

CISC 1001 [CORC 1312, CC 3.12] Computing: Nature, Power and Limits

3 hours; 3 credits

The nature, power and limits of the computer and computing. The components of the computer. Information representation. Computer networks, the Internet, and the World Wide Web. The nature of algorithms, problem-solving, and computer programming. Feasibility and computability. Computer and network security and privacy.

Common Goals Addressed by Core Course:

1. To develop the ability to think critically and creatively, to reason logically, and to reason quantitatively. (*includes OARM Goal 16*)
2. To understand the development and workings of modern societies in an interdependent world. (*includes OARM Goal 6*)
3. To acquire the tools that are required to understand and respect the natural universe. (*includes OARM Goal 5*)
4. To understand what knowledge is and how it is acquired by the use of differing methods in different disciplines. (*includes OARM Goal 17*)
5. To produce informed and responsible citizens. (*includes OARM Goal 8*)
6. To establish a foundation for life-long learning and the potential for leadership. (*includes OARM Goal 30*)

Objectives of Core Course:

1. Students will be able to describe the nature, power and limits of information technology (*from OARM Goal 16*)
2. Students will be able to explain the structure of the Internet and the World Wide Web and the roles of the fundamental protocols that drive them; (*from OARM Goal 6 & 16—knowledge goal*)
3. Students will be able to create simple Web pages, including interactive elements. (*from OARM Goal 6 & 16—knowledge goal*)
4. Students will be able to identify basic components of the computer, describe their function, describe the different forms of data and how they are represented, and describe how data flows among the different parts of the computer. (*from OARM Goal 6 & 16—knowledge goal*)

5. Students will be able to define “algorithm,” provide algorithms for solving simple problems, and explain the process by which algorithms are rendered executable by a program. (*from OARM Goal 5 & 16—knowledge goal*)
6. Students will be able to identify some problems that are not feasible and/or computable. (*from Goal 5 & 16—knowledge goal*)
7. Students will be able to explain criteria for evaluating data and their sources (*from OARM Goal 17*)
8. Students will be able to describe plagiarism and how to avoid it and to make determination regarding their personal online privacy and security. (*from OARM Goal 8—knowledge goal*)
9. Students will be able to demonstrate personal responsibility and forthrightness in principle and action. (*from OARM Goal 30*)

Outcomes for this Core Course:

1. Students describe the nature, power and limits of information technology through their writing, oral presentation, and/or computing experiments.
2. Students create computer-based solutions to problems through the use of Web-based resources.
3. Students create simple Web pages, including interactive elements.
4. Students identify basic components of the computer, describe their function, describe the different forms of data and how they are represented, and describe how data flows among the different parts of the computer.
5. Students write simple programs to solve a problem described in English.
6. Students identify some problems that are not feasible and/or computable.
7. Given a topic, students will research the topic on the Web and determine which sources have higher significance and authority.
8. Students identify cases of plagiarism.
9. Students complete assignments within the designated time.

Methods of Assessment:

1. Students are asked if certain problems do or do not lend themselves to solution by computer.
2. Students will be asked to find the answer to a question using the Web, and document their search for the solution.
3. Students are asked to create simple Web pages, including interactive elements.
4. Students are asked to identify basic components of the computer, describe their function, describe the different forms of data and how they are represented, and describe how data flows among the different parts of the computer.
5. Students are asked to write simple programs to solve a problem described in English.
6. Students are asked whether a specific problem is computable and/or feasible.
7. Given a topic, students will be asked to research the topic on the Web and determine which Web sources they find have higher significance and authority.
8. Students are presented with a Web site and a paragraph on material from the site, and are asked if the paragraph constitutes an example of plagiarism.
9. Students will be given assignments with definite due dates, and the timeliness and completion level of the assignments will be evaluated.

Syllabus

Lecture	Lab	Readings
1) Intro - what is CS? algorithms, programs	1) Intro to use of computers for subject matter to follow Windows, Web, Email	Pearson Custom (PC), Chap. 1 Two Appendices
2) networks, LANs, WANS, TCP/IP	2) URLs, IP addresses, DNS names, tracert	PC - Chap. 3
3) Algorithmic thinking	3) HTML I source file vs. browser display; basic tags; ordered and unordered lists	PC - Chap. 2, 7 First Appendix
4) Computer languages compilation process (software view)	4) HTML II links, images	PC - Chap. 2, 7
5) data representation, storage devices	5) data representation, searching on the web, plagiarism	PC - Chap. 8, 9
6) Exam I	6) History of CS online tour of "virtual museum" material	PC - Chap. 5
7) Introduction to JavaScript: scripts, variables and expressions	7) JavaScript I alert and prompt methods variables and expressions	PC- Chap. 4
8) Using predefined functions; introduction to event-driven programming	8) JavaScript II library functions and predefined methods; simple responses to events	PC - Chap. 6
9) machine architecture stored program concept (hardware view)	9) architecture simulation lab	PC - Chap. 10
10) writing user-defined functions	10) JavaScript III functions; events that invoke functions	PC - Chap. 6
11) unsolvability and nonfeasibility, halting problem	11) JavaScript IV loops and running time	PC - Chap. 11

12) Review and Exam II		
13) Security and privacy	13) e-commerce; cookies; secure transactions	PC - Chap. 12, 13
14) Encryption	14) PGP encryption and digital signatures	PC - Chap. 12, 13

Method of Evaluation

The course grade will be based on assignments and participation (33%), midterm examinations (2 at 17% each), and a final examination (33%).

Course Text

Reed, *A Balanced Introduction to Computer Science*, Prentice-Hall, 2005.

Bibliography

Brookshear, *Computer Science: An Overview, 7th edition*, Addison Wesley, 2002.

Comer, *The Internet Book, 3rd edition*, Prentice-Hall, 2000.

Lehnert, *Web 101, 2nd edition*, Addison Wesley, 2000.

Lin, *QuickStart to JavaScript*, Scott/Jones, 1999.

Rawlins, *Slaves of the Machine*, MIT Press, 1997.

Snyder, *Fluency with Information Technology: Skills, Concepts, and Capabilities, 2nd edition*, Addison Wesley, 2006.

Walker, *The Limits of Computing*, Jones and Bartlett, 1994.

Substitutions for BC students: CIS 1.0 or CIS 1.5

Substitutions for transfer students: 3 transfer credits in Computer and Information Science courses, except for the following: Computer and Information Science 5.2, 9.50, 10.31, 10.33, 11.