Programming the Internet

Module Aims

- To provide students with sufficient knowledge and skills relating to core Internet technologies such as HTML5, CSS, JavaScript, and PHP, to enable them to create robust applications.
- To prepare students for potential careers as Web developers or for management roles that oversee Web development projects.
- To develop students' capacities to engage in team working.

Module Learning Outcomes

At the end of this module students will be able to:

1. Critically appraise and employ successfully Internet Programming tools, techniques and current standards.
2. Design and create an effective and maintainable Web site in accordance with established Web standards.
3. Construct working applications that access a back-end database on a Web site.
4. Assess the merits of alternative solutions to Web programming problems.
5. Through a process of discussion, compare and critique the recommendations of others; construct and amend their own recommendations in the light of other students' criticisms.
6. Work effectively as part of a team to plan and develop a Web site.
7. Demonstrate an awareness of the legal, ethical and social implications of the Web.

Learning Resources

Required text(s) and software

Deitel, P., Deitel, H. & Deitel, A. (2012) *Internet and World Wide Web: how to program*. 5th ed. Boston, MA: Pearson Education, Inc.

ISBN 0-13-215100-6
ISBN 0-273-76402-0 (International edition)

Last update: 01 March 2013

Weekly Lecture Notes

Each week's topic will be introduced in weekly Lecture Notes.

Recommended prior knowledge

N/A, though basic knowledge of programming principles may be helpful.

Recommended preparatory reading

N/A

Follow-up modules

This module prepares the student for further study in subjects related to Internet technologies. In particular, the module XML and Web Applications is an excellent follow-on module from this one. The XML and Web Applications module extends the basics of Internet programming and covers XML technologies and Web service construction and consumption, as well as a brief look at the Semantic Web.

Software installations

There will be some software programs recommended for installation throughout this module. These include an HTML editor and an FTP program for connection to the student server as well as a PHP editor and MySQL program. Links to these and advice will be given during the course of the module.

Remote computing

During the module, students will build a Web site that will be hosted on the Laureate Web server. This will require using an FTP (File Transfer Protocol) program and MySQL Workbench.

Overview of module work

During this module, students are required to submit:

- Sixteen individual Discussion Question answers (two DQs per week);

- 3–5 meaningful follow-on postings per Discussion Question in response to fellow student submissions;
- Five individual Hand-In Assignments; and
- A Group Project.

Discussion Questions

You must submit your initial response to the Discussion Questions by the end of **Day 4 (Sunday)**. A typical answer should have about 500 words, but it is the quality of the answer that matters, not the number of words. Answers will be submitted to the weekly Discussion Board as well as to the Turnitin link.

Following the 3 out of 7 days rule, you are required to participate with follow-on postings to your peers' answers. You must make 3–5 substantial Discussion Question follow-on postings in addition to your initial response for each Discussion Question by the end of **Day 7 (Wednesday)**. Follow-on postings are not submitted to any Turnitin link. Your total Discussion Board participation must occur on at least three individual days during each week. Follow-on postings should be significant contributions to the Discussion. You may wish to respond to your colleagues' postings in one or more of the following ways:

- Share an insight from having read your colleague's posting.
- Offer and support an opinion or suggestion.
- Validate an idea with your own experience.
- Expand on the ideas in your colleague's posting.

Hand-in Assignments

Hand-in Assignments are one way for you to demonstrate your learning. The Hand-in Assignments provide an opportunity to apply concepts and strategies to an authentic context. Typically, Hand-in Assignments are written papers or computer programs that are submitted to the Instructor. They require you to pull together information from the weekly Learning Resources, the Discussion and your own experiences to address an issue from the perspective of a real-world situation. Unless otherwise noted, the papers you write in Hand-in Assignments must follow Harvard Referencing Style reference and citation guidelines.

You must submit your answer to the Hand-in Assignment by the end of **Day 7 (Wednesday)**. A typical answer for non-programming assignments should have between 750 and 1,000 words, but it is once again the *quality* of the answer that matters, not the number of words. Answers will be submitted to the specified

Turnitin or Assignments links (as appropriate) and are not to be posted in the module Discussion Board.

Module topics

Topics of this module include but are not limited to:

- HTML, CSS and Web standards
- HTML events and JavaScript event handlers
- The Document Object Model
- Cookies
- JavaScript client-side programming
- PHP server-side programming
- Internet database connectivity
- The latest features of HTML5 and CSS3
- The Open Web Application Security Project (OWASP)
- The mobile Web
- Web usability and accessibility

Assessment

The table below outlines the mandatory contribution in each category and the weight that applies to each component.

	Weeks								**Weight**
	1	2	3	4	5	6	7	8	
Discussion Question Initial Response	X	X	X	X	X	X	X	X	15%
Discussion Question Follow-on (DQF)	X	X	X	X	X	X	X	X	15%
Hand-in Assignments (HA)	X	X		X		X		X	35%
Group Project			X		X		X		35%

For general information on assessment and grading, please consult the Student Handbook section pertaining to grading at http://success.ohecampus.com/index.php?mod=dcp&act=navigationindex&navigationid=3691

Syllabus by Week

Week 1: Introduction to HTML5 and Cascading Style Sheets (CSS)

Learning Objectives

At the end of this week, you should be able to:

- Investigate and use effectively some of the software tools that you will need in order to program the Internet.
- Create a simple Web page, tested by the W3C HTML Validator, according to a specification, in order to demonstrate a clear understanding of basic HTML tags and hyperlinks, style sheets, and their use within the Web page.
- Understand and apply Web Standards.
- Make effective use of hypertext links, ordered and unordered lists, and images.
- Research, evaluate and debate the future role of the Web.

Required Resources

- Deitel, P., Deitel, H. & Deitel, A. (2012) *Internet and World Wide Web: how to program*. 5th ed. Boston, MA: Pearson Education, Inc.
    - Chapter 1, 'Introduction to Computers and the Internet'
        - Sections 1.1-1.9
    - Chapter 2, 'Introduction to HTML5: Part I'
        - Sections 2.1-2.9
        - Section 2.12
    - Chapter 4, 'Introduction to Cascading Style Sheets™ (CSS): Part 1'
        - Sections 4.1-4.5

Workload

Self-study

- Read the Lecture Notes.

- Read the textbook pages and/or other Learning Resources.

Discussion Question

- Submit your responses to the two Discussion Questions to the Turnitin links and also post them to the Discussion Board.

- Review responses by other students and make 3–5 meaningful follow-on postings per Discussion Question.

Hand-in Assignment

- Prepare and submit your response to the Hand-in Assignment to the Assignment link.

Week 2: More Advanced HTML5 and CSS

Learning Objectives

At the end of this week, you should be able to:

- Negotiate effectively with other students to reach agreement on the composition of Group Project teams.
- Consider, within groups, possible themes for a Group Project.
- Design and implement HTML pages to produce specified visual outcomes employing divisions, a form, and a table.
- Produce a simple style sheet that formats Web pages according to the latest widely supported standards.
- Research, evaluate and debate technical aspects of HTML5/CSS and questions of security and freedom on the Web.

Required Resources

- Deitel, P., Deitel, H. & Deitel, A. (2012) *Internet and World Wide Web: how to program*. 5th ed. Boston, MA: Pearson Education, Inc.
  - Chapter 2, 'Introduction to HTML5: Part I'
    - Sections 2.10-2.11
  - Chapter 4, 'Introduction to Cascading Style Sheets (CSS): Part 1'
    - Sections 4.8-4.12
  - Chapter 5, 'Introduction to Cascading Style Sheets (CSS): Part 2'
    - Sections 5.1-5.5

Workload

Self-study

- Read the Lecture Notes.

- Read the textbook pages and/or other Learning Resources.

Discussion Question

- Submit your responses to the two Discussion Questions to the Turnitin links and also post them to the Discussion Board.

- Review responses by other students and make 3–5 meaningful follow-on postings per Discussion Question.

Hand-in Assignment

- Prepare and submit your response to the Hand-in Assignment to the Assignment link.

Week 3: Introduction to JavaScript and the Document Object Model

Learning Objectives

At the end of this week, you should be able to:

- Master basic programming concepts using JavaScript.
- Understand and plan to use the Document Object Model.
- Acquire the skills and knowledge necessary to implement event driven programming.
- Understand the role of functions and selection in programming as a precursor to implementing these techniques.
- Appreciate that CSS provides an alternative to the use of JavaScript in certain contexts.
- Select an appropriate method of debugging JavaScript applications.
- Employ relative addressing to locate external files.
- Research, evaluate and debate the use of JavaScript/DOM and a question relating to social and ethical responsibilities or intellectual property rights.
- As part of a team, plan and develop Web pages for your Group Project that demonstrates skills employing HTML5 and CSS.

Required Resources

- Deitel, P., Deitel, H. & Deitel, A. (2012) *Internet and World Wide Web: how to program*. 5th ed. Boston, MA: Pearson Education, Inc.

- Chapter 7, 'JavaScript: Control Statements I'
  - Sections 7.1-7.6
- Chapter 12, 'Document Object Model (DOM): Objects and Collections'
  - Sections 12.1-12.2
- Chapter 13, 'JavaScript Event Handling: A Deeper Look'
  - Sections 13.1-13.9

Workload

Self-study

- Read the Lecture Notes.
- Read the textbook pages and/or other Learning Resources.

Discussion Question

- Submit your responses to the two Discussion Questions to the Turnitin links and also post them to the Discussion Board.
- Review responses by other students and make 3–5 meaningful follow-on postings per Discussion Question.

Group Project

- Prepare and submit your work on the Group Project to the submission link.

Week 4: JavaScript II

Learning Objectives

At the end of this week, you should be able to:

- Solve a problem by designing and developing a Web page that demonstrate the use of the Document Object Model in a JavaScript application.
- Provide practical evidence of your understanding of functions, arrays and validation in writing JavaScript.
- Understand and demonstrate the role of iteration in programming.
- Research, evaluate and debate a current issue arising from the use of JavaScript.

Required Resources

- Deitel, P., Deitel, H. & Deitel, A. (2012) *Internet and World Wide Web: how to program*. 5th ed. Boston, MA: Pearson Education, Inc.
    - Chapter 7, 'JavaScript: Control Statements I'
        - Sections 7.7-7.13
    - Chapter 8, 'JavaScript: Control Statements II'
        - Sections 8.1-8.9
    - Chapter 9, 'JavaScript: Functions'
        - Sections 9.1-9.4
    - Chapter 10, 'JavaScript: Arrays'
        - Sections 10.1-10.4
    - Chapter 11, 'JavaScript: Objects'
        - Section 11.1-11.3

Workload

Self-study

- Read the Lecture Notes.
- Read the textbook pages and/or other Learning Resources.

Discussion Question

- Submit your responses to the two Discussion Questions to the Turnitin links and also post them to the Discussion Board.
- Review responses by other students and make 3–5 meaningful follow-on postings per Discussion Question.

Hand-in Assignment

- Prepare and submit your response to the Hand-in Assignment to the Assignment link.

Week 5: PHP and Server-Side Programming

Learning Objectives

At the end of this week, you should be able to:

- Use PHP to handle information in HTML forms and to engage in string manipulation.
- Explain and implement the methods by which PHP retrieves cookies from a Web site.
- Research, evaluate and debate the role of programming knowledge in the process of Web management, the relative merits of client- side and server-side scripting, the use of open source Web technologies, or Internet privacy issues.
- As part of a team, plan and develop Web pages for your Group Project that demonstrate more advanced JavaScript involving client-side validation and the trapping of events.

Required Resources

- Deitel, P., Deitel, H. & Deitel, A. (2012) *Internet and World Wide Web: how to program*. 5th ed. Boston, MA: Pearson Education, Inc.
    - Chapter 17, 'Web Servers (Apache and IIS)'
        - Sections 17.1-17.6
    - Chapter 19, 'PHP'
        - Sections 19.1-19.8
        - Section 19.10
        - Section 19.12

Workload

Self-study

- Read the Lecture Notes.

- Read the textbook pages and/or other Learning Resources.

Discussion Question

- Submit your responses to the two Discussion Questions to the Turnitin links and also post them to the Discussion Board.

- Review responses by other students and make 3–5 meaningful follow-on postings per Discussion Question.

Group Project

- Prepare and submit your work on the Group Project to the submission link.

Week 6: PHP and MySQL: Database Connectivity

Learning Objectives

At the end of this week, you should be able to

- Solve a problem by designing and creating an HTML form and a PHP script that facilitate database connectivity.
- Formulate SQL queries and embed them successfully in a PHP script.
- Create PHP scripts to facilitate the retrieval and updating of information held in a database.
- Understand and implement PHP applications which read from and write to text files.
- Research, design and implement PHP scripts to add and delete records in a database.
- Research, evaluate and debate issues relating to the development of Web sites.
- As part of a team, plan and develop a database for your Group Project that will later be accessed by your PHP scripts.

Required Resources

- Deitel, P., Deitel, H. & Deitel, A. (2012) *Internet and World Wide Web: how to program*. 5th ed. Boston, MA: Pearson Education, Inc.
    - Chapter 18, 'Database: SQL, MySQL, LINQ and Java DB'
        - Sections 18.1-18.5
    - Chapter 19, 'PHP'
        - Section 19.9

Workload

Self-study

- Read the Lecture Notes.
- Read the textbook pages and/or other Learning Resources.

Discussion Question

- Submit your responses to the two Discussion Questions to the Turnitin links and also post them to the Discussion Board.
- Review responses by other students and make 3–5 meaningful follow-on postings per Discussion Question.

Hand-in Assignment

- Prepare and submit your response to the Hand-in Assignment to the Assignment link.

Week 7: Advanced Topics

Learning Objectives

At the end of this week, you should be able to

- Understand and implement a range of advanced Web programming techniques that will form the basis for self-directed learning.
- Research, evaluate and debate the effect on the future of the Web of two of the aforementioned programming techniques.
- As part of a team, plan and develop Web pages for your Group Project that demonstrate the use of PHP for form processing and database connectivity.
- Research, evaluate and debate an issue relating to the future of the Web.

Required Resources

- Deitel, P., Deitel, H. & Deitel, A. (2012) *Internet and World Wide Web: how to program*. 5th ed. Boston, MA: Pearson Education, Inc.

  Review the textbook and follow up on the following topics which most interest you:

- AJAX: Chapter 16, 'Ajax-Enabled Rich Internet Applications with XML and JSON'
- HTML5: Chapter 14, 'HTML5: Introduction to Canvas'
- CSS3: Chapter 5, 'Introduction to Cascading Style Sheets (CSS): Part 2'

Workload

Self-study

- Read the Lecture Notes.
- Read the textbook pages and/or other Learning Resources.

Discussion Question

- Submit your responses to the two Discussion Questions to the Turnitin links and also post them to the Discussion Board.
- Review responses by other students and make 3–5 meaningful follow-on postings per Discussion Question.

Group Project

- Prepare and submit your work on the Group Project to the submission link.

Week 8: Web Design, Usability, and Accessibility

Learning Objectives

At the end of this week, you should be able to

- Understand and apply a number of Web design and usability principles.
- Demonstrate an appreciation of the role of accessibility.
- Analyse constructively the Web sites of other Project groups, and propose usability and accessibility enhancements.
- Write a report about the mobile Web.
- Research, evaluate and debate accessibility and usability issues.

Required Resources

- Read the Week 8 Lecture Notes and follow up on some of the references at the end.

Workload

Self-study

- Read the Lecture Notes.
- Read the textbook pages and/or other Learning Resources.

Discussion Question

- Submit your responses to the two Discussion Questions to the Turnitin links and also post them to the Discussion Board.
- Review responses by other students and make 3–5 meaningful follow-on postings per Discussion Question.

Hand-in Assignment

- Prepare and submit your response to the Hand-in Assignment to the Assignment link.