li> <li>• demonstrate the use of files:               <ul style="list-style-type: none"> <li>– fields and records</li> <li>– sequential files</li> <li>– random access files</li> </ul> </li> <li>• demonstrate abstract data types, using:               <ul style="list-style-type: none"> <li>– arrays</li> <li>– structs or records</li> <li>– classes</li> </ul> </li> </ul>	
<p>Platform for Executing the Algorithm (Computer Systems)</p>	<ul style="list-style-type: none"> <li>• demonstrate the principals of a Turing machine with an emphasis on being able to:               <ul style="list-style-type: none"> <li>– build/assemble a working Turing machine</li> <li>– demonstrate the ability to execute simple programs on the machine, such as a unary addition machine</li> <li>– interpret/design/write state diagrams</li> <li>– describe its nature as an ultimate model of a computing agent</li> <li>– describe/explain/utilize the Church-Turing thesis</li> <li>– describe the nature of unsolvable problems</li> </ul> </li> </ul>	

