PRINCE EDWARD ISLAND

SENIOR HIGH CURRICULUM

Computer Studies 621A

Curriculum Guide

2010
Prince Edward Island
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Introduction

Background

The Computer Studies 621A curriculum has been developed with the intent of responding to continually evolving education needs of students and society while preparing students for the challenges they will face throughout their lives.

On going changes in society - for example, rapidly expanding use of technologies - require a corresponding shift in learning opportunities for students to develop relevant knowledge, skills, strategies, processes, and attitudes that will enable them to function well as individuals, citizens, workers, and learners. To function productively and participate fully in our increasingly sophisticated technological, information-based society, citizens will need broad digital-age literacy abilities.

Rationale

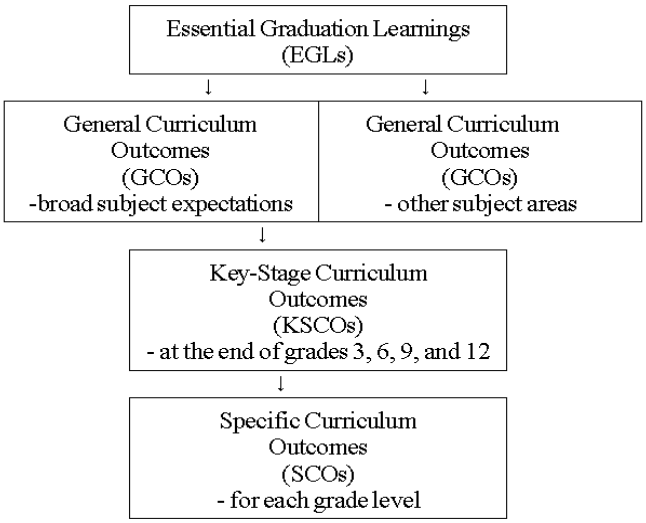
The primary goal of Computer Studies 621A is to promote technological competence, communication and problem solving skills. The curriculum prepares individuals to meet personal needs, provides an awareness of the variety of careers, and lays the foundation for lifelong learning. It can serve as a vocational preparation for a career in information technology industry, mastery of skills for related business occupations, or a foundation for a post-secondary education.

Program Design and Components

Program Organization

The curriculum is designed to support the foundation documents created and approved in partnership with the other Atlantic Provinces. The APEF Essential Graduation Learnings (EGL) statements describe the knowledge, skills, and attitudes expected of all students who graduate from high school. Achievement of the Essential Graduation Learnings will prepare students to continue to learn throughout their lives. These cross-curriculum learnings confirm the need for students to make connections to meet the ever changing workplace in the future. The Essential Graduation Learnings serve as a framework for the curriculum developed in this guide.

Curriculum Outcomes



Essential Graduation Learnings

Essential Graduation Learnings are statements describing the knowledge, skills, and attitudes expected of all students who graduate from high school. Achievement of the Essential Graduation Learnings will prepare students to continue to learn throughout their lives. These learnings describe expectations not in terms of individual school subjects but in terms of knowledge, skills, and attitudes developed throughout the curriculum. They confirm that students need to make connections and develop abilities across subject boundaries if they are to be ready to meet the shifting and ongoing demands of life, work, and study today and in the future. Essential Graduation Learnings are cross-curricular, and curriculum in all subject areas is focused to enable students to achieve these learnings. Essential Graduation Learnings serve as a framework for the curriculum development process.

Specific Essential Graduation Learnings

Aesthetic Expression

Graduates will be able to respond with critical awareness to various forms of arts and be able to express themselves through the arts.

Citizenship

Graduates will be able to assess social, cultural, economic, and environmental interdependence in a local and global context.

Communication

Graduates will be able to use the listening, viewing, speaking, reading and writing modes of language(s) and mathematical and scientific concepts and symbols, to think, learn, and communicate effectively.

Personal Development

Graduates will be able to continue to learn and to pursue an active, healthy lifestyle.

Problem Solving

Graduates will be able to use the strategies and processes needed to solve a wide variety of problems, including those requiring language, mathematical, and scientific concepts.

Technology Competency

Graduates will be able to use a variety of technologies, demonstrate an understanding of technological applications, and apply appropriate technologies for solving problems.

Curriculum Outcomes

Curriculum outcomes are statements articulating what students are expected to know and be able to do in particular subject areas. These outcomes statements also describe the knowledge, skills, and attitudes students are expected to demonstrate at the end of certain key stages in their education. These are based upon their cumulative learning experiences at each grade level in the entry-graduation continuum. Through the achievement of curriculum outcomes, students demonstrate the Essential Graduation Learnings.

General Curriculum Outcomes

are statements that identify what students are expected to know and be able to do upon completion of study in a curriculum area.

Key-Stage Curriculum Outcomes

are statements that identify what students are expected to know and be able to do by the end of grades 3, 6, 9, and 12, as a result of their cumulative learning experience in a curriculum area.

Specific Curriculum Outcomes

are statements identifying what students are expected to know and be able to do at a particular grade level. The specific curriculum outcomes serve as a framework for students to achieve key stage and general curriculum outcomes.

Cross-Curriculum Specific Items

Meeting the Needs of all Students

This curriculum is inclusive and is designed to help all learners reach their potential through a wide variety of learning experiences. The curriculum seeks to provide equal entitlements to learning opportunities for all learners.

The development of students' literacy is shaped by many factors including gender, social and cultural background, and the extent to which individual needs are met. In designing learning experiences for students, teachers should consider the learning needs, experiences, interests, and values of all students.

In recognizing and valuing the diversity of students, teachers should consider ways to:

- provide a climate and design learning experiences to affirm the dignity and worth of all learners in the classroom community
- redress educational disadvantage - for example, as it relates to students living in poverty
- model the use of inclusive language, attitudes, and actions supportive of all learners
- adapt classroom organization, teaching strategies, assessment strategies, time, and learning resources to address learners' needs and build on their strengths by:
    - providing opportunities for learners to work in a variety of learning contexts, including mixed-ability groupings
    - identifying and responding appropriately to diversity in students' learning styles
    - building upon students' individual levels of knowledge, skills, and attitudes
    - designing learning and assessment tasks that correspond to diverse learning styles
    - using students' strengths and abilities to motivate and support learning
    - offering multiple and varied avenues to learning
- celebrate the accomplishments of learning tasks by students

Gender-Inclusive Curriculum

In a supportive learning environment, male and female students receive equitable access to teachers' assistance, resources, technology, and a range of roles in group activities. It is important that the curriculum, classroom practice, and learning resources reflect and value the experiences, interests, achievements, and perspectives of both males and females.

- Teachers promote gender equity in their classrooms when they:
- articulate equally high expectations for male and female students
- provide equal opportunity for input and response from male and female students
- model gender-fair language and respectful listening in all their interactions with students
- promote critical thinking and challenge discrimination

Valuing Social/Cultural Diversity

In order to engage in and maximize learning, all students need to see their social/cultural identities reflected and affirmed in curriculum and classroom practices. It is important to recognize that students in Prince Edward Island come from an increasingly wider range of diverse ethnic, racial, cultural, and social backgrounds than in the past. In addition, they communicate with the wider multicultural world through technology, media, travel, and family and business connections in order to understand their own and others' customs, histories, traditions, values, beliefs, and ways of seeing and making sense of the world. Through experiential learning or through reading, viewing, and discussing authentic texts that reflect diverse social and cultural voices, students from different social and cultural backgrounds can come to understand each other's perspectives; to realize that their own ways of seeing and knowing are not the only ones possible; and to probe the complexities of the ideas and issues they are examining.

Curriculum, classroom practices, and learning resources should reflect the diverse and multicultural nature of our society, examine issues of power and privilege, and challenge stereotypes and discrimination.

Engaging All Students

One of the greatest challenges to teachers is engaging students who feel alienated from learning - students who lack confidence in themselves as learners, who have a potential that has not yet been realized. Among them are students who seem unable to concentrate, who lack everyday motivation for academic tasks, who rarely do homework, who fail to pass in assignments, who choose to remain on the periphery of small-group work, who cover up their writing attempts fearing the judgements of peers, who are mortified if asked to read aloud, and who keep their opinions to themselves. These students are significantly delayed when it comes to learning. Some, though not all, exhibit behaviors in classrooms that further distance them from learning. Others are frequently absent from class. Cumulatively, these are disengaged students.

These students need essentially the same experiences as their peers - experiences that:

- engage students in authentic and worthwhile communication situations
- allow them to construct meaning, connect, collaborate, and communicate with each other

- form essential links between the world of text and their own world
- give them a sense of ownership of learning and assessment tasks

They need additional experiences as well - experiences designed to engage them personally and meaningfully to make their learning pursuits relevant. They need substantial support in reading and writing. They need positive and motivational feedback. They need all of these experiences within purposeful and interactive learning contexts. Ultimately, the curriculum for students should prepare them for adult life.

Preparing students means engaging them with resources and with people from whom they can learn more about themselves and their world. Many students feel insecure about their own general knowledge and are reluctant to take part in class discussions, deferring to their peers who seem more competent. Through the curriculum, the students must find their own voice. The learning environment must be structured in such a way that all students, alongside their peers, develop confidence and gain access to information and to community.

The greatest challenge in engaging learners is finding an appropriate balance between supporting their needs by structuring opportunities for them to experience learning success and challenging them to grow as learners. Teachers need to have high expectations for all students and to articulate clearly these expectations.

Links to Community

A complete curriculum allows for the flexibility of inclusion of the community through various means. Activities such as guest speakers, field trips, and historical presentations allow the students to become more aware of the influence of the community on their lives. Students gain insight into the current workings of their local society, as well as observe role models and establish contacts with the community.

This curriculum guide provides suggestion, wherever possible, for community involvement to become an integrated part of the course.

Role of Parents/Guardians

Parents and guardians play a vital role in the educational focus of the students. Although parents and guardians may or may not necessarily feel comfortable to help in specific subject learning with their children, their role is a vital link to the development of the students. It is most important that the parents and guardians understand and support the

school policies. Parents and guardians are a vital component in the facilitation of the learning of student responsibility in such areas as attendance, safe school policies, goal setting and career investigations. Schools need parents and guardians to share in their children's successes.

Teachers should invite opportunities for parents and guardians to discuss these matters. Frequent parent-teacher conferences are encouraged via telecommunications and/or school-based meetings.

Involvement in school councils, home and school associations, and/or other school-based organizations enable parents and guardians to play an active role in the educational development of their child. Parents and guardians may become actively involved as guest speakers in the classroom for students to understand the community in which they live or as a spokesperson on a particular career.

Homework

Homework is an essential component of a program as it extends the opportunity to think and reflect on ideas investigated during class time. Meaningful homework experiences can allow the students to learn self-discipline and team responsibility while acquiring a sense of self-worth.

Homework provides an effective means to model classroom practice. This might involve seeking community input, constructing a model, group discussion to prepare a presentation, or answering questions for assessment purposes.

Teachers use their professional judgement to assign homework as a means of reinforcement, assessment, and/or further investigation.

Homework is another channel for parents and guardians to be involved. It is a tool for parents and guardians to understand the focus of their child's education in a specific subject area. In some cases, it opens the opportunity for parents and guardians to become actively involved in the homework process.

The Senior High School Learning Environment

Learning environment for grades 10-12 is:

- participatory, interactive, and collaborative
- inclusive
- caring, safe, challenging
- inquiry based, issues oriented

- a place where resource-based learning includes and encourages the multiple uses of technology, the media, and other visual texts as pathways to learning and as avenues for representing knowledge

The teacher structures the learning situation and organizes necessary resources. In assessing the nature of the task, the teacher may find that the situation calls for teacher-directed activities with the whole class, small groups of students, or individual students. Such activities include direct instruction in concepts and strategies and brief mini-lessons to create and maintain a focus.

As students develop a focus for their learning, the teacher moves to the perimeter to monitor learning experiences and to encourage flexibility and risk taking in the ways students approach learning tasks. The teacher intervenes, when appropriate, to provide support. In such environments, students will feel central in the learning process.

As the students accept more and more responsibility for learning, the teacher's role changes. The teacher notes what the students are learning and what they need to learn, and helps them to accomplish their tasks. The teacher can be a coach, a facilitator, an editor, a resource person, and a fellow learner. The teacher is a model whom students can emulate, a guide who assists, encourages, and instructs the student as needed during the learning process. Through the whole process, the teacher is also an evaluator, assessing students' growth while helping them to recognize their achievements and their future needs.

Learning environments are places where teachers:

- integrate new ways of teaching and learning with established, effective practices
- have an extensive repertoire of strategies from which to select the one most appropriate for the specific learning task
- value the place of dialogue in the learning process
- recognize students as being intelligent in a number of different ways and encourage them to explore other ways of knowing by examining their strengths and working on their weaknesses
- value the inclusive classroom and engage all learners in meaningful activities
- acknowledge the ways in which gender, race, ethnicity and culture shape particular ways of viewing and knowing the world
- structure repeated opportunities for reflection so that reflection becomes an integral part of the learning process

The physical learning environment should not be restricted to one classroom. There should be ample physical space for students to use cooperative learning techniques as well as other learning styles. There should be access to other learning centers in the school building such as labs and gymnasiums. Learning should be extended to community facilities, allowing field trips and guest speakers to expand the learning environment.

Safety

Students and teachers need to feel safe, both physically and emotionally, in the school setting. In a learning environment where cooperative, active, and collaborative teaching strategies are utilized, students must become knowledgeable of their role in enabling a safe environment to exist.

Empowering students to take ownership for their own safety and those of their peers is an essential component of the classroom learning. Teachers can provide students with the knowledge necessary to prevent unnecessary risks in their learning environment. By educating students about the risk factors involved in the classroom setting, they can become active participants in the ownership of their own safety. In all learning situations, the teacher needs to encourage a positive, responsible student attitude toward safety.

Risk is involved in everything a person does. To minimize the chance of harm, the student must become a conscious participant in ensuring a healthy, safe learning environment. Complacent attitudes regarding safety reflect a behaviour which invites a less protected setting.

While physical safety is of utmost importance in the classroom setting, emotional safety is equally important. Students need to know the unacceptable behaviour and the consequences that ensue. Students should be encouraged to be active learners without being intimidated by others. In every learning environment, teachers foster cooperative, respectful verbal dialogue, and physical presence. Student consequences to the contrary are essential components to the learning process.

Motivation

Motivation plays a very important role in student understanding and successful completion of curriculum. Motivation for the student is heightened when the emphasis within the classroom is placed on the “whole person”. This environment provides a focus which recognizes achievements accomplished and initiates the growth of a safe place to belong.

Many factors are cited as instruments that foster student motivation. Clear expectations and flexibility of structure enhance the desire to learn. When students have a structure which enables them to accomplish goals, the motivation increases.

Support must exist for both the teacher and the student. Daily support for teachers via such modes as "pairing and sharing" techniques, education web sites, and professional development should be available.

Student support should include career awareness. Promoting student goal-setting strategies enables her/him to develop higher self-esteem which is a natural motivator to success.

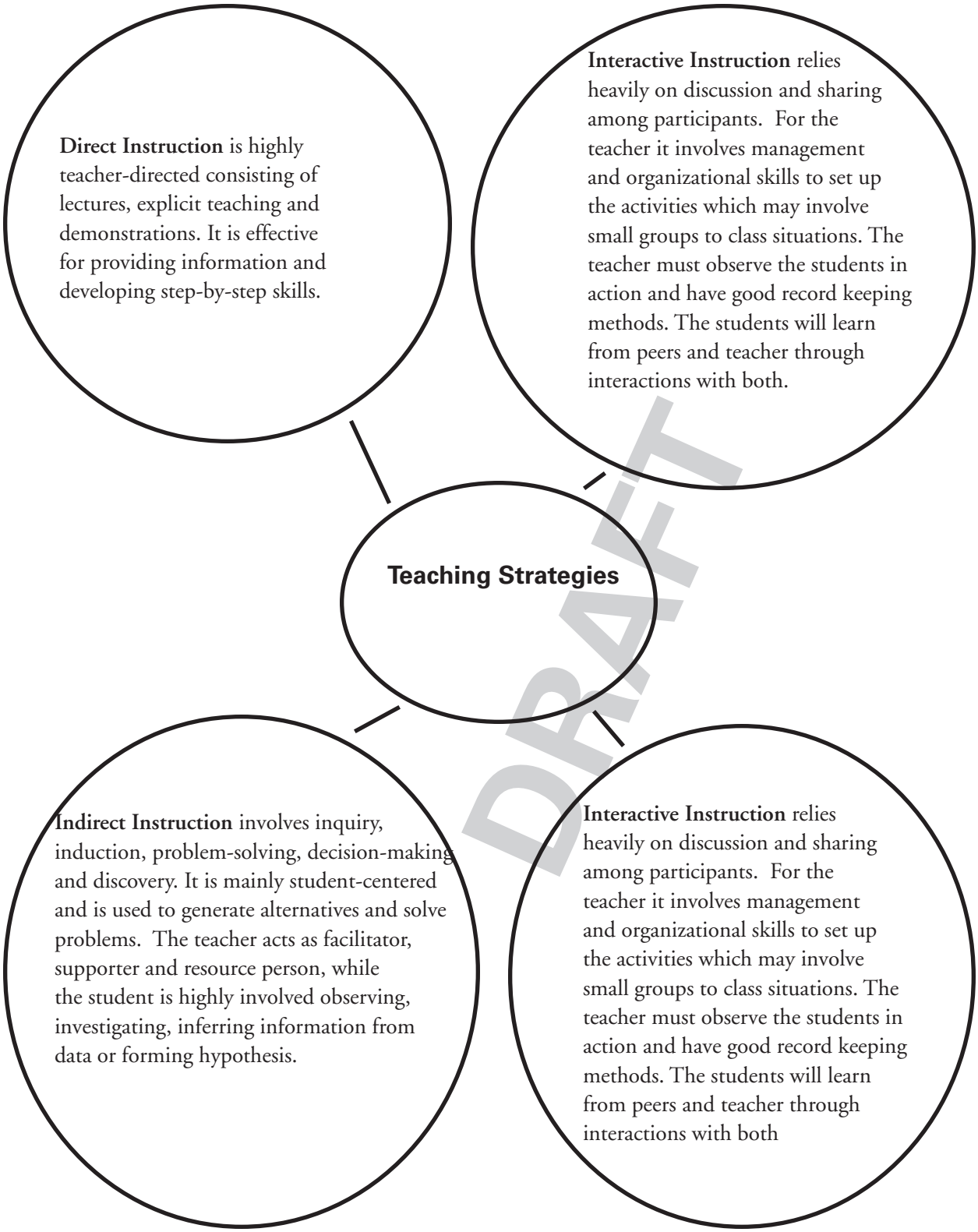
Varied instructional strategies within the class time also excites motivation. Students need variety, choices, and opportunities to take ownership of their learning.

There should be a limited amount of "traditional homework" and the home assignments given should relate to the students interests in real life.

Teaching Strategies

Learning theory research clearly indicates that teachers need to employ a wide variety of instructional strategies to address the learning styles of all learners. Moreover, the nature of certain content or processes can only be taught effectively if specific instructional strategies are employed. In order to achieve this objective, students must have an opportunity to co-operatively brainstorm, discuss, evaluate information, and make informed decisions. Students often point to experiential activities as the best part of a program as they have the chance to work cooperatively and be actively involved in the learning process.

Teachers are ultimately responsible for determining the best teaching methods for their student, the best way of grouping them, and the best way to present material to make it relevant and interesting. Exemplary teachers use a variety of instructional strategies and have the flexibility to call upon several different strategies both within one period and during a unit of study. Adolescent learners need a balance between practical work, listening, discussing, and problem-solving.


Direct Instruction is highly teacher-directed consisting of lectures, explicit teaching and demonstrations. It is effective for providing information and developing step-by-step skills.
Interactive Instruction relies heavily on discussion and sharing among participants. For the teacher it involves management and organizational skills to set up the activities which may involve small groups to class situations. The teacher must observe the students in action and have good record keeping methods. The students will learn from peers and teacher through interactions with both.
Teaching Strategies
Indirect Instruction involves inquiry, induction, problem-solving, decision-making and discovery. It is mainly student-centered and is used to generate alternatives and solve problems. The teacher acts as facilitator, supporter and resource person, while the student is highly involved observing, investigating, inferring information from data or forming hypothesis.
Interactive Instruction relies heavily on discussion and sharing among participants. For the teacher it involves management and organizational skills to set up the activities which may involve small groups to class situations. The teacher must observe the students in action and have good record keeping methods. The students will learn from peers and teacher through interactions with both

Assessment and Evaluation

The terms “assessment” and “evaluation” are often used interchangeably. However, they are not exactly the same. “Assessment” refers to the process of collecting and gathering information about student performance as it relates to the achievement of curriculum outcomes. “Evaluation” refers to the systematic process of analyzing and interpreting information gathered through the process of assessment. Its purpose is to make judgements and decisions about student learning. Assessment provides the data. Evaluation brings meaning to the data. Assessment must reflect the intended outcomes, be ongoing, and take place in authentic contexts.

Meaningful learning involves reflection, construction, and self-regulation. Students are seen as creators of their own unique knowledge structures, not as mere recorders of factual information. Knowing is not just receiving information but interpreting and relating the information to previously acquired knowledge. In addition, students need to recognize the importance of knowing how to perform, when to perform and how to adapt that performance to new situations. Thus, the presence or absence of discrete bits of information - which has been the traditional focus of testing - is no longer the focus of assessment of meaningful learning. Rather, what is important is how and whether students organize, structure, and use that information in context to solve problems.

Evaluation may take different forms depending on its purpose. *Diagnostic* evaluation will identify individual problems and suggest appropriate corrective action. Evaluation may be *formative* in that it is used during the instructional process to monitor progress and to make necessary adjustments in instructional strategies. *Summative* evaluation is intended to report the degree to which the intended curriculum outcomes have been achieved. It is completed at the end of a particular instructional unit.

Since the specific curriculum expectations indicate behaviours involving knowledge, skills, and attitudes, assessment must reflect student performance in each of these areas. The learning outcomes specific to the cognitive domain emphasize the acquisition of cognitive skills at three taxonomic levels: knowledge, understanding, and higher-order thinking. This will help to ensure that the focus on instruction goes beyond the lower levels of learning - recalling facts, memorizing definitions, solving problems and so on. Likewise, the focus of evaluation should also go beyond testing at the knowledge level.

Assessment/Evaluation Techniques

The evaluation plan should include a wide variety of assessment methods. Any single item of information about a student's learning is only a minuscule sample of that individual's accomplishments. All types of learning outcomes cannot adequately be evaluated with a single type of instrument. Notions about students having different learning styles also apply to their performance on items designed for purposes of evaluation.

Evaluation strategies must closely resemble the nature of the instructional program, curriculum, and modern learning theory. There is significant movement toward authentic assessment or performance assessments. These could include such strategies as open-ended questions, exhibits, demonstrations, hands on execution of experiments, computer simulations, writing, and portfolios of students' work over time.

A multifaceted plan is needed to respond to the differences in the intended learning outcomes, the learning styles of students, and to reflect the APEF Essential Graduation Learning.

Individual learning outcomes, the criteria for success and the form that assessment and evaluation will take, should be clearly understood by teachers, students, and parents. This involves clearly describing unit and lesson objectives and how the achievement of these objectives will be assessed. If students are to see themselves as responsible for their own learning, the requirements for attaining success in a unit of work must be clearly understood. The assessment and evaluation of the unit should contain no surprises.

Using Varied Assessment Strategies

Teachers must realize they are preparing students for a world where knowledge is expanding at a rate we can no longer track. This requires that we shift emphasis from content knowledge to information processing skills. Our students need to be able to select, process, and evaluate knowledge.

This knowledge does not always need to be tested directly on evaluations that rely strictly on recall of facts during tests, rather it can be encompassed in higher level objectives such as comprehension, synthesis, or application. These could be better measured through a problem-solving approach.

It is therefore important to emphasize a variety of strategies in evaluation plans. These must reflect the teaching strategies employed in the delivery of the specific topic.

Anecdotal Records are positively written reflections of a student's actions and work while activities are occurring. As an informal assessment process, it is typically based on notes or a check list with space for writing comments. It is completed when appropriate.

Teacher Student Conferences are valuable evaluation techniques to gather information about students not obtained in other ways. More information is shared through conversation than through writing. It allows teachers to assess progress through questioning content and feelings on selected topics. A written record of the conference is advised.

Checklists**:**

Student **self-evaluation of:**

- interest
- attitudes
- social
- group skills
- understanding

Teacher **evaluation of:**

- laboratory skills
- groups skills
- interests
- attitudes

Group **Self-evaluation of:**

- group skills
- achievement

Testing assesses the student's knowledge and understanding of the subject matter. The most common methods include: essay, column matching, true/false, and multiple choice questions. Also included are problem solving, interpretation and production of graphs, data tables, and illustrations.

Student Work Samples are means for students to communicate what they are learning through a variety of experiences including:

portfolios - a collection of student's work

laboratory reports - documentation of experiential activities

major reports and written reports - further research on topics

homework - opportunity for parent/guardian involvement

learning journals - individual perceptions of progress

oral presentations - individual or group form of communicating ideas.

Object Oriented Programming

Software: Visual Studio 2008 (Visual Basic)
Recommended Time Allocation: 70% (56 periods)

design, develop, evaluate, and articulate technological solutions

Outcomes	Elaboration- Strategies for Learning and Teaching
Students will be expected to : OP1: apply problem-solving techniques for object oriented programming	Problem solving techniques include: • defining the problem and determine the desired output of the program. Students will find that if the output of a program is understood, then it becomes easier to plan the solution to the problem. Create an input/processing/output (IPO) chart. • using research and resource materials to gather information about the problem and possible solutions • identifying and defining all variables and constants. Variables and constants are used to store data in the program. Storing data for use throughout the program is an essential part of writing a program. • planning the successful solution using an algorithm. An algorithm is simply a solution to a problem. An algorithm must be developed before any problem can be solved. Planning is often recursive in that the algorithm must be revised as various aspects of the problem are analyzed. Once the algorithm is developed, it is often easier to write the solution in language similar to English (pseudocode) than to try to code directly into a computer language. • developing and maintaining a personal software code library. Project Based Learning is associated with inquiry, critical thinking and problem-based learning. A culminating programming project will be planned, coded, documented and presented during the semester. Research related to project based learning indicates that the process must be made explicit to learners, modeled and practiced over time to develop competence and confidence. A further aspect of project based learning is that it often will involve seeking information or advice from professionals in the community. Refer to the project based learning planning and assessment resources in the appendix to this curriculum guide. It is suggested that: • the project be introduced very early in the semester • the student have input into the selection of a specific project topic • classroom learning be transferable to specific stages of the project • model planning, problem solving strategies, and the maintenance of a software code library • regular feedback and assessment of the project occur throughout the semester

design, develop, evaluate, and articulate technological solutions

Tasks for Instruction and/or Assessment	Resources/Notes
OP1.1: The most important aspect of computer programming is the planning of the program solution. Emphasis should be placed on correct planning of a program. With this is mind, problems should be presented to the students with the aim of planning solutions to these problems. Model the solution to these problems, by demonstrating the six steps of problem solving to write a program.	ATutor CMP621 Teacher Resource http://atutor.edu.pe.ca Six Step Problem Solving Method handout and Powerpoint presentation.
OP1.2: In the "real" programming world, programs are not written by one individual. Programming teams are used to write a program. Use pair programming groups and pedagogy to solve problems presented. Each group should then plan a solution to the problem. The solution of each group should be discussed with the other groups to demonstrate that there may be more than one solution to a given problem.	Computer Science Teachers Association (CSTA), Pair Programming Video Downloadhttp://csta.acm.org/Resources/sub/DownloadableResources.html?searchterm=pair+programming
OP1.3: Observe how students problem-solve the steps of completing a task such as making a cup of coffee. Note how they: interact in a group, identify the components of the task, develop the steps to complete the task.	
OP1.4: Analyse own contribution to group work and identify skills and activities that made the group effective. Identify factors that interfered with work progress. As a class, have students develop a rubric to assess teamwork skills in future group activities.	Self Assessment rubric
OP1.5: Maintain a code library from mini problems solved during classroom sessions. Model the re-purposing of source code to solve problems.	Google Code http://code.google.com/p/support/wiki/GettingStarted
OP1.6: Utilize project based learning planning and assessment instruments in daily classroom routines and assignments. This will familiarize learners with the project based learning process and being actively involved in planning their own learning and in the assessing of their own learning.	
OP1.7: Introduce the project based learning activity for the semester including planning and assessment instruments. Clearly identify project benchmarks and expectations.	

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Outcomes	Elaboration- Strategies for Learning and Teaching
Students will be expected to : OP2: design a user-friendly interface	Input and output forms may contain a multitude of objects with a variety of property settings. Basic design principles may be applied to these forms so that they are user-friendly. Some items to consider ate: • controls which are appropriate • size of form and controls • alignment and grouping of objects • size and type of fonts • preciseness of captions; directions for users • selection of colour Ensure that labels are provided to guide users and to specify format for data entry. e.g.: dd/mm/yr. Prompts or error trapping messages should be provided for incorrect data entry. Use standard naming conventions for variables, objects and object properties. Familiarize learners with the location of the object properties panel. Modify common object properties such as naming the control, display text, font, colour (including background and foreground) and visibility. Specific object property choices vary depending upon the type and function of the object selected. Note that OP2 (designing a user-friendly interface) and OP3 (develop algorithms) are done in conjunction. An algorithm and interface may need to be reassessed as a solution is developed.

design, develop, evaluate, and articulate technological solutions

Tasks for Instruction and/or Assessment	Resources/Notes
OP2.1 Research GUI design principles. Create a top ten list ranking the ten most important considerations.	Handout & Powerpoint of GUI design principles
OP2.2 Examine a program GUI (program, web interface, Xbox game, etc.) Identify GUI design principles that were applied.	PowerPoint of interface screen shots
OP2.3 Design a graphic user interface (GUI) form on paper given a problem definition. With a partner justify GUI design choices implemented.	Handout of Reddick Symbols
OP2.4 Use standard naming conventions for the controls selected in OP2.3	Reddick Naming Convention. (Dev Ashish, 2009) http://www.mvps.org/access/general/gen0012.htm
OP2.5 Create the GUI form from the paper planning sheet in Visual Basic. Assign object properties to implement the design.	Search terms such as GUI, intuitive interfaces, and usability to locate more information about interface design.

design, develop, evaluate, and articulate technological solutions

Outcomes	Elaboration- Strategies for Learning and Teaching
Students will be expected to : OP3: develop algorithms	The solution to a problem may be outlined using an algorithm, which may consist of pseudo-code or be visually presented through the use of flowcharts and storyboards. Point out that the use of these planning strategies will uncover logical problems early before valuable time is spent coding the solution only to find that the work must be redesigned. Pseudo-code descriptions of what the program will do as it executes is the preferred logical planning strategy for object oriented programming. Model the use of a planning strategy when solving computer problems in the classroom. Insist that coded solutions to programming problems be documented with evidence of planning. The use of the input process and output model to solve problems helps to break the problem solution into logical blocks. As problem solutions become more complex incorporate modularity (subroutines and functions) into the program design. Modularity allows teams to work on a collaborative solution and allows re-purposing of source code. Note that OP2 (designing a user-friendly interface) and OP3 (develop algorithms) are done in conjunction. An algorithm and interface may need to be reassessed as a solution is developed.

design, develop, evaluate, and articulate technological solutions

Tasks for Instruction and/or Assessment	Resources/Notes
OP3.1 Work in small groups to create an algorithm to solve a problem in pseudocode that is unrelated to programming. (change a tire, bake a cake, get to the bus from the classroom) Test the solution by having a partner describe or perform the steps exactly as written. Are there unexpected results? Identify the type of problem encountered. Observe groups as activities are broken down into specific tasks. Provide guidance and feedback as necessary.	Marrelli, Jan. Pg. 101 Troubleshooting when the Car Won't Start. UTube Video http://www.youtube.com/watch?v=NSgp3w66RgU
OP3.2 Plan solutions to programming problems with a partner. Evaluate the solution plan with another group. Reviewing groups may sign the planning sheet and specify an assessment scheme based upon an agreed upon rubric. e.g.: planning logic is accurate, instructions are complete, conventions utilized, solution original and/or creative. Emphasize that there may be multiple equally valid solutions to a problem.	Rubric
OP3.3 Assess students' algorithms for completeness and structure.	
OP3.4 Select a personal artifact (exemplar) for a personal learning portfolio that demonstrates planning and organizational skills. Describe why a particular item was included.	Career Cruising http://www.careercruising.com/
OP3.5 Construct an algorithm in pseudocode to plan the logical steps required to program the solution to the culminating term project. Ensure that the solution is modular and that the logic is sound before coding commences. Revise the pseudocode as necessary.	ATutor http://atutor.edu.pe.ca CMP621 Teachers Workspace. Cumulating End of Term Proejct.

design, develop, evaluate, and articulate technological solutions

Outcomes	Elaboration- Strategies for Learning and Teaching
Students will be expected to :	
OP4: use programming concepts and practices	Programmers must adhere to defined programming style, including naming conventions for variables and sub-routines, indentation, spacing and comments.
OP4a: programming style	Consistently demonstrate the use of code conventions in programs. Recognize that an organization may adopt its own programming style and code conventions that must be used (Similar to an office procedures manual that will differ from one organization to another).
OP4b: data types	Good programs are designed to run efficiently and to use system resources effectively. Object oriented programming languages have a variety of built in data types (primitive types) that may be selected to conserve data storage allocation. Recognize data types and implement them most appropriately. • string • integer • single • long • double • boolean • date
OP4c: mathematical operators	Review order of operation conventions and the use of parenthesis in the formulation of equations. Common operators include subtraction (-), addition (+), multiplication (*), division (/), exponent (^), modules (mod) and integer division (\).

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Tasks for Instruction and/or Assessment	Resources/Notes
OP4.1 Demonstrate placing comments within code. OP4.2 Demonstrate recognized Visual Basic naming conventions for variables and sub-routines. OP4.3 Demonstrate spacing and indenting style for program code. OP4.4 Assess programming style and naming conventions for the culminating term project.	Marrelli, Jan. An Introduction to Programming using Microsoft Visual Basic 2008. Lawrenceville Press. pg. 54 MSDN http://msdn.microsoft.com/en-us/library/h63fsef3.aspx (accessed October, 2009)
OP4.5 Reference a Visual Basic Data Type summary table online. Provide examples of data that may be inputted or outputted by a computer program and specify primitive data types that would be assigned. OP4.6 Demonstrate errors that may occur if incorrect data type is used for a variable (run time error). OP4.7 Determine data types for variables that are used in the culminating end of term project.	Data Type Summary. (MSDN, October 2009) http://msdn.microsoft.com/en-us/library/47zceaw7(VS.80).aspx (Matching Activity) (Demonstration Program showing incorrect data type)
OP4.8 Solve a variety of mathematical expressions containing operators and parenthesis. OP4.9 Enter equations into Visual Basic to check answers. OP4.10 Provide problem statements. Determine the equation required to solve each problem. OP4.11 Determine equations required to solve the problem(s) in the culminating end of term project.	(handout operators - modular division, integer division, trig.)

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Outcomes

Students will be expected to :

OP4: use programming concepts and practices

OP4d: scope, constants and variables

Elaboration- Strategies for Learning and Teaching

Use constants, variables, expressions and assignment statements to store and manipulate numeric, text, and logical data in programs.

For data that does not change the use of constants should be emphasized. Variables, on the other hand, contain data that change throughout the program.

Point out that standard naming conventions require that the constant name be all upper case.

Some programs provide a statement to ensure that all variables are declared. For example, Visual Basic uses **Option Explicit**.

An important programming practice is to declare variables so that their scope is limited to where they are needed. Where the variable is declared determines the scope. Variables may be declared at four different locations in a programs:

- a **form's** General Declarations section. Available in all events on a form and lives until the program ends.
- a **module's** General Declarations section. Available in all sections of the program and uses the keyword Public. Variable value lives until the program ends.
- an objects event procedure - **outside** a block of code. The life of the variable is until the event or procedure ends.
- an objects event procedure - **inside** a block of code. For instance, inside an If .. Then statement. The life of the variable is until the block processing ends.

Programming errors are more easily identified when variables are local to where they are used since an error will be isolated to a particular event or form.

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Tasks for Instruction and/or Assessment	Resources/Notes
OP4.12 Identify four standard variable naming conventions for the Visual Basic programming language.	Sartain, Steve. "Download .NET Coding Guidelines." October 2006. Sub-Domain. October 2009 <http://submain.com/download/guidelines/>.
OP4.13 Provide a description of several pieces of data and associated primitive types that would be used in a program. Suggest variable names that follow good naming conventions. Demonstrate correct syntax when declaring variable names.	pg 27 student manual - chart
OP4.14 The use of the equal (=) sign in assigning values to variables should be demonstrated. Point out that the variable must always be on the left hand side of the statement, and **gets** the value that is being stored on the right hand side of the assignment statement. Note in programming that the word **equals** is replaced with **gets** to emphasize data flow.	handout - variable names wrong - make corrections.
OP4.15 Demonstrate the placement of the Option Explicit statement code.	MSDN knowledgebase http://msdn.microsoft.com/en-us/library/ms973875.aspx Accessed October, 2009.
OP4.16 Follow standard naming conventions for variables that are used in the culminating end of term project.	
OP4.17 Provide example code for a program. Determine which variables are local, form level or global explaining the differences.	example code - atutor
OP4:18 Demonstrate the placement of coding for a local and a global variable in Visual Basic.	
OP4.19 Identify variables as local, form level or global in the input-output chart for the culminating end of term project	

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Outcomes	Elaboration- Strategies for Learning and Teaching
Students will be expected to :	
OP4: use programming concepts and practices	An array contains a group of variables that have the same name and data type and are related. Arrays may be one dimensional or two dimensional. Array data can be referenced by its position in the array, which is known as an array index.
OP4e: arrays	
OP4f: modules, classes, procedures, functions, and methods	Modules are a container for global procedures, variables, and functions necessary to enable access from multiple forms. Built into many computer languages are class methods that perform common tasks that can assist the programmer in writing a computer program. A class is a container for the method types. For example, the form class is a container for all local variables, procedures and functions for that form. These class methods generally help the programmer with often repeated tasks. For example, the math class contains methods/ functions for square root, sine, log and present value. For example, in Visual Basic the most common built-in classes include Array, Conversion, DateTime, Math and String. Within each class there are several methods/functions to perform specific tasks. A procedure is simply a block of code much like a subroutine which allows large complex applications to be broken into small, manageable tasks. Several functions are available that perform a specific task and return a value such as formatting numeric values (currency, scientific, percent) and returning random numbers. User defined functions may be written by programmers and called upon for use in multiple subroutines within a computer program.

design, develop, evaluate, and articulate technological solutions

Tasks for Instruction and/or Assessment	Resources/Notes
OP4.20 Explain the concept of an array. Include the advantages of storing data within an array structure.	[upload program segment]
OP4.21 Write code to create a one dimensional array.	
OP4.22 Write code to create a two dimensional array.	
OP4.23 Enter data into a particular address within an array.	
OP4.24 Enter data sequentially into an array using a For .. Next loop and indexes.	
OP4.25 Use the array class methods to manipulate data found within a one dimensional array (sort and search).	
OP4.26 Write code to perform a bubble sort on a one dimensional array.	
OP4.27 Write code to perform a sequential search and replace.	
OP4.28 Implement an array to manage data in the culminating end of term project.	[upload program segment] Handout - format - show output
OP4.29 Use math class methods to perform a variety of calculations (trigonometry, square root, and log).	
OP4.30 Use string class methods to manipulate text (e.g.: find the number of characters in a string).	
OP4.31 Show the output resulting from applying a variety of formatting functions.	
OP4.32 Use one procedure to perform similar tasks for multiple events.	
OP4.33 Use modules to pass variables from one form to another.	

design, develop, evaluate, and articulate technological solutions

Outcomes	Elaboration- Strategies for Learning and Teaching
Students will be expected to : OP4: use programming concepts and practices OP4g: iteration	Understand and be able to use an iteration that is either repeated a set number of times or until a condition is met. FOR loops can be used when the number of times the loop structure to be run is known. Do loops run until a condition is met. For example in Visual Basic FOR ... NEXT, DO UNTIL... LOOP, DO WHILE ... LOOP, DO ... LOOP UNTIL, and DO ...LOOP WHILE loops should be understood. Use and understand accumulators and how they are used. An example of an accumulator is a variable that keeps a running total. Nested loops are iterations that are performed within other iterations. Nested loops are often used to fill multi dimensional arrays or to delay the processing within a program.

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Tasks for Instruction and/or Assessment	Resources/Notes
OP4.33 If at first you don't succeed, try ... try again. This is the premise used in solving some problems by repetition. This method of problem solving should be discussed. The discussion should lead into how computers can solve problems by using repetition.	
OP4.34 Use kinesthetics to visually demonstrate the action of a loop. A student may be assigned to perform an action such as clapping or standing up/sitting down as classmates execute the loop and increment the accumulator.	Use ESC or Ctrl + Break keys to end a continuous loop process.
OP4.35 Follow and diagram the working of a loop, tracking counter values.	
OP4.36 Explain nested loops and how they work	
OP4.37 Provide examples of when a program might require the use of a particular loop statement.	
OP4.38 Demonstrate the use of the STEP value in a FOR ... NEXT statement.	
OP4.39 Demonstrate the use of an accumulator in a FOR ... NEXT loop. The speed at which a computer operates could be shown by using an accumulator to add all the integers between 1 and 1000. This could be compared with using the formula SUM = 500(LAST - FIRST).	
OP4.40 Provide code for a variety of loop statements (including nested loops). Trace and predict the output for each.	
OP4.41 Write a FOR .. NEXT loop to display the even numbers from 60 to 100, inclusive.	
OP4.42 Write a DO WHILE .. LOOP to display numbers in increments of 50 from 250 to 1000, not inclusive.	
OP4.43 Write a DO UNTIL .. LOOP to generate 8 random numbers.	

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Outcomes	Elaboration- Strategies for Learning and Teaching
Students will be expected to :	
OP4: use programming concepts and practices	Conditional statements IF ... THEN are used in a computer program to change the way in which a computer program may be run. Conditional statements are used to change the flow of a program.
OP4h: decision structures	The statement following an IF clause will only be executed if and only if the condition is TRUE. If the condition is FALSE, then the statement after the IF structure will be executed. The programmer however can force an alternate action with the ELSE clause and even more complex tests with ELSEIF. Note: any given IF-Block can have any number of ELSEIF statements but only one ELSE statement. The CASE structure is an effective decision making structure that simplifies choosing among several actions. It avoids the complex (and hard to follow) use of nested IFs
OP4i: Boolean operators	Boolean operators allow for the testing of complex conditions. The Truth table of each Boolean should be explained. AND is a logical conjunction that produces a result of True, if and only if, both of the operands are True. On a Venn diagram this would be the area of intersection of the sets. OR is a logical disjunction that results in True whenever one or more of its operands are True. On a Venn diagram this would be all members of the sets. For example:

AND:

p	q	Result
T	T	T
T	F	F
F	T	F
F	F	F

OR:

p	q	Result
T	T	T
T	F	T
F	T	T
F	F	F

The NOT operator negates a condition, eg. a TRUE condition becomes FALSE and a FALSE condition becomes TRUE.

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Tasks for Instruction and/or Assessment	Resources/Notes
OP4.44 Write some simple programs that use the IF ... THEN statement. For example, students might write a program that asks for a mark in computer class. If the mark is 50 or greater the computer prints that it is a "pass mark".	
OP4.45 Write a computer program that asks for a student mark and will return the equivalent letter grade. If the mark is below 50 return a letter grade of F; 50-59 return a D; 60-69 return a C; 70-79 a B; and 80-100 an A letter grade. Repeat solution using the CASE statement.	A similar problem would be to calculate the cost per page of photocopying different quantities. e.g.: the larger the print job the cheaper the cost per page.

OP4.46 Let students determine the error (if any) in conditionals. For example:
IF flag = 0 THEN
flag = 1
ENDIF
IF flag = 1 THEN
flag =0
ENDIF
This error of intent could be avoided through the use of an "ELSE" statement where the flag is set to zero. For example, should the variable "flag" have a value of 2 when the conditional is encountered it would be set to zero in the ELSE part of the statement.	

OP4.47 Students should discuss the various benefits of using the IF ... THEN statement and the CASE structure. Give students an example employing a CASE structure and ask them to rewrite the segment, using IF -ELSEIF and ELSE statements.	Lianne - problem - university tuition figures from 1999
OP4.48 Although conditional statements can be used to write a program that contains a menu, it is not necessarily the most practical way of coding the menu. The menu can usually be coded more simply by using the CASE structure. Ask students to write a menu to which a user can respond, employing the CASE structure.	
OP4.49 Write conditionals with Booleans to test the following conditions: • If a number lies between and including 1 and 8 • If a number is greater than 100 but not greater than 150 • If a name starts with Mac but not with Mc	

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Outcomes	Elaboration- Strategies for Learning and Teaching
Students will be expected to : OP4: use programming concepts and practices OP4j: sequential files	Sequential files are used to store data records external to the program in .txt format. Become familiar with the structures and controls required to manage sequential files. Explain that data read from a sequential file is placed into an array. To change a specific data item in a sequential file, the item is located and changed in the array and the file would be written back to disk. Similarly, a sequential file is sorted by reading the data into an array, sorting the array and writing the sequential file back to disk. Explain that the indices of remaining items in an array must be decreased by one when one item in an array is deleted.

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Tasks for Instruction and/or Assessment	Resources/Notes
OP4.50 Demonstrate creation of a sequential file. OP4.51 Explain the concept of a data stream object. OP4.52 Demonstrate the creation of a data stream object. OP4.53 Explain the concept of data conversion to Unicode when using the FileInfo Class OP4.54 Read the names of ten items from a provided sequential file. OP4.55 Write the names of ten friend to a sequential file. OP4.56 Demonstrate the use of the OpenFileDialog and SaveFile Dialog controls. OP4.57 Demonstrate changing the name of the fifth friend in the ten friend list. OP4.58 Demonstrate deleting the seventh friend in the ten friend list (which will be a nine friend list when the file is written back to disk) OP4.59 Use a sort utility to sort the names of the friends in the ten friend list and writes the file back to disk.	

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Outcomes	Elaboration- Strategies for Learning and Teaching
Students will be expected to : OP4: use programming concepts and practices OP4k: databases	Programming languages are not typically used to create new databases, but are used to display, analyze, and manipulate the information in an existing database. **Suggestion to remove database outcome. Meet in the dynamic web section.**

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Tasks for Instruction and/or Assessment	Resources/Notes
OP4.60 Explain the terms field, record, table, relational database, index and primary key. OP4.61 Create a GUI for an existing Access database. OP4.62 Demonstrate connecting to an existing Access database and binding dataset controls to form objects. OP4.63 Demonstrate the use of the DataGridView control to display database information.	Provide a courses database i.e.: home room teacher, courses taken, credits, room number, etc.

operate and manage technological systems

Outcomes	Elaboration- Strategies for Learning and Teaching
Students will be expected to : OP5: run, test, troubleshoot and debug program solutions	Once a GUI has been developed and code written, programs should be run to test and debug. By entering a variety of data, program stability and reliability is tested. Errors in syntax and logic are to be corrected in the debugging phase. Once a program has been tested and debugged it is ready for distribution to users. For example, programs written in Visual Basic are interpreted as they are run in the program editor. This means that the program is run line-by-line and makes it easier to identify and locate errors. An executable file is compiled completely into binary machine language. This enables the program to be run independently of the program editor and enables the program to run much faster.

operate and manage technological systems

Tasks for Instruction and/or Assessment	Resources/Notes

OP5.1 Observe how students troubleshoot programs to find and correct errors. In particular, note how they ask for help from each other and how they interact as they help each other.

OP5.2 Run sample program listings that have been entered or solutions that have been created. Encourage the testing of program subroutines in longer programs.

OP5.3 Demonstrate Visual Basic debugging tools such as Breakpoints, Watch Window, Test View, Test List Editor, Test Results, Ordered Test, and Unit Test.

OP5.4 Correct all syntax errors and use test data that has know results. Should there be exception cases for the problem being solved enter this data as well.

OP5.5 Ask students to explain how they identify and correct errors in programs. Do they use programming terminology accurately in their explanations?

OP5.6 Develop criteria for each program to evaluate programming style, utility, and aesthetics. Have students use the criteria to give feedback to others on how to improve their assignments before they are submitted.

OP5.7 Assess students' programs for:.

- programmer header information
- variable, type, procedure identifiers
- internal formatting and style
- logic errors
- syntax and grammar errors
- accuracy of execution
- user interface

OP5.8 Demonstrate the creation of an executable file for at least one programming assignment.

OP5.9 Test and debug the culminating end of term project.

operate and manage technological systems

Outcomes	Elaboration- Strategies for Learning and Teaching
Students will be expected to :	
OP6: document program	Documentation is a critical component to a program. Provide meaningful internal documentation for the program coding and external documentation for program conventions and features for users. Stress the importance of descriptive documentation in commercial programming applications where teams of programmers collaborate to create subroutines that are combined into a single program.

operate and manage technological systems

Tasks for Instruction and/or Assessment	Resources/Notes
OP6.1 Describe the importance of providing internal and external documentation for programs.	Example worksheet with meaningful and descriptive comments.
OP6.2 Provide internal documentation for sub-routines, code segments, including the programmer's name and the date the code was last modified at the beginning of the program (or sub-routine for team produced projects).	Provide a program - students enter documentation comments.
OP6.3 Prepare external documentation for end users with information regarding the proper use of the program and any special features.	
OP6.4 Assess the documentation of the culminating end of term project.	

examine current and evolving careers and the influence of technology on the nature of work

Outcomes	Elaboration- Strategies for Learning and Teaching
Students will be expected to :	
OP7: examine careers that incorporate programming	Reinforce the importance of the development of transferable skills, coop work placement, community involvement, educational requirements and professional certifications available for particular careers, and the importance of life long learning.

examine current and evolving careers and the influence of technology on the nature of work

Tasks for Instruction and/or Assessment	Resources/Notes
OP7.1 Relate the careers examined to the nine essential skills as identified by Human Resources and Skill Development Canada (HRSDC).	Essential Skills, Human Resources and Skill Development Canada. Available: http://www.hrsdc.gc.ca/eng/workplaceskills/essential_skills/general/home.shtml
OP7.2 Examine labor market trends in careers related to computer science.	University of Washington, Why Choose Computer Science? Video. Available: http://www.cs.washington.edu/WhyCSE.
OP7.3 Research educational requirements and professional certifications that are associated with a particular career related to computer science.	Information and Communication Technology Council. Available: http://www.ictc-ctic.ca/
OP7.4 Investigate opportunities for community based learning in your school	

examine the history and evolution of technology and its social and cultural implications

Outcomes	Elaboration- Strategies for Learning and Teaching
Students will be expected to :	
OP8: research computer programming in relation to environmental stewardship and sustainability	Advances in technology have made positive impacts on waste management, recycling, water use, energy, food production, urban planning, emergency preparedness and response, environmental protection, etc. The relationship to programming is often in the area of modelling and in the analysis and representation of large amounts of data so that informed decisions may be made. e.g.: global warming models predict rising sea levels. These models may be used to forecast future impact to shoreline and the identification of those areas that may be susceptible to flooding during storm surges. The widespread use of technology has also had a negative impact on the environment through energy consumption and e-waste. Innovative solutions have been implemented to minimize these impacts, such as monitoring and regulating electrical use (monitor sleep mode, operating system power save mode, etc), the development of more energy efficient computer components, and recycling programs.

examine the history and evolution of technology and its social and cultural implications

Tasks for Instruction and/or Assessment	Resources/Notes
OP8.1 Describe solutions to complex problems affecting society that have been developed through the use of computer programming and advances in technology.	
OP8.2 Identify measures that have been implemented to reduce the negative impacts of technology usage. Identify the relationship of programming to the problem solution.	

Dynamic Web Site Development

Software: Visual Web Developer 2008
Recommended Time Allocation: 30% (24 periods)

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Outcomes	Elaboration- Strategies for Learning and Teaching
Students will be expected to : DW1: describe client side and server side website communication	Provide a simple description at the concept level. Do not provide detailed information regarding the server processing that includes the states and modes that occur during receipt, processing and forwarding of data.

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Tasks for Instruction and/or Assessment

DW1.1: Identify two of the most popular dynamic web page technologies.

DW1.2: Describe client and server communication that takes place when a dynamic web page is implemented.

DW1.3: Use a kinesthetic activity to demonstrate client - server communication with students role playing response and reply activity.

DW1.4: Examine a variety of commercial and government web sites. Determine if each site is static or dynamic. Justify reasons for categorizing the web site as dynamic or static.

DW1.5: Explain the difference between POST and GET methods for transferring information between clients and web servers.

DW1.6: Demonstrate "View in Browser" and explain the meaning of LocalHost and the port number in the resulting URL.

DW1.7: View the source HTML code for a client page and the HTML code found in a page that has been returned from the server to demonstrate that processing has taken place. e.g.: client code requesting date and time; server dynamic HTML code that has formatted the response in HTML.

Resources/Notes

Dynamic Web Programming with Visual Web Developer, Lab Manual. Department of Education and Early Childhood Development, 2010.

CMP621A Teachers' ATutor site. http://atutor.edu.pe.ca

Note:

XML will not work from the network G: drive. Microsoft included security features to prevent the simulated server from accessing external servers. Students must use memory sticks or place their .asp files on the C: drive.

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Outcomes	Elaboration- Strategies for Learning and Teaching
Students will be expected to : DW2: develop the concept and logical design for a dynamic web site	Reinforce the process involved in creating a web site and the controls, pages and supporting database structures required for a functional dynamic web site. Remind students that the content of dynamic web pages does not exist until a request is made to the web server. Cascading style sheets are necessary to format elements and layout of the "empty containers" that will hold data provided from the SQL database. Introduce the culminating web site project early in the unit so students have an opportunity to plan. They can transfer the knowledge acquired from the classroom learning activities to and apply these to their own creations. Insist upon written evidence of planning, coding, troubleshooting and documentation for the dynamic web site project.

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Tasks for Instruction and/or Assessment

DW2.1: Review cascading style sheets including inline, internal and external styles.

DW2.2: Develop an external style sheet and code to apply element and layout styles to web pages and page controls.

DW2.3: Plan the information requirements for a web site. Design the database relationships and queries that will be needed.

DW2.4: Plan a web page to display dynamic data and information.

DW2.5: Plan a secure web page to add new records to the database.

DW2.6: Plan a secure web page to modify records in the database.

DW2.7: Plan a secure web page to delete records.

DW2.8: Develop a plan and information requirements for the culminating dynamic web site project. Consider page hierarchy, controls, database, and security requirements.

Resources/Notes

HTML/CSS CMP521A lab manual. Department of Education and Early Childhood Development, 2009.

W3Schools CSS Tutorials. http://www.w3schools.com/css/default.asp

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Outcomes	Elaboration- Strategies for Learning and Teaching
Students will be expected to : DW3: create a database for deployment of a dynamic web site	The power of relational database storage and query structures make commercial dynamic web applications possible. Reinforce that various versions of Structured Query Language (SQL) databases are most popular for the creation of dynamic web sites.

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Tasks for Instruction and/or Assessment

DW3.1: Identify three versions of SQL databases that are available.

DW3.2: List four reasons why SQL databases are popular.

DW3.3: Review the concept of relational databases and how they provide flexibility and efficiency for data storage and retrieval.

DW3.4: Identify specific instances where dynamic web sites accept or provide information that would be maintained in a relational database structure.

DW3.5: Demonstrate the creation of an SQL database table.

DW3.6: Demonstrate the creation of SQL database fields and assigning appropriate field data types.

DW3.7: Demonstrate the creation of a primary field.

DW3.8: Demonstrate direct data entry into a database table.

DW3.9: Create a relational database for the culminating dynamic web site project.

Resources/Notes

operate and manage technological systems

Outcomes	Elaboration- Strategies for Learning and Teaching
Students will be expected to : DW4: configure a database connection	The connection configuration allows SQL tables to have a relational structure. The fields to be accessed, along with the action to be performed (SELECT, UPDATE, INSERT, and DELETE) is determined with connection control settings (SqlDataSource control in Visual Studio).

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Tasks for Instruction and/or Assessment

DW4.1: Demonstrate setting up a connection string for an SQL database.

DW4.2: Explain the function of the SQL statements SELECT, UPDATE, INSERT, and DELETE.

DW4.3: Demonstrate the application of a SqlDataSource control.

DW4.4: Demonstrate data display, entry or modification through web interface controls (GridView, DetailsView and FormView).

DW4.5: Demonstrate the SQL JOIN statement and query creation.

DW4.6: Apply a SqlDataSource control, interface controls and queries for the culminating dynamic web site project.

Resources/Notes

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Outcomes	Elaboration- Strategies for Learning and Teaching
Students will be expected to : DW5: apply database web interface controls	The functionality that a web interface control will provide is made available through the database connection (SELECT, UPDATE, INSERT, and DELETE). Indicate that GridView, DetailsView, FormView have specific uses. Point out that the repeater control and pagination provide options for presenting data from multiple records.

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Tasks for Instruction and/or Assessment

DW5.1: Identify an instance where a GridView, DetailsView or FormView control would be most appropriate for the display of data.

DW5.2: Apply a GridView Control to a web page.

DW5.3: Apply a DetailsView Control to a web page.

DW5.4: Demonstrate how to customize the appearance of data on a web page using the FormView Control.

DW5.5: Demonstrate the use of a repeater Control.

DW5.6: Demonstration how to apply pagination to the GridView and DetailsView controls.

Resources/Notes

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Outcomes	Elaboration- Strategies for Learning and Teaching
Students will be expected to : DW6: validate form data	Remind students that data sent to the server may be validated similar to the validation of data when using ACCESS database forms. Point out that while the toolbox contains validation tools that are used to ensure that data is complete and reliable when it reaches the server that this wastes computing power and ties up communication links. In practice a better way to ensure the integrity to data is to use JavaScript on the client computer to check for data validity. The use of JavaScipt is outside the scope of this course.

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Tasks for Instruction and/or Assessment

DW6.1: Distinguish between client-side and server-side input validation.

DW6.2: Identify four advantages of validating input data that is sent to a server for processing.

DW6.3: Apply a validation control

Resources/Notes

Validation Controls http://msdn.microsoft.com/en-us/library/debza5t0.aspx

operate and manage technological systems

Outcomes	Elaboration- Strategies for Learning and Teaching
Students will be expected to : DW7: store image links in a database and display images dynamically	Images links are stored as text in the database. The image resources are stored in the images folder on the web server. Inform students that the images would need to be placed on a production web server through the use of FTP using this method. It is also possible to store and retrieve actual images within the database. The procedures required to do this are beyond the scope of our discussion but could be assigned as an area of independent study for a motivated individual. Point out that FTP would not be required when a web interface control has been set up to upload, modify or delete images.

operate and manage technological systems

Tasks for Instruction and/or Assessment

DW7.1: Explain the process for storing graphic information in the database and displaying a particular image dynamically.

DW7.2: Add .png, .jpg, or gif image files to the images folder of a simulated web server.

DW7.3: Add relative link data for image resources through the use of a database field.

DW7.4: Demonstrate how to apply an image control to a web page and assign an imageURL binding to this control.

Resources/Notes

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Outcomes	Elaboration- Strategies for Learning and Teaching
Students will be expected to : DW8: apply URL parameters	Providing examples of search engines or other sites passing information from one page to another through the use of URL parameters would be a good way to introduce the concept to students. Advise them that this way of passing data is known as a "get" method and would not be appropriate for sensitive or private data. Another method of passing information from one page to another is using the "post" method. This involves using a hidden field on a form where data is written and submitted to the server when the form is submitted. The POST method is not demonstrated within this curriculum.

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Tasks for Instruction and/or Assessment

DW8.1: Explain the purpose of a URL parameter.

DW8.2: Demonstrate well know web services that use URL parameters.

DW8.3: Discuss security issues related to the use of URL parameters.

DW8.4: Demonstrate the manipulation of a URL parameter to alter the behaviour of a web site or the information that it provides.

DW8.5: Explain the code required to pass a URL parameter.

DW8.6: Demonstrate how to configure the SqlDataSource control to receive and process a particular URL parameter.

Resources/Notes

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design, develop, evaluate, and articulate technological solutions

Outcomes	Elaboration- Strategies for Learning and Teaching
Students will be expected to : DW9: apply authentication to a web site	The Administrators Tools interface is used to create and configure the authentication database. The information contained in the database is entered or modified through the use of a variety of Login controls that are applied to web pages. The assignment of permissions and roles using the Administrators Tool is outside the scope of the CMP621A course but may be a topic for independent study for motivated students.

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Tasks for Instruction and/or Assessment

DW9.1: Explain the procedure for applying authentication to a web site.

DW9.2: Demonstrate the creation of an authentication database using the Administrators Tool.

DW9.3: Demonstrate the use of the LoginView control with the LoggedInTemplate and AnonymousTemplate.

DW9.4: Apply and configure a Login control.

DW9.5: Apply and configure a CreateUserWizard control.

DW9.6: Configure a LoginStatus control to indicate to the user when they are logged in by displaying a logout link.

DW9.7: Configure a PasswordRecovery control.

DW9.8: Configure a ChangePassword control.

Resources/Notes

http://www.asp.net/Learn/Security/

examine the history and evolution of technology and its social and cultural implications

Outcomes	Elaboration- Strategies for Learning and Teaching
Students will be expected to : DW10: identify security issues related to dynamic web sites	This is an area that is continually evolving. Frequently there are news stories that describe hacking, fraud and denial of service activities that relate to this outcome. Involve students in locating and describing different security stories. This is an area that students generally find highly interesting.

examine the history and evolution of technology and its social and cultural implications

Tasks for Instruction and/or Assessment

DW10.1: Explain the concept of a script exploit.

DW10.2: Identify ways in which script exploits may be prevented.

DW10.3: Research examples of SQL injection or script exploits.

DW10.4: Invite a guest speaker to discuss dynamic web site security issues.

Resources/Notes

ASP Security Issues http://msdn.microsoft.com/en-us/library/ms525813%28VS.90%29.aspx

Cross site scripting http://support.microsoft.com/kb/252985

SQL Injection http://msdn.microsoft.com/en-us/library/ms161953.aspx