

Technology Education

Webmasters 3224

Web Design and Information Management

*Curriculum Guide
2012*

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Scott Blundon

Technology Teacher
Queen Elizabeth Regional High School, Conception Bay South

Wylie Butler

Technology Teacher
Prince of Wales Collegiate, St. John's

Bridget Ricketts

Assistant Principal
Bishop's College, St. John's

Wayne Adey

Technology Teacher
Prince of Wales Collegiate, St. John's

John Barron

Program Development Specialist - Technology/Career Education

Wayne Hillier

Technology Teacher
Mount Pearl Senior High, Mount Pearl

Robert Riche

Technology Teacher
Bishop's College, St. John's

Wade Gillard

Technology Teacher
Booth Memorial, St. John's

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Chapter 1

Background and Rationale

Background

The Webmasters 3224 course is based, conceptually, philosophically and practically, on the Atlantic Canada Foundation for Technology Education Curriculum (2001). The teacher is directed to the Foundation document for specific information that forms the basis for this and other technology education curricula in the province of Newfoundland and Labrador. In particular:

the *Introduction* section of the foundation document for information on the design of the technology education program in this province, and in Atlantic Canada
the *Nature of Technology* section for a description of the components of technology education
the *Outcomes* section for an explanation of the curriculum development structure, including Essential Graduation Learnings (EGLs), General Curriculum Outcomes (GCOs), and Key Stage Curriculum Outcomes (KSCO) for Technology Education
the *Contexts for Learning and Teaching* section for the issues presented by technological problem-solving and implications for student and teacher practices, for teaching and learning strategies, for classroom organization, and for information related to student assessment and evaluation

Rationale

Since it's introduction into Newfoundland schools in 1994 we have seen the Web evolve from a curiosity to a powerful tool for both educators and business people. The Web has pervaded intellectual and economic activities in a manner that has no comparison. It is one of the most exhilarating and important examples of how a media has grown to impact all the lives of students, teachers and parents.

Now, a great many companies and organizations have seen the need to develop a 'web presence'. These organizations have highlighted their history, informed the public of their goals and the products they sell, and have used multimedia to display a wide array of information, products and ideas. Web technologies have changed the way we do business, the way we educate our young, even how we perceive the world.

What is a WebMaster?

A Webmaster is given information of a company or a product to be put on the Web. For this the Webmaster needs to know how to put together several different elements in a logical and effective manner by proper means of communication and presentation. This course will offer a comprehensive and intensive look at the theoretical and practical aspects of website development.

Students in this course will learn to design professional looking web pages using HTML (Hypertext Markup Language) and other web design tools. A variety of technologies will be

available to enhance the pages created for school projects and/or members of the community.

Outcomes Structure

Curriculum content and student activities are defined with respect to a structure of curriculum outcomes (Figure 1). The essential components of the outcomes structure are:

EGLs. Essential Graduation Learnings are statements describing the knowledge, skills, and attitudes expected of all students who graduate from high school.

GCOs. 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.

KSCOs. Key Stage Curriculum Outcomes provide additional detail for each of the GCOs. There are four Key Stages - Key Stage 1 (K-Grade 3), Key Stage 2 (Grades 4-6), Key Stage 3 (Grades 7-9), and Key Stage 4 (Grades 10-12). Key Stage Curriculum Outcomes provide a means to quickly assess progress in a subject area at the end of a level of schooling.

SCOs. Specific Curriculum Outcomes are statements which describe knowledge, skills, and attitudes, in measurable terms, that students should possess upon completion of a grade level or course, e.g., Grade 3 science, or Webmasters 3224.

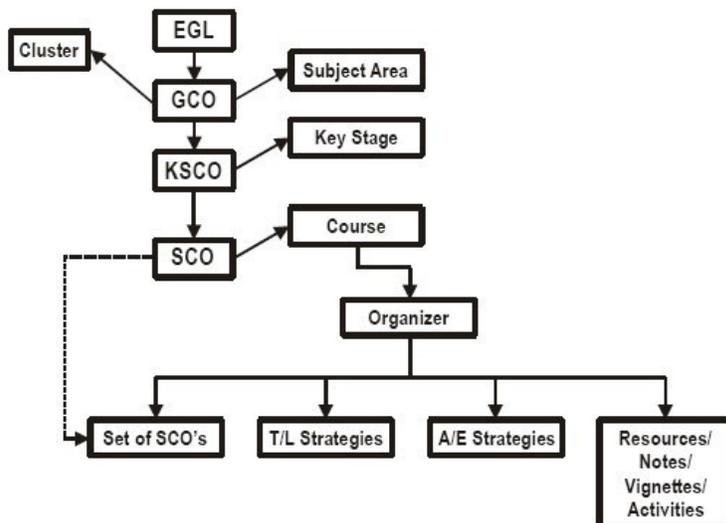


Figure 1

Curriculum Guide Structure

Curriculum Guides are developed for a course of study. This guide contains the SCOs for the Webmasters 3224 course (Chapter 3) and presents other information related to it. Content is presented in four columns that span across two pages. Each set of two pages has an organizer stated at the top. An Organizer may be a topic, or some other statement which is employed to create a discrete component of the course. The

four columns of content include:

1. **Outcomes.** The set is one or more SCOs from the course that will be addressed by the organizer. Each SCO also contains a listing of the KSCOs it directly relates (The related KSCOs are included in brackets). The KSCO(s) would be those for the subject area of the course.
2. **Suggestions for Teaching and Learning.** Teaching / Learning Strategies are recommendations for implementing the curriculum. This section could include Organization and Preparation and Sample Student Projects and Activities sections.
3. **Suggestions for Assessment.** Assessment and Evaluation Strategies are recommendations for determining student achievement. Suggestions are provided to assist the teacher with the evaluation and assessment of student activity.
4. **Resources.** This column provides additional information that may be of help to the teacher in lesson planning. References to teacher and student texts, appendix material, and other resources will be included here.

Technology Education Program

Essential Graduation Learnings

Essential Graduation Learnings are documented in the Outcomes section of the Foundation for the Atlantic Canada Technology Education Curriculum document. The Essential Graduation Learnings (EGLs) are:

Aesthetic Expression. Graduates will be able to respond with critical awareness to various forms of the 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, and mathematical and scientific concepts.

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

Spiritual and Moral Development. Graduates will be able to demonstrate understanding and appreciation for the place of belief systems in shaping the development of moral values and ethical conduct. Reference to the Foundation for the Atlantic Canada

Technology Education Curriculum document is encouraged.

General Curriculum Outcomes

Technology Education curriculum in the Atlantic Provinces is defined in terms of five General Curriculum Outcomes (GCOs). They define the intent and focus of the Technology Education Program and apply from Kindergarten to Grade 12. They are:

GCO 1: Technological Problem Solving. Students will be expected to design, develop, evaluate, and articulate technological solutions.

GCO 2: Technological Systems. Students will be expected to evaluate and manage technological systems.

GCO 3: History and Evolution of Technology. Students will be expected to demonstrate an understanding of the history and evolution of technology, and of its social and cultural implications.

GCO 4: Technology and Careers. Students will be expected to demonstrate an understanding of current and evolving careers and of the influence of technology on the nature of work.

GCO 5: Technological Responsibility. Students will be expected to demonstrate an understanding of the consequences of their technological choices.

Key Stage Curriculum Outcomes

The Key Stage Curriculum Outcomes for Technology Education are listed in the Outcomes section of the Foundation for the Atlantic Canada Technology Education Curriculum document. Key Stage Curriculum Outcomes (KSCOs) expand the intent of the GCOs and summarize what is expected of students during each of the four Key Stages. The Webmasters 3224 course adheres to the KSCOs at the Key Stage 4 level (Grades 10-12).

Key Stage 4 Curriculum Outcomes listed are organized according to each of the five General Curriculum Outcomes (GCOs) for the Atlantic Canada Technology Education Curriculum.

By the end of grade 12, students will have achieved the outcomes for entry to grade 9 (Key Stage 1, Key Stage 2, and Key Stage 3) and will also be expected to:

GCO 1

Technological Problem Solving

1.401 - articulate problems that may be solved through technological means
assess diverse needs and opportunities
construct detailed design briefs that include design criteria and a work schedule

1.402 - conduct design studies to identify a technological solution to a problem

investigate related solutions
document a range of options to solve this problem
determine and justify the best option
determine resource requirements and availability
develop detailed action plans, including technical drawings and sequences of action

1.403 - develop (prototype, fabricate, make) technological solutions to problems
match resources and technical processes for specific tasks
construct and test models and prototypes as needed
construct the solution with adherence to the design criteria
document activities, decisions, and milestones

1.404 - critically evaluate technological solutions and report their findings
develop detailed evaluations of both their own and others' technological solutions, with reference to independently developed criteria
employ a continuous assessment methodology with the purpose of continuous improvement of the design
document and report their changes, the rationale for change, and conclusions

1.405 - communicate ideas and information about technological solutions through appropriate technical means
accurately present technical information by using a representative sample of analog and digital tools

GCO 2

Technological Systems

2.401 - operate, monitor, and adjust technological systems of increasing complexity

2.402 - manage technological systems of increasing complexity

2.403 - modify programming logic and control systems to optimize the behaviour of systems

2.404 - deconstruct complex technological systems into their simpler systems and components

2.405 - troubleshoot and maintain systems

GCO 3

History and Evolution of Technology

3.401 - evaluate technological systems in the context of convergence where one system has multiple functions, or divergence where multiple systems have the same function

3.402 - evaluate the symbiotic roles of technology and science in modern society

3.403 - analyse the symbiotic relationship between technology and education, including factors that influence standards for technological literacy and capability, and ways that the community responds

3.404 - critically evaluate the effects of accelerating rates of technological change on self and society

3.405 - account for effects of cultural diversity on technological solutions

critically examine the effects of cultural diversity on market forces and technological products, and vice versa
incorporate knowledge of cultural diversity into development of technological solutions

GCO 4

Technology and Careers

4.401 - assess and evaluate employability profiles for a variety of workplaces and careers and determine the level of technological literacy and capability they would need to achieve for job entry

4.402 - employ design and invention as tools to create entrepreneurial activity

4.403 - envision their short- and longer-term future and develop a plan for acquiring the technological literacy/capability required to achieve their vision

GCO 5

Technological Responsibility

5.401 - demonstrate responsible leadership in employing legal and ethical rules and principles

5.402 - demonstrate responsible leadership in employing health and safety rules and standards

5.403 - demonstrate responsible leadership in taking proper measures to manage current and future technological risk

Chapter 2

Course Organization

Organization

The Specific Curriculum Outcomes (SCOs) for the Webmasters 3224 course are derived from Key Stage 4 (Grade 10–12) Key Stage Curriculum Outcomes (KSCOs). The SCOs are organized into seven units:

Unit 1: Introduction to the Internet and its Technologies

Unit 2: Elements and Principles of Web Site Design

Unit 3: Web Based Multimedia

Unit 4: Web Server Management

Unit 5: Programming for the Web

Unit 6: Ethical Issues

Unit 7: Careers

Besides the listing of SCOs, each Unit has Suggested Teaching/Learning Strategies, Assessment/Evaluation Strategies and Resources listed for each topic that are designed to provide introductory material for the teacher and foster lesson preparation.

Unit 1

Introduction to the Internet and its Technologies

Unit 1 provides a focus on the physical and functional structure of the Internet itself. Though many students have likely been using the Internet for several years, much of this essential information will be new to them. These outcomes form the basis for students to begin designing and developing their own web pages.

All of the Specific Curriculum Outcomes (SCOs) for the Webmasters 3224 course are listed. The Key Stage Curriculum Outcome(s) the SCO it relates to are included at the end of each SCO statement, included in the brackets. Refer to the *Key Stage Curriculum Outcomes* in Chapter 1.

Unit 1 has ten (10) SCOs. Students are expected to:

- 1.1 trace the historical development of the Internet [3.401]
- 1.2 differentiate the physical and the logical components of the Internet [3.403, 2.404]
- 1.3 define the terminology associated with the World Wide Web [2.404]
- 1.4 demonstrate use of logical components of the World Wide Web [2.404, 3.404]
- 1.5 describe the logic and use of Internet search engines [2.404]
- 1.6 demonstrate the strengths and weaknesses of various search engines [2.404]
- 1.7 analyze search engine results to determine authority and relevancy [2.404]
- 1.8 construct a web page using hypertext mark up language tags [1.402, 1.403]
- 1.9 investigate the use of web site management tools in designing and maintaining web sites [2.404]
- 1.10 create, modify web pages using graphical editors [1.402, 1.403]

Unit 2

Elements and Principles of Web Site Design

Unit 2 provides a focus on the theory and practice of graphic design as it pertains to web pages. Students will develop skills both through their own design work and the critical evaluation of the work of others.

Unit 2 has six (6) SCOs:

- 2.1 investigate the history of graphic communication [3.401]
- 2.2 recognize the elements and principles of graphic design [2.404]
- 2.3 utilize the computer technology tools available in graphic design [1.405, 2.404]
- 2.4 investigate the design process as a problem solving strategy [1.401]

2.5 model the design process by planning and constructing a web site that forms the basis of a design portfolio [1.401, 1.402, 1.403, 1.404, 1.405]

2.6 critique web sites in terms of the elements and principles of web site design [1.404]

Unit 3

Web Based Multimedia

Unit 3 provides a focus on the many varied types of multimedia found on the Web today, how to develop some types of multimedia, and how to integrate them into their own sites.

Unit 3 has three (3) SCOs:

3.1 identify the different types of web based multimedia [2.404]

3.2 investigate the nature and uses of web based multimedia [2.404]

3.3 utilize the computer technology tools available in design and production of web based multimedia [1.405, 2.404]

Unit 4

Web Server Management

Unit 4 provides a focus on the purposes, setup and maintenance of a Web Server.

Unit 4 has four (4) SCOs:

4.1 define the terminology associated with the Internet server environment [2.404]

4.2 examine the role of IP routing in the functioning of the Internet and an intranet [2.404]

4.3 research the differences between an intranet and the Internet [2.404]

4.4 demonstrate the setup and maintenance of a web server package [2.405, 2.404, 2.401]

Unit 5

Programming for the Web

Unit 5 Provides a focus on the design and development of data-driven web sites that provide interactivity and access to dynamic content. Students will learn any of several widely used programming languages and specifications to create sites of this type.

Unit 5 has nine (9) SCOs:

5.1 differentiate between static and dynamic web content [2.404]

5.2 distinguish between client-side and server-side scripting [2.404]

5.3 compare current scripting languages [2.403]

5.4 model the principles of effective data design [2.404, 1.403]

5.5 demonstrate using a web interface to manipulate data in a database [2.401, 2.404, 2.405, 1.403]

5.6 construct a web application that will solve a unique data management problem [1.405, 2.401, 2.404, 4.402]

5.7 apply performance testing procedures to evaluate the solution [1.402]

5.8 establish a plan to maintain data integrity and security [5.403, 2.404]

5.9 engage in idea generating strategies to identify possible solutions [1.402]

Unit 6

Ethical Issues

Unit 6 provides a focus on the ethical issues that students will encounter when exploring the Internet itself and developing their own sites and content.

Unit 6 has two (2) SCOs:

6.1 research ethical issues associated with the internet [5.401, 3.404]

6.2 demonstrate ethical practices and societal expectations in web design [5.401, 3.405]

Unit 7

Careers

Unit 7 provides a focus on the exploration of careers related to the many facets of Internet Technology.

Unit 7 has one (1) SCO:

7.1 investigate careers in the area of web technology [4.401, 4.403]

Chapter 3

Course Components, Outcomes and Strategies

Overview

This course, like all technology education curricula, is based primarily on a technological problem solving strategy called design. Design, by definition, is a purposeful activity resulting in the development of solutions to human needs and wants. It applies technological resources and technical methods. Webmasters 3224 is comprised of 7 units:

Unit 1 - Introduction to the Internet and its Technologies

Unit 2 - Elements and Principles of Web Site Design

Unit 3 - Web Based Multimedia

Unit 4 - Web Server Management

Unit 5 - Programming for the Web

Unit 6 - Ethical Issues

Unit 7 - Careers

The Units are designed to be delivered in sequential order. However, many teachers may wish to incorporate the outcomes of Units 6 and 7 throughout the preceding units, as opposed to dealing with them in isolation, since discussions of Ethical Issues and Careers may be relevant at many points in those units.

Since the effective delivery of this course depends to a very great extent on the expertise of the teacher, this curriculum guide is intended to be flexible and adaptable where it concerns the technologies to be used. Teachers are encouraged to learn new skills just as their students are, but it is also desirable to work to one's strengths within the confines of the stated outcomes. For example, in **Unit 2** teachers could meet those outcomes using a modern software package available to them with which they have previous experience. Likewise, in **Unit 5**, the outcomes can be met using any one of several powerful and widely used programming languages, including ASP, PHP, CGI, or others.

This course does not have a textbook, since the Internet itself is a vast database of resources, tutorials, and information on any of the outcomes.

Time Allocation

Webmasters 3224 is a 2-credit course. Suggested time allocations are as follows:

Unit 1 – 10%

Unit 2 – 20%

Unit 3 – 20%

Unit 4 – 10%

Unit 5 – 30%

Unit 6 – 5%

Unit 7 – 5%

Unit 1 – Introduction to the Internet and its Technologies	
Unit 1 Outcomes	Suggestions for Teaching and Learning
Webmasters 3224	
Students will be expected to	
1.1 trace the historical development of the Internet	<p>Points to Emphasize:</p> <ul style="list-style-type: none"> • The Internet was originally a military project used for defense purposes. • In the late 1960s, the Advanced Research Projects Agency (ARPA) launched the first parts of what would become the Internet, the ARPAnet. • The ARPAnet was expanded in the 1970s, when universities and companies were allowed to use it • Other unaffiliated networks popped up, such as BITNET (1981) and Usenet (1984). Commercial networks like CompuServe and America Online also began drawing customers. • A major movement related to the Internet was toward open commercial use. Business was a significant driving force behind research and innovation. • In 1993, a group of students created Mosaic, a software tool for browsing the Internet. Once Mosaic was released, the Internet became accessible to anyone with a personal computer. <p>Typical Student Activities:</p> <ul style="list-style-type: none"> • Timelines may be used to organize and sequence major events, inventions, and developments. • Major developments may be highlighted and detail provided about them. • Developments have been growing exponentially, especially with regard to the WWW. Students could consider addressing a short period of recent history (i.e., the last 12 months) and identifying developments that occurred in that time period.

Suggestions for Assessment	Resources
<ul style="list-style-type: none"> • Online research on such topics as ARPAnet, MILNET, BITNET, Usenet, TCP/IP, and early web browsers. • Development of a timeline highlighting the major milestones in the historical development of the Internet. • Production of a report that highlights some of the major developments that led to the Internet as it is today. 	<ul style="list-style-type: none"> • A Brief History of the Internet: http://www.internetsociety.org/internet/what-internet • Hobbes' Internet Timeline: http://www.zakon.org/robert/internet/timeline/

Unit 1 Outcomes	Suggestions for Teaching and Learning
Webmasters 3224	
Students will be expected to	
<p>1.2 define the terminology associated with the Internet</p> <ul style="list-style-type: none"> i) Bandwidth ii) Blog / Weblog iii) Browser iv) Chat v) Client vi) Domain name vii) Email viii) FTP ix) HTML x) HTTP xi) Internet xii) ISP xiii) Hyperlink xiv) Modem xv) News group xvi) Search engine xvii) Spam xviii) Spyware / adware xix) URL xx) Web cam xxi) Web page xxii) Web site xxiii) World Wide Web xxiv) Virus 	<p>Points to Emphasize:</p> <ul style="list-style-type: none"> • In defining these terms, students should be aware that many may have multiple definitions and that they should choose the one that is applicable to the technology being discussed. • Also, where the term is an acronym, students should discover not only what the letters stand for, but what the term means. <p>Typical Student Activities:</p> <ul style="list-style-type: none"> • Teachers should look for clarity and conciseness in the definitions. • Students should demonstrate understanding of the many acronyms in use, beyond simply knowing what the letters stand for.

Suggestions For Assessment	Resources
<ul style="list-style-type: none"> • Definition of the above terms and suggestions of other terms of importance. • Development of a glossary of important terms relating to the Internet. • Development of a report outlining the dangers of the Internet and how to avoid them. 	<p>There are many very useful online reference sites for technology related terms and concepts. The following are among the most popular.</p> <ul style="list-style-type: none"> • Whatis.com – http://www.whatis.com • Webopedia.com – http://www.webopedia.com • Wikipedia.com – http://www.wikipedia.com

Unit 1 Outcomes	Suggestions for Teaching and Learning
Webmasters 3224	
Students will be expected to	
<p>1.3 differentiate the physical and logical components of the Internet.</p> <p>1.4 demonstrate use of logical components of the World Wide Web</p>	<p>Points to Emphasize:</p> <ul style="list-style-type: none"> • The Internet is a worldwide system of computer networks - a network of networks in which users at one computer can get information from another computer. • What most people think of when referring to the Internet is the <i>World Wide Web</i> (WWW) – the collection of web pages created with HTML that you view in a browser. However, the term WWW is not synonymous with the Internet. • The WWW is actually only one of the data systems providing the services that make up the Internet. The others include Email, FTP, Chat, Newsgroups, Telnet, and videoconferencing. These data systems are collectively known as the Logical Components of the Internet. • The Physical Components of the Internet are those actual devices and hardware that allow the logical components to function and make up the <i>infrastructure</i> of the Internet. They include servers, personal computers, modems, routers, cables, and much more. <p>Typical Student Activities:</p> <ul style="list-style-type: none"> • Students should be able to identify the major services (listed above) available on the Internet and examples of software and hardware required for their use. For example, a chat session using both audio and video capability would require a computer connected to the Internet, instant messaging software, a web cam, a microphone, and speakers. • Students should demonstrate they understand logical components as being the functions of the Internet, and physical components as being the necessary physical devices to make the system work.

Suggestions For Assessment	Resources
<ul style="list-style-type: none"> • Development of a report outlining the distinctions between the physical and logical components of the Internet. • Development of a graphical presentation illustrating the major logical and physical subsystems of the Internet • Use of a browser to access WWW resources by typing a URL and/or by clicking on hyperlinks. • Use of an email client to send email messages, as well as replying, forwarding, and sending attachments. • Use of news reader software to access specific information in a newsgroup. • Use of a FTP client to transfer files. • Use social networking sites to participate in real-time chat sessions using text-only, audio-only, and/or audio-video. 	<ul style="list-style-type: none"> • HowStuffWorks – http://www.howstuffworks.com • Software: <ul style="list-style-type: none"> • Mozilla Suite: Includes Firefox Browser, Thunderbird email client, chat client, news reader, calendar, address book, and HTML Editor. http://www.getfirefox.com • OpenOffice.org productivity suite. Free package including word processing, spreadsheet, HTML Editor, presentation, drawing. http://www.openoffice.org • Microsoft Internet Explorer / Outlook Express • Twitter • Facebook • Skype • WS_FTP – free for educational use.

Unit 1 Outcomes	Suggestions for Teaching and Learning
Webmasters 3224	
Students will be expected to	
<p>1.5 describe the logic and use of Internet search engines</p> <ul style="list-style-type: none"> i) search engine ii) spider iii) indexer iv) algorithm v) query vi) accuracy vii) authority viii) objectivity ix) coverage x) currency 	<p>Points to emphasize:</p> <ul style="list-style-type: none"> • A search engine is an online program that searches the Internet for specific keywords and/or phrases. The results are returned in the form of a list of resources in which those keywords and phrases can be found. • Most search engine use programs called spiders that retrieve documents from the web. Another program called an indexer reads each document and creates a searchable index stored in a database. When users enter a query into a search engine, they are actually searching through this stored index. Finally, an algorithm unique to each search engine is used to rank results according to what the user is most likely looking for.
<p>1.6 analyze search engine results to determine authority and relevancy</p>	<ul style="list-style-type: none"> • Properly composing the query given to the search engine is the most important step in getting relevant results. To use search engines effectively, it is essential to apply techniques that narrow results and push the most relevant pages to the top of the results list. In general, the more specific the query is, the fewer results will be returned and the more relevant they will be. • Even with a very specific query, it is still possible for a search engine to return a huge number of results (for example, as of this writing the search engine Google indexes over 8 billion web pages). With this in mind it is important to make judgments about the authority and relevancy of the results. This judgment can be based on five criteria: <ul style="list-style-type: none"> • Accuracy – Is the information reliable and error-free • Authority – Is the author an expert in the subject? • Objectivity – Does the information show bias? Is it meant to sway opinion? • Coverage – Is the topic completely covered? Is there information that cannot be found elsewhere? • Currency – When was the page created / updated?
	<p>Typical Student Activities:</p> <ul style="list-style-type: none"> • Students should be able to adjust and improve a search query in order to narrow down the results. • When searching, ask students to record their search query and the number of hits returned so that this information can be compared among the class. • Students should be able to distinguish between advertising and information on a web page, as opposed to taking any information at face value.

Suggestions For Assessment	Resources
<ul style="list-style-type: none"> • Demonstration of the use of a variety of search engines by locating specific resources or answering specific questions on the WWW. • Development of a chart illustrating the various techniques used to improve search engines queries, such as the use of Boolean terms or phrase searches. • Demonstration of the use of techniques to compose an effective search query such as determining keywords, Boolean terms, and phrase searches, among others. • Development of a report providing a comparison of a variety of search engines. • Development of a chart to evaluate a variety of web sites based on the five evaluation criteria. 	<ul style="list-style-type: none"> • Why Evaluate Web Sources? - http://lib.nmsu.edu/instruction/eval.html • The Media Awareness Network - http://www.media-awareness.ca/english/index.cfm

Unit 1 Outcomes	Suggestions for Teaching and Learning
Webmasters 3224	
Students will be expected to	
<p>1.7 construct a simple web page using hypertext markup language (HTML)</p>	<p>Points to emphasize:</p> <ul style="list-style-type: none"> • HTML is short for HyperText Markup Language, the language used to create documents (web pages) on the World Wide Web. • HTML defines the structure and layout of a Web document by using a variety of tags and attributes. <ul style="list-style-type: none"> • A tag is a command inserted in a document that specifies how the document, or a portion of the document, should be formatted. • An attribute is a characteristic used to add additional information to a tag. • There is an extensive array of tags used to format and layout the information in a Web page. Comprehensive lists are available from a variety of sources. • CSS refers to Cascading Style Sheets, a feature added to HTML that gives both Web site developers and users more control over how pages are displayed. With CSS, designers and users can create style sheets that define how different elements, such as headers and links, appear. These style sheets can then be applied to any Web page. <p>Typical Student Activities:</p> <p>Activities should allow students to develop:</p> <ul style="list-style-type: none"> • Their ability to use a variety of HTML tags and their attributes. • Their ability to troubleshoot, identify, and correct errors in their HTML. • The functionality of the web pages created. • The visual design of the web pages created. • Their ability to use CSS to apply formatting rules to multiple web pages.

Suggestions For Assessment	Resources
<ul style="list-style-type: none"> • Development of basic web pages using a simple text editor, such as MS NotePad. • Development of web pages that make use to a variety of fonts and colors, as well as images, hyperlinks, and tables. • Development of a web page that contains a list of tags and their attributes to be used in the future as a reference. • Development of small web sites on a given topic that use CSS for their visual design and formatting. • Development of a website for a “client”, such as a school team or club. 	<p>The following websites are among the most useful and comprehensive online resources on these and other web development topics.</p> <ul style="list-style-type: none"> • HTMLGoodies – http://www.htmlgoodies.com • WebMonkey – http://www.webmonkey.com • HTML Primer – http://www.htmlprimer.com • World Wide Web Consortium - http://www.w3.org/

Unit 1 Outcomes	Suggestions for Teaching and Learning
Webmasters 3224	
Students will be expected to	
<p>1.8 investigate the use of web site management tools in designing and maintaining web sites</p> <p>1.9 create and modify web sites using graphical editors.</p>	<p>Points to emphasize:</p> <ul style="list-style-type: none"> • Website management tools, such as Adobe DreamWeaver, Microsoft FrontPage, NVU, and others, can take a great deal of work out of designing and developing web sites. These tools are designed to allow developers with a minimal knowledge of HTML to produce a professional looking website that is both functional and visually appealing. • The tools mentioned above, and others as well, are WYSIWYG (what you see is what you get) web page editors. This means that web pages can be created in much the same fashion as documents in a word-processor. The user does not have to know HTML in order to create web pages, though it is often helpful. • In addition to creating web pages, these tools also allow the user to manage an entire website by keeping track of all of the files that compose it and perform operations that can affect the website as a whole instead of a single page at a time. <p>Typical Student Activities:</p> <ul style="list-style-type: none"> • Activities should be evaluated based on the students' ability to use the tool to both create and manage web sites. • Students should be able to use the interface effectively and determine the proper course of action if initially something does not work correctly.

Suggestions For Assessment	Resources
<ul style="list-style-type: none">• Development of a web page report illustrating the use and function of a website management tool.• Development of a web page illustrating a side by side comparison of two or more website management tools.• Use of a WYSIWYG graphical HTML editor to design, develop and manage web pages and web sites.	<p>Full, trial, or free versions of software are available at these sites, as well as tutorials and sample work.</p> <ul style="list-style-type: none">• http://www.dreamweaver.com• http://www.nvu.com• http://www.microsoft.com/frontpage

Unit 2 – Elements and Principles of Web Site Design	
Unit 2 Outcomes	Suggestions for Teaching and Learning
<i>Webmasters 3224</i>	
Students will be expected to	
2.1 investigate the history of graphic communication	<p>Points to emphasize:</p> <ul style="list-style-type: none"> • Graphic design is as old as civilization. The development of written language involved a process of graphic design, as scribes agreed that symbols would represent words or sounds. Over time, these symbols were refined, clarified, simplified, and standardized. • Cave paintings have been found dating back 30,000 years. The earliest examples of writing are over 9000 years old. The Egyptians used hieroglyphics as long as 6000 years ago, and the earliest books date to 9th century China. • Cultures throughout history have appreciated the visual aspects of their written language. In Chinese, Japanese, and Islamic cultures, calligraphy is considered an art form • The invention of the printing press in the 15th century made it possible to create printed materials that could be reproduced and widely distributed. It became necessary to decide exactly how the materials would look. • Today, computer users can select fonts and create documents that look typeset, producing desktop publications such as newsletters and brochures. With the dramatic expansion of the WWW, the computer has also become an exciting new place for design. • Design for the WWW draws on such traditional models as posters, magazine layout, and advertising. To these it adds the potential for motion and interactivity. • Many web sites take the form of succeeding pages. This way of presenting information is deeply rooted in our way of thinking, since we have been storing information on pages in books for almost 1000 years. <p>Typical Student Activities:</p> <ul style="list-style-type: none"> • Time lines may be used to organize and sequence major events, inventions, and developments. • Major developments may be highlighted and detail provided about them. • Developments have been growing exponentially, especially with regard to the WWW. Students could consider addressing a short period of recent history (i.e., the last 12 months) and identifying developments that occurred in that time period.

Suggestions For Assessment	Resources
<ul style="list-style-type: none">• Completion of an online search for information on such topics as cave paintings, scribes, the printing press, movable type, typography, publishing, calligraphy.• Development of a timeline highlighting the major milestones in the history of graphic communication.• Production of a webpage report that highlights some of the major developments that led to modern graphic design.• Production of a report that draws comparisons between the designs of print publishing and online publishing.	

Unit 2 Outcomes	Suggestions for Teaching and Learning
Webmasters 3224	
Students will be expected to	
<p>2.2 recognize the elements and principles graphic design</p> <ul style="list-style-type: none"> i) Colour ii) Line iii) Mass iv) Movement v) Space vi) Texture vii) Typography viii) Balance ix) Contrast x) Direction xi) Economy xii) Emphasis xiii) Proportion xiv) Rhythm xv) Unity xvi) Value <p>2.3 critique web sites in terms of the elements and principles of web site design</p>	<p>Points to emphasize:</p> <p>The Elements of Design create and define every object.</p> <ul style="list-style-type: none"> • Colour: A light wavelength found in the spectrum, ranging from red to yellow, green, blue and back to red. • Line: A point in motion with a single dimension - length. A line has position and direction in space. Points create lines; lines create shapes and volume. • Mass: A solid body or a grouping of visual elements (line, color, texture, etc.) that compose a solid 2D or 3D form. • Movement: The act or process of changing place, direction, orientation, and/or position through the visual illustration of starting or stopping points, blurring of action, etc. Distinct from animation. • Space: A 2- or 3D element defined by other elements. • Texture: A technique used in 2D design to replicate 3D surfaces through drawing techniques. • Typography: The art of selecting and arranging type. <p>The Principles of Design format the elements of design.</p> <ul style="list-style-type: none"> • Balance: The elements converge to create an arrangement of parts with equilibrium. • Contrast: When an element is placed in a format, contrast is created among the elements. It is emphasized by contrast in size, shape, color, texture, etc. It offers variety within a visual format. • Direction: Use of movement to create the visual illusion of displacement. • Economy: Simplicity in design - when the subject is more important than the elaboration of design elements. • Emphasis (dominance): Exists when elements within a format contain a hierarchy of visual importance. • Proportion: A 2 or 3D element defined by other elements of design. • Rhythm: A recurrence or repetition of one or more elements within a visual format, creating harmony. • Unity: Completeness with the use of all visual elements within a format. • Value: Another word for the lightness or darkness of an area - measured on a graded scale from white to black. <p>Typical Student Activities:</p> <ul style="list-style-type: none"> • Examples of the various elements and principles of graphic design can be found almost anywhere including in newspapers, magazines, television, and online. • Students' reports can take the form of webpages, written reports, presentations, etc. • Practice in creating examples can be completed using software or pencil and paper since at this point the emphasis is on understanding and distinguishing between the elements and principles of design. • Teachers should look for clarity and conciseness in explanations

Suggestions For Assessment	Resources
<ul style="list-style-type: none">• Development of a report providing visual examples of each of the elements and principles with an explanation of how each is present.• Creation of visual formats demonstrating each of the elements and principles.• Critical evaluation of webpages or other media in terms of their use of the elements and principles of graphic design.	

Unit 2 Outcomes	Suggestions for Teaching and Learning
<i>Webmasters 3224</i>	
Students will be expected to	
<p>2.4 utilize the computer technology tools available in graphic design</p>	<p>Points to Emphasize:</p> <ul style="list-style-type: none"> • A wide variety of software tools are available for the purposes of graphic design which are categorized according to their function: <ul style="list-style-type: none"> • Paint or Bitmap • Technical Drawing • Illustration • 3D Rendering • Image Capture, Conversion, and Enhancement • File Compression • Choosing the appropriate tools for graphic production is essential. Considerations in making this choice include the purpose of the graphic; the presentation medium; special characteristics such as animation or 3D effects; time required to complete the task; the tools and software available. • File formats are the data encryption techniques used to save the data in computer memory to a file on disk. Each software program usually has one or more unique file formats for storing its own data. Two common file formats used on the web are: <ul style="list-style-type: none"> • JPG - designed to handle photographic style images. • GIF - useful for non-photographic type images with fewer than 256 colors. • The outcomes of this course can be met using any of a number of software tools. Some of the most popular are: <ul style="list-style-type: none"> • Adobe PhotoShop – though expensive, it is the industry standard for graphics production. • PaintShop Pro – a popular tool due to its functionality, ease of use, and relatively low cost. • The GNU Image Manipulation Program (GIMP) – An alternative to commercial products since it is OpenSource and can be downloaded, installed, and distributed for free. • Macromedia Flash – industry standard tool for creating web-based animation. • Microsoft GIF Animator – free tool to develop simple animated GIF files. <p>Typical Student Activities:</p> <ul style="list-style-type: none"> • Activities should allow students to expand their ability to: Use software to accomplish a given task • Create graphics that effectively demonstrate use of the elements and principles of graphic design. • Create graphics that effectively communicate a desired message.

Suggestions For Assessment	Resources
<ul style="list-style-type: none">• Selection of a task that is to be executed through the use of a particular software application.• Determination of the most logical sequence of actions and steps in each action to accomplish the task.• Selection of a software application that can be used for the task and determination of how well it allows the accomplishment of that task.• Production of graphics for use on a web page that demonstrate knowledge of the elements and principles of graphic design.	<ul style="list-style-type: none">• Graphic Design Basics http://www.graphicdesignbasics.com.• Official site of the GNU Manipulation Program (GIMP) –http://www.gimp.org.

Unit 2 Outcomes	Suggestions for Teaching and Learning
Webmasters 3224	
Students will be expected to	
<p>2.5 investigate the design process as a problem solving strategy</p> <p>2.6 model the design process by planning and constructing a web site that forms the basis of a design portfolio</p>	<p>Points to Emphasize:</p> <ul style="list-style-type: none"> The previous outcomes focused on aspects of <i>graphic design</i> in the sense of the development of visual graphics for use on the WWW. Students looked at elements and principles of visual design, as well as some of the tools employed in the process. However, <i>design</i> has a much broader meaning than this. It is really a specific strategy for solving technological problems. <div data-bbox="803 535 1247 934" data-label="Diagram"> <pre> graph TD IR[Investigate Research] --> GO[Generate Options] GO --> SBO[Select Best Option] SBO --> DS[Develop Solution] DS --> ER[Evaluate Redesign] ER --> IR DB[Design Brief] --> GO DB --> IR </pre> </div> <ul style="list-style-type: none"> Design, by definition, is a purposeful activity resulting in the development of solutions to human needs and wants. It consists of the thinking and doing processes involved in the creation of a solution. It applies technological resources and technical methods. The Design Process Model employed is illustrated above. A Design Portfolio is a diary of work performed. It is not a collection of the best work. It is intended to show a glimpse of the thinking processes of the design team, as well as document what the members did, why the members did it, what worked, what did not, and the relative success of the final product. <p>Typical Student Activities:</p> <ul style="list-style-type: none"> Student activities for the design process would be encapsulated in a worked example of the design process that follows the development of a website. The process should follow the development of a website that solves a communication or information management problem.

Suggestions For Assessment	Resources
<ul style="list-style-type: none"> • Creation of a design brief leading to the development of a small brochure-type website on a chosen topic. • Design and creation of visual graphic products that demonstrate effective use of the elements and principles of graphic design and communicate a desired message. • Design and development of websites in small groups with team members alternately playing the roles of client and developer. 	<ul style="list-style-type: none"> • Graphic Design Basics – http://www.graphicdesignbasics.com • HTMLGoodies reference website - http://www.htmlgoodies.com • WebMonkey graphic design and website development reference website http://www.webmonkey.com. • Tutorials available at http://www.w3schools.com

Unit 3 – Web-Based Multimedia	
Unit 3 Outcomes	Suggestions for Teaching and Learning
Webmasters 3224	
Students will be expected to	
3.1 identify the different types of web based multimedia	<p>Points to emphasize:</p> <ul style="list-style-type: none"> • An interactive computer/web presentation that includes the following elements: text, sound, graphic images, video, and animation. • The combined use of media, such as television, radio, print, and the Internet, as for advertising or publicity. • Elements are optimized in such a way that quality is high while minimizing download time. • Identify the appropriate type of file format to use for a particular multimedia element <p>Typical student activities:</p> <ul style="list-style-type: none"> • Identify web graphic formats <ul style="list-style-type: none"> • Graphics File Formats: Introduction to the various standard file formats for graphics such as BMP, WMF, TIFF, GIF, JPG, etc. • Explain the features and use of the GIF format • Explain the features and use of the JPEG format • Explain the features and use of the PNG format • Recognize the importance of resolution and image size on web graphics • Convert and export images <ul style="list-style-type: none"> • Image Editing: Image capturing from AVI files. Various aspects of editing (retouching, filtering, special effects, etc.) using appropriate software. • Create transparent GIFs and animated GIFs • Create an image map • Create sound, video, and animation for a web site <ul style="list-style-type: none"> • Sound Files: Sound file formats. Recording and editing wave files. Adding special effects. • Movie Files: Movie file formats (.avi,mvi,etc.). Editing .avi files. Adding special effects. • Video Capture: Capturing Video Tape input into avi files. • Optimize sound, video, and animation for web delivery

Suggestions For Assessment	Resources
<ul style="list-style-type: none"> • Define multimedia and relate its components to traditional presentation techniques. • Demonstrate knowledge of the hardware and software underlying the components of multimedia. • Demonstrate knowledge of text, graphics, sound, video, animation, and the corresponding software. • Identify the system resources required for various types of multimedia presentations. • Know how to handle different types of file extensions and how to convert them. 	<ul style="list-style-type: none"> • Several free and commercial software packages that meet a variety of needs have been listed previously in this document. • Documentation, tutorials, and working samples are also widely available from many of the sources listed above.

Unit 3 Outcomes	Suggestions for Teaching and Learning
Webmasters 3224	
Students will be expected to	
3.2 investigate the nature and uses of web based multimedia	<p>Points to emphasize:</p> <ul style="list-style-type: none"> • People retain: 20% of what they see; 30% of what they hear; 50% of what they see and hear; 80% of what they see, hear and experience. • Multimedia is changing the world: convergence (mass media), education, electronic publishing, telecommuting, home shopping, and business • Highlight examples of Multimedia: visual modeling, multimedia encyclopedias, teaching materials for children with disabilities on-line training, simulations, games, museum tours, etc. <p>Typical student activities:</p> <ul style="list-style-type: none"> • Discuss examples of jobs in which multimedia has or will become an important function. • Discuss five ways in which multimedia is changing the world in which we live. • Discuss the pros and cons of online shopping. • Discuss how home telecommuting has an impact on the way we work. • Comment on the development of Internet based films and television shows.

Suggestions For Assessment	Resources
<ul style="list-style-type: none">• Development of a rubric for the analysis of a web site, its content and multimedia elements• Conduct research to discover where to obtain specific multimedia resources on the World Wide Web.• Develop a research report on the current copyright laws concerning multimedia.	<ul style="list-style-type: none">• T.H.E. Journal is an online magazine devoted to a variety of topics in k-12 educational technology. http://www.thejournal.com/

Unit 3 Outcomes	Suggestions for Teaching and Learning
Webmasters 3224	
Students will be expected to	
<p>3.3 utilize the technology tools available in design and production of web based multimedia</p>	<p>Points to emphasize:</p> <ul style="list-style-type: none"> • Constructing digital elements can take many forms and employ many different hardware (digital camera) and software (Flash, PhotoShop, etc.) tools. • Developing multimedia requires considering the purpose and use of the content in question. • Websites can be improved through the use of multimedia, but it must also be reinforced that its overuse or inappropriate use can detract from the usability of a site. <p>Typical student activities:</p> <ul style="list-style-type: none"> • Creating a digital “art work” with drawing and painting software • Using music software (such as the open source Audacity software) to compose and/or edit audio samples. • Writing poems, stories and other written works using word processing software • Taking and editing digital photos • Creating digital photo albums and/or multimedia galleries.

Suggestions For Assessment	Resources
<p>Suggestions include:</p> <ul style="list-style-type: none"> • Design, develop and demonstrate a multimedia presentation • Produce a multimedia tour of your school; include interactive visits to various areas in the school and student activities. • Create an interactive web site in which the user is presented with choices. The subject should be something that is in the common domain so that the emphasis is on the software tool, not on the content. Some examples might be movies, musicians, shows, TV, baseball cards, recipes, resorts, poetry, art, sports and popular magazines. Features include text, color, graphics, still and moving images, visible and invisible linking buttons, digitized sound output, and animation. The completed work should take a user from 10 to 15 minutes from beginning to end. 	<ul style="list-style-type: none"> • Audacity – free Audio Editor and Recorder http://audacity.sourceforge.net/ • OpenOffice.org – free productivity suite including word processing, HTML and film compositing, editing editing, and drawing software and special effects system http://www.openoffice.org • Jahshaka.org – free video http://www.jahshaka.org

Unit 4 – Web Server Management	
Unit 4 Outcomes	Suggestions for Teaching and Learning
Webmasters 3224	
Students will be expected to	
<p>4.1 define the terminology associated with the Internet server environment</p> <ul style="list-style-type: none"> i) http ii) ftp iii) html iv) dns v) client-side vi) server-side vii) scripts viii) network interface card ix) physical media x) throughput xi) switch xii) services xiii) server xiv) gateway xv) router / routing xvi) broadband xvii) addressing xviii) protocols xix) operating system 	<ul style="list-style-type: none"> • The Internet server environment is composed of both software and hardware devices. Computers, servers, routers, switches and communication media are supported with operating systems, network operating systems, protocols, web services, and routing software. • The best way to teach this section is tracing the route that information travels. A simple example is a request for information from a web browser using http. The request is processed by the computer, which due to the request sends it out over the network interface card via some media, then processed by all intervening or internal network devices which send it properly to the gateway device. The gateway device determines, using the destination of the request and routing information, where to go from here. Each intervening router or routing device will pass the request on until it runs out of time or reaches its destination. <p>Typical student activities:</p> <ul style="list-style-type: none"> • Definition of terms listed above. • Development of a graphical representation of the information path with all significant parts identified. This should include typical situations; school-based networks, business-based networks, home-based networks.

Suggestions For Assessment	Resources
<ul style="list-style-type: none"> • A formal definition test in this area is indicated. Use of the suggested terms above as base is suggested. • Identify points in the information path where decisions are made and by what device. • Demonstrate knowledge how devices make the information path decisions they make. 	<ul style="list-style-type: none"> • HowThingsWork.com provides detailed discussions of how a wide variety of systems function. http://www.howthingswork.com • Software Examples: Microsoft Visio(or any other graphics program with similar templates and stencils) OpenOffice Impress MS PowerPoint Corel Presentations (or other presentation software) • Fluke Network Inspector • The Internet Maniac

Unit 4 Outcomes	Suggestions for Teaching and Learning
Webmasters 3224	
Students will be expected to	
<p>4.2 examine the role of IP routing in the functioning of the Internet and intranet</p>	<p>Points to emphasize:</p> <ul style="list-style-type: none"> • IP stands for Internet Protocol and is part of the entire networking protocol list. A networking protocol is a formal description of a set of rules and conventions that govern how devices on a network exchange information. The main protocol for the Internet is IP, with all devices on these networks requiring IP addresses to be recognized and to function. • IP is a hierarchal addressing system using 32-bit binary numbers. These binary numbers are grouped in octets, with some of them representing the network portion of an address and some of them representing the host portion of an address. They are read left to right. The <i>class</i> of the address is determined by how many octets are used in the network portion of an address. There are three main classes of addresses which are given for information only, A, B, and C. Class A would use only the first octet for the network portion, B the first and second and C the first, second and third. For the most part the class C address will be our main study. • Consider the example of a request for information from a web browser using http. The request is processed by the computer, which due to the request sends it out over the network interface card via some media, (in the IP case the IP address is analyzed first by the computer and sent out onto the network if it does not “see” where it is itself) then processed by all intervening or internal network devices which send it properly to the gateway device (the IP address is analyzed along the way and only sent to the gateway if it is found the network address is different than the current address). The gateway device determines, using the destination of the request and routing information, where to go from here (the gateway device will either send it along a static route, or recognizing the destination network send it directly to that one). Each intervening router or routing device will pass the request on until it runs out of time or reaches its destination (as in all previous cases the routers will search their tables for the destination network IP address, if it is found they will send the request directly to that address). <p>Typical student activities:</p> <ul style="list-style-type: none"> • Research how IP addresses are assigned and by whom. • Note the differences in the classes of IP address. Identifying the main differences and how each class has been designated to be recognized. (in the first octet, class A start with a 0 bit, 0-127 decimal, class B start with 10 bits, 128-191 decimal, class C with 110 bits, 192 -223 decimal.) • Design an exercise or activity to explain how IP or hierarchal addressing works.

Suggestions For Assessment	Resources
<ul style="list-style-type: none"> • Identify the organization in charge of assigning Internet Protocol Addresses. • Demonstrate the method for showing and changing an IP address on a desktop computer. • From an IP address, extrapolate from the size of the address pool as to the size of the organization which will utilize it. • Assessment of the student design above for relevancy and accuracy. 	<ul style="list-style-type: none"> • Terms reference: http://www.webopedia.com • IP addressing and subnetting: http://www.cisco.com • Software examples <ul style="list-style-type: none"> - winipcfg / ipconfig - The Internet Maniac

Unit 4 Outcomes	Suggestions for Teaching and Learning
Webmasters 3224	
Students will be expected to	
4.3 research the differences between an intranet and the Internet	<p>Points to emphasize:</p> <ul style="list-style-type: none"> • The Internet is a term used to refer to the largest global internetwork, connecting tens of thousands of networks worldwide. It utilizes a series of protocols and programs to allow for flow of information to and from end users. Common protocols used are IP, ftp, http, smtp, etc. • An intranet is usually a single local area network (LAN) or wide area network (WAN) that has access to information via software and protocols like that used on the Internet, but is for internal use only, and is not accessible to the public. <p>Typical student activities:</p> <ul style="list-style-type: none"> • Identify 10 examples of intranet works. • Explain when and why an intranet would be utilized instead of full web access. The school environment is one example not to be used. • Research methods and support for intranets on the Internet.

Suggestions For Assessment	Resources
<ul style="list-style-type: none">• Identify the aspects that separate an Intranet from the Internet.• Demonstrate why an Intranet would be used and in what context.• Evaluate tools and support used for Intranet deployment.	<ul style="list-style-type: none">• The following websites offer discussions and descriptions of the technologies involved in intranets:• http://www.intranets.com• http://www.intranetjournal.com• http://www.intrack.com• http://www.strom.com

Unit 4 Outcomes	Suggestions for Teaching and Learning
Webmasters 3224	
Students will be expected to	
4.4 demonstrate the setup and maintenance of a web server package	<p>Points to emphasize:</p> <ul style="list-style-type: none"> • Web server packages are many and varied, some come with Network Operating Systems, some can be downloaded, some are free, some are not. Whatever the case, the student has to be able to demonstrate that they have accomplished this task, so platform dependency will be an issue. • No matter what web server package is chosen due to expediency, some familiarity with other packages is required, which will be covered in the student activity section. <p>Typical student activities:</p> <ul style="list-style-type: none"> • Compile a list of web server packages. • Compare two of the web server packages listed previously. The only requirement is that one of them be the web server package you will be installing in the next assignment. The comparison should be based on the following criteria: <ul style="list-style-type: none"> • How much traffic it can handle. (load) • Features supported. • Supported platforms. • Popularity. • Security Issues. • Ease of use. • Anything else of relevance you wish to include. • Perform an install of the accepted package. Demonstrate methods of maintaining the software in proper operating condition.

Suggestions For Assessment	Resources
<p>A successful installation of a web server package is necessary to attain a passing grade in this section.</p> <ul style="list-style-type: none"> • Suggestions include: <ul style="list-style-type: none"> • Demonstration of a web server installation. • Identification of different web server packages. • Evaluation of web server packages based on the criteria outlined above. 	<p>The following sites offer information on the variety of free and commercial server packages available</p> <ul style="list-style-type: none"> • www.microsoft.com • www.apache.org • www.howstuffworks.com • www.w3.org • Software examples <ul style="list-style-type: none"> • IIS • Apache Web Server • Windows 2003 Web Server • Personal WebServer

Unit 5 – Programming for the Web	
Unit 5 Outcomes	Suggestions for Teaching and Learning
Webmasters 3224	
Students will be expected to	
<p>5.1 differentiate between static and dynamic web content</p> <p>5.2 distinguish between client-side and server-side scripting</p> <p>5.3 compare current scripting languages</p>	<p>Points to emphasize:</p> <ul style="list-style-type: none"> • A static document is any web page that is saved to disk and passed back to a requesting browser without changes. Standard HTML pages are considered static. The content is determined solely by the creator of the HTML document. • A dynamic web page is any web page which has content that is changed by a program or script at the time the page is requested. One example is the results delivered by a search engine. • Dynamic web pages require the use of scripting that can be used to manipulate or process information and then send customized content back to the viewer. • We can use a variety of scripting languages to accomplish this task. Examples of scripting languages are: VBScript, JavaScript, CGI, PHP, ColdFusion, JSP, Java Servlets, Perl and ASP. • Either of these languages, alone or in combination, can be used to successfully meet the outcomes of this course. • Client-side scripting refers to scripting that is executed on the client by the user's browser. Client-side scripts are most often embedded within an HTML document. • Upon request, the files are sent to the user's computer by the web server. The user's browser executes the script, then displays the document, including any visible output from the script. • In Server-side scripting a user's request is fulfilled by running a script directly on the web server to generate dynamic HTML pages. • The primary advantage to server-side scripting is the ability to highly customize the resulting page based on the user's requirements, access rights, or queries into databases. <p>Typical student activities:</p> <ul style="list-style-type: none"> • Students should be able to identify whether a particular web page displays static or dynamic content, or a combination of both. • Students should be able to distinguish between the source of a particular web page and the server-side code that generated it.

Suggestions For Assessment	Resources
<ul style="list-style-type: none"> • Development of a comprehensive list of scripting languages. The report should classify the languages as either client-side or server-side. • Development of a report comparing several scripting languages based on their uses, platforms, and their advantages and disadvantages for particular tasks. • Development of webpages using client-side scripting languages to implement simple examples of interactivity. 	<ul style="list-style-type: none"> • W3Schools Online Web Tutorials: http://www.w3schools.com/ • http://www.microsoft.com/asp • http://www.php.net

Unit 5 Outcomes	Suggestions for Teaching and Learning
Webmasters 3224	
Students will be expected to	
<p>5.4 model the principles of effective data design</p> <p>5.5 demonstrate using a web interface to manipulate data in a database</p> <p>5.6 construct a web application that will solve a unique data management problem</p>	<p>Points to emphasize:</p> <ul style="list-style-type: none"> • A data store is any body of related information stored in a systematic way such that it can be managed and queried to answer questions. • A data store can take many forms including a database file, text file, drive, directory, or even graphical data. • The software used to manage and query a database is called a database management systems (DBMS). • A wide variety of commercial and open source data store products are available including MS Access, MS SQLServer Express, MySQL, Borland, PostgreSQL, and others. • Queries on the data store are typically written in Structured Query Language (SQL). • The choice of product depends on cost, platform, ease of use, availability, performance, types of data, environment, and users. • When designing a data store, two essential principles must be taken into account: <ul style="list-style-type: none"> • What kinds of information will be stored? • What requests for information (queries) will be made? • Along with these questions, the data store must be designed in such a way that it avoids structural problems such as data redundancy and anomalies. <ul style="list-style-type: none"> • Redundancy refers to data that is repeated in multiple locations in a data store. • Anomalies occur when data that is inserted or updated does not match data already in the data store, or when “orphan” data is left behind when related data is deleted. • As stated earlier, any of several server-side languages can be used in combination with any of the database products listed above to meet the outcomes of this unit. <p>Typical Student Activities:</p> <ul style="list-style-type: none"> • Examine existing databases for data integrity • Create simple databases with single tables or multiple related tables. • Write database queries using SQL to select, insert, update, and delete data through a DBMS. • Develop simple web pages, using a server-side script, that use SQL queries to access data.

Suggestions For Assessment	Resources
<ul style="list-style-type: none"> • Develop a report comparing a variety of database management systems on the basis of their uses and performance in different situations. • Given a data set, design and develop a database that follows the principles of effective data design. • Design and execute queries that manipulate data in databases with single or multiple tables. • Design and develop web pages that use SQL queries to select, insert, update and delete data in a database. • Given a set of data use requirements, design and develop a web application that meets the needs of users. 	<ul style="list-style-type: none"> • http://databases.about.com • http://en.wikipedia.org/wiki/Database • http://www.w3schools.com/sql • http://www.aspfaq.com • http://www.php.net

Unit 5 Outcomes	Suggestions for Teaching and Learning
Webmasters 3224	
Students will be expected to	
<p>5.7 apply performance testing procedures to evaluate the solution</p> <p>5.8 establish a plan to maintain data integrity and security</p> <p>5.9 engage in idea generating strategies to identify possible solutions</p>	<p>Points to emphasize:</p> <ul style="list-style-type: none"> • Performance testing refers to a process whereby a system is tested under working conditions according to an established set of criteria and benchmarks • A definite plan for performance testing is essential for any data-enabled web application. • It is ideally carried out before, during and after the release of the application to users and should mirror, as closely as possible, the actual usage scenarios of the end users. • Aspects of an application to be tested may include: <ul style="list-style-type: none"> • Response: time between the initiation of a request and the complete download of response. • Load: how the application responds with large numbers of concurrent users. • Scalability: the ability of an application to handle more load by adding hardware resources as needed. • Data Integrity: when data is valid, accurate, complete and predictably related to its source throughout the application's processes. • Security: the extent to which data is protected from unauthorized access. • A plan for performance testing should include: <ul style="list-style-type: none"> • Functional testing: ensuring that all usage scenarios and workflows functions as they should. • Load and Scalability testing: ensuring the application will have favourable response times during periods of peak usage. • Data Integrity testing: ensuring that authorized data manipulation occurring within the database follows rules to prevent its corruption. • Security testing: ensuring that unauthorized access to data is prevented while not negatively affecting performance or legitimate use. • Optimization: Interpreting results of testing procedures to locate problems and tuning the system to compensate. <p>Typical Student Activities:</p> <ul style="list-style-type: none"> • Working in groups to examine applications for problems and improvements. • Brainstorming ideas for testing methodologies and approaches. • Collaborating with each other to test applications. • Comparing results of testing to determine the best approaches for optimization.

Suggestions For Assessment	Resources
<ul style="list-style-type: none">• Development of a comprehensive plan for performance testing of the application.• Development of a comprehensive plan for ensuring data integrity and security.• Development of a report detailing the results of testing procedures and recommended optimizations.	<ul style="list-style-type: none">• Performance Testing http://en.wikipedia.org/wiki/Performance_testing

Unit 6 – Ethical Issues	
Unit 6 Outcomes	Suggestions for Teaching and Learning
Webmasters 3224	
Students will be expected to	
<p>6.1 research ethical issues associated with the Internet.</p> <ul style="list-style-type: none"> i) fraud ii) copyright infringement iii) intellectual property iv) identity theft v) cyberstalking vi) encryption vii) e-commerce viii) cookies ix) confidentiality x) digital footprint xi) Pretty Good Privacy xii) spam xiii) phishing xiv) spoofing 	<p>The Units are designed to be delivered in sequential order. However, many teachers may wish to incorporate the outcomes of Units 6 and 7 throughout the preceding units, as opposed to dealing with them in isolation, since discussions of Ethical Issues and Careers may be relevant at many points in those units.</p> <p>Points to emphasize:</p> <ul style="list-style-type: none"> • Like all new technologies, criminals have found ways to make use of the Internet; The web and the Internet can be used for identity theft, and other types of e-commerce fraud • The Internet can be used for other types of crime such as identity theft and cyberstalking. • Pornography and other types of questionable material are available on the Internet. • Discuss web-site security, encryption of information, digital footprint, spam • Cookies and their implications to users. • What sort of information about you is in the possession of others? • Discuss how governments and institutions store and transmit confidential information about you through computers and how they allow access to that information. <p>Typical Student Activities:</p> <ul style="list-style-type: none"> • Reading handouts, articles etc. (see resources) • Class / group discussion • Debates • Presentations <p>Questions that could be posed include:</p> <ul style="list-style-type: none"> • What sort of information about you is in the possession of others? • What are some ways the Internet can be used for criminal purposes? • In what ways are you at risk? • What are some strategies you can use to protect yourself?

Suggestions For Assessment	Resources
<ul style="list-style-type: none"> • Choose one of the following topics and write a formal research paper. <ul style="list-style-type: none"> • Cyberstalking, computer crime, piracy, identity theft, freedom of speech, phishing, spam, privacy. • Small groups of no more than two or three students could present to the class on the one of the above topics. Class time should be limited to at least 2 presentations per period. • Arrange a series of timed debates using the questions above as resolutions. 	<ul style="list-style-type: none"> • Center for Democracy and Technology: Free Speech http://www.cdt.org/speech/ • American Civil Liberties Union http://www.aclu.org/free-speech • Anti-Phishing http://anti-phishing.org/ • Cyberstalking http://www.victimsofviolence.org/ca/ • Tech Law Journal http://techlawjournal.com/ • Net Privacy http://www.privacyrights.org/ • Identity Theft http://www.privacyrights.org/ • Cyberspace: the ethical frontier http://ethics.ccsr.cse.dmu.ac.uk/ccsr • E-Commerce Fraud www.scambusters.org/

Unit 6 Outcomes	Suggestions for Teaching and Learning
Webmasters 3224	
Students will be expected to	
6.2 demonstrate ethical practices and societal expectations in web design.	<p>Points to emphasize:</p> <ul style="list-style-type: none"> • Ethically constructed websites will provide accurate content. How can we tell if a web site is accurate? • How up to date is the content of a site? • How clearly is the information presented? Discuss design implications here as well as issues of propaganda, misinformation and hate sites. • Protection of children from “adult content” eg how search engines will filter out adult content such as pornography. • Discuss the responsibility of the web professional in securing their content from an unintended audience. • As a class (using a display device preferably) viewing a particularly controversial website may explore some of the biases inherent in “interest groups” as approved by the teacher. <p>Typical Student Activities:</p> <ul style="list-style-type: none"> • Reading handouts, articles etc. (see resources) • Class / group discussion • Presentations <p>Questions that could be posed include:</p> <ul style="list-style-type: none"> • Is the main purpose of the site to inform or to persuade (advocate for a cause)? • Who is the author of the site? Check site documents or external sources to find out more about the author. • Is the content biased? Does the author have a "vested interest" in the topic? Look for and a balanced point of view or external documentation supporting claims. • How current is the information presented? Be sure to determine when information was added. • Has the site has been recognized as exemplary, either in reviews or by others linking to it? • Does the site attempt to lure underage viewers into the site?

Suggestions For Assessment	Resources
<ul style="list-style-type: none">• Develop a list of criteria that can be used to evaluate websites in terms of ethical issues covered.• Write a brief report critically evaluate several web sites for authenticity, veracity and ethical expectations.• Present a report to the class critically evaluating a single web site for authenticity, veracity and ethical expectations.	<ul style="list-style-type: none">• Thinking Critically about World Wide Web Resources http://www.library.ucla.edu/libraries/college/help/critical/

Unit 7 - Careers	
Unit 7 Outcomes	Suggestions for Teaching and Learning
Webmasters 3224	
Students will be expected to	
7.1 investigate careers in the area of web technology	<p>The Units are designed to be delivered in sequential order. However, many teachers may wish to incorporate the outcomes of Units 6 and 7 throughout the preceding units, as opposed to dealing with them in isolation, since discussions of Ethical Issues and Careers may be relevant at many points in those units.</p> <p>Points to emphasize:</p> <ul style="list-style-type: none"> • Web development involves programmers, managers, graphic artists, security professionals, entrepreneurs, technicians, marketing specialists, designers etc. • There are a variety of training programs available for most IT professionals <p>Typical Student Activities</p> <ul style="list-style-type: none"> • Listen to and be involved in class presentations and guest speakers. • Search for resumes of IT professionals on a job board site such as monster.ca • Create an online resume on a job board site such as monster.ca <p>Questions that could be posed include:</p> <ul style="list-style-type: none"> • What are the careers associated with web development? • How much web development is done locally? • Is it a growth area? • How do I become a web professional? • What are local (and national) opportunities for training in web based careers?

Suggestions For Assessment	Resources
<ul style="list-style-type: none"> • Choose a job title and write a paper about that career in web development. The rough outline could include education and training, opportunities for work at home, in Canada and abroad, opportunities for advancement, a typical day at work, etc. • Job shadow a local web professional and give a brief presentation to the class. • Interview an IT professional and distribute written copies of the interview for all students in the class. • Students should include a form of the above projects in design portfolio. 	<ul style="list-style-type: none"> • This would be a great unit to bring in local IT professionals as guest speakers to present to the class about their particular aspect of web development: • MediaJam TV (Pope productions) are more than willing to speak to high school students about their internet based video projects. www.mediajam.com • The Software Human Resources Council http://www.shrc.ca • The Newfoundland Association of Technology Industries http://www.nati.net/ • International Webmasters Association http://www.iwa.org • Monster Job Board http://www.monster.ca

Chapter 4

Assessment and Evaluation

Overview

Webmasters 3224 is a two-credit course. The suggested evaluation distribution is:

- **Unit 1 – 10%**
- **Unit 2 – 20%**
- **Unit 3 – 20%**
- **Unit 4 – 10%**
- **Unit 5 – 30%**
- **Unit 6 – 5%**
- **Unit 7 – 5%**

Throughout the Webmasters 3224 curriculum guide there are assessment and evaluation suggestions provided for each specific curriculum outcome. Teachers of technology education curriculum should understand that evaluation of student achievement in a design and problem-solving environment has different requirements than in traditional teaching/learning environments. *The Contexts for Learning and Teaching* chapter in the *Foundation for the Atlantic Canada Technology Education Curriculum* has a section titled, *Assessing and Evaluating Student Learning*. It provides some guidance for the technology education teacher and excerpts of it are included in this section of the curriculum guide.

Foundation for the Atlantic Canada Technology Education Curriculum (excerpts)

Assessing and Evaluating Student Learning

Overview

Assessment and evaluation are essential components of learning and teaching in technology education. Without effective assessment and evaluation it is impossible to know whether students have learned, whether teaching has been effective, or how best to address student learning needs. The quality of assessment and evaluation in the educational process has a profound and well-established link to student performance. Research consistently shows that regular monitoring and feedback are essential to improved student learning. What is assessed and evaluated, how it is assessed and evaluated, and how results are communicated send clear messages to students and others about what is really valued - what is worth learning, how it should be learned, what elements of quality are considered most important, and how well students are expected to perform.

Teacher-developed assessments and evaluations have a wide variety of uses, such as

- providing feedback to improve student learning
- determining whether curriculum outcomes have been achieved
- certifying that students have achieved certain levels of performance
- setting goals for future student learning
- communicating with parents about their children's learning
- providing information to teachers on the effectiveness of their teaching, the program, and the learning environment
- meeting the needs of guidance and administrative personnel

Assessment

Assessment is the systematic process of gathering information on student learning.

To determine how well students are learning, assessment strategies have to be designed to systematically gather information on the achievement of the curriculum outcomes. In planning assessments, teachers should use a broad range of strategies in an appropriate balance to give students multiple opportunities to demonstrate their knowledge, skills, and attitudes. Many types of assessment strategies can be used to gather such information, including, but not limited to,

- formal and informal observations
- work samples
- anecdotal records
- conferences
- teacher-made and other tests
- portfolios
- learning journals
- questioning
- performance assessment
- peer- and self-assessment

Evaluation

Evaluation is the process of analysing, reflecting upon, and summarizing assessment information and making judgments or decisions based upon the information gathered.

Evaluation involves teachers and others in analysing and reflecting upon information about student learning gathered in a variety of ways. The process requires

- developing clear criteria and guidelines for assigning marks or grades to student work
- synthesizing information from multiple sources
- weighing and balancing all available information
- using a high level of professional judgment in making decisions based upon information

Reporting

Reporting on student learning should focus on the extent to which students have achieved the curriculum outcomes. Reporting involves communicating the summary and interpretation of information about student learning to various audiences who require it. Teachers have a special responsibility to explain accurately what progress students have made in their learning and to respond to parent and student inquiries about learning.

Narrative reports on progress and achievement can provide information on student learning that letter or number grades alone cannot. Such reports might, for example, suggest ways in which students can improve their learning and identify ways in which teachers and parents can best provide support.

Effective communication with parents regarding their children's progress is essential in fostering successful home-school partnerships. Other means include the use of conferences, notes, and phone calls.

Guiding Principles

In order to provide accurate, useful information about the achievement and instructional needs of students, certain guiding principles for the development, administration, and use of assessments must be followed.

Principles for Fair Student Assessment Practices for Education in Canada (1993) articulates five basic assessment principles, as follows:

- Assessment strategies should be appropriate for and compatible with the purpose and context of the assessment.
- Students should be provided with sufficient opportunity to demonstrate the knowledge, skills, attitudes, or behaviours being assessed.
- Procedures for judging or scoring student performance should be appropriate for the assessment strategy used and be consistently applied and monitored.
- Procedures for summarizing and interpreting assessment results should yield accurate and informative representation of a student's performance in relation to the curriculum outcomes for the reporting period.
- Assessment reports should be clear, accurate, and of practical value to the audience for whom they are intended.

These principles highlight the need for assessment which ensures that

- the best interests of the student are paramount
- assessment informs teaching and/or promotes learning
- assessment is an integral and ongoing part of the learning process and is clearly related to the curriculum outcomes
- assessment is fair and equitable to all students and involves multiple sources of information

While assessments may be used for different purposes and audiences, all assessment must give each student optimal opportunity to demonstrate what he/she knows and can do.

Assessing Student Learning in the Technology Education Classroom

Because of the nature of technology, assessing and evaluating student learning in technology education has specific considerations:

- Assessment strategies, integral to design activities, are seamless components of the learning experience.
- Technology education outcomes are the basis for assessment.

- Collaborative strategies, essential to all technological activities undertaken by students, provide a model that makes the student a partner in assessment.
- Students engaged in technological activities are required to assess their own learning and interpret that assessment as a component of the activity.
- Experiential authenticity, expressed by the use of real-world problems, systems, and resources, is critical to growth in technological capability.

Growth in capability is exhibited in a variety of ways. These include tacit and other forms of technological knowledge, technical proficiency, development of technological solutions, assessment and management of technological systems, collaborative and team management skills, and students' evaluation of their own technological solutions and processes. Assessment tools have to be effective across all these forms of evidence. In addition to the standard assessment tools and techniques employed in all subject areas, the following merit special consideration for technology education.

The Design Brief

The design brief, negotiated between student and teacher, sets the conditions under which the student engages in a design activity.

The brief parallels the industrial and commercial practice of design briefs and contracts, with one notable difference—design professionals are assessed mainly on the solution to the problem, while students are assessed mainly on growth in design capability.

The Design Portfolio

The student's design portfolio is essentially a diary of the progress of the design activity. It contains all relevant information, especially trial and error information. It is used to illustrate the thinking and planning processes that students engage in while developing a technological solution to a problem. Assessment of process is often indirect, in that the evidence comes from a variety of sources. The value of the portfolio comes from how well it represents the process.

A design portfolio, containing the facts of what transpired and documenting students' decision-making processes, is a significant tool in assessing growth in design capability. Employing the major phases of the design process as headings, it documents

- processes and components that were successful, and those that were not
- topics of discussion if decisions had to be made
- decisions
- the rationale for decisions
- the student's evaluation of the process and the solution

Other evidence of student progress provided by the portfolio includes use of technical language and terminology, use of technical drawings, and the organization and technical presentation of the material.

The Solution

Students' technological solutions are assessed and evaluated by both students and teachers with respect to the design brief.

Solutions typically result in a product or service that can be examined, assessed, and evaluated as an independent entity. The context for assessment and evaluation is the design brief. It provides the problem statement and the conditions under which the problem will be resolved. A valid assessment of the solution requires a determination of how the designers addressed not just the problem but also the constraints and conditions.

Student assessments provide evidence of how students considered the criteria, how the criteria affected their decision making, and what, if anything, they did about it. These are important issues for assessing growth in design capability.

The Report

The report is an opportunity for students and student design teams to demonstrate how they solved the problem, why they made particular choices, and how the solution could be improved, extended, and/or adapted to different circumstances.

Typically the report takes the form of an individual or design team presentation. Presenting to the client (as represented by the teacher and the class) at various stages of the process is an important part of design. Assessment of the report should consider, among other things,

- organization
- completeness
- appropriate use of technical language
- evidence that students have a developmentally appropriate grasp of the issues arising from the problem and the solution
- evidence of growth in collaborative and team skills