CSC 1250: Introduction to Programming

Credit Hours: 3 hours

Prerequisites:
Credit or registration in MATH 1022 or 1023 or 1431 or 1550.

Prerequisites by Topics:
Basic problem solving skills to develop algebraic formulas, and rudimentary trigonometry.

Catalog Course Description:
Credit will not be given for this course and CSC1248 or 1253 or 1350 or ISDS 3107. Fundamentals of problem solving, program design, algorithms, and programming using a high-level language.

Course Outcomes
1. Be familiar with basic hardware and software types,
2. Master problem solving using algorithm development,
3. Master basic syntax and semantics of a high-level imperative language,
4. Be familiar with the basic data structure of lists in simple applications,
5. Be familiar with structured programming techniques,
6. Be familiar with modular design and implementation,
7. Be familiar with designing text-oriented user interfaces,
8. Be familiar with text file input and output,
9. Be familiar with command-line interface with an operating system.

Texts and Other Course Materials
Essential C++ for Engineers and Scientists. Jeri Hanly, ISBN 0-201-74125-3. (text varies by instructor)

Major Topics
- Hardware and Software: different types of computers and terms; parts of a computer (memory, CPU, I/O); how data and instructions are represented including base conversions; types of software; types of programming languages and terms. Introduction to operating systems.
- Compilation process, programming process (software development lifecycle), algorithm development, writing algorithms using pseudocode.
- Structured programming principles and construction.
- Preprocessor directives and system libraries.
- Variables, expressions (arithmetic, Boolean, literals), assignment statements, precedence, association, data types.

- Interactive input/output, formatting output.
- Branching statements (single selection, double selection, nested selection).
- Repetition structures (while, do-while, for). Counter-control loops (incremental and decremental), event control loops including sentinel control. Nested repetition.
- Programming standards and style guidelines: good documentation.
- Modular design, functions, predefined functions. (omit recursive functions). Different types of parameter passing.
- Single dimensional and multi-dimensional arrays. Partially filled arrays.
- Unordered and ordered linear search. Bbinary search of arrays.
- Sorting of arrays: bubble, selection sort.
- Character and string I/O. Predefined string functions. Character manipulation I/O: get and put. Introduction of the standard class string.
- Streams and text File I/O: open files, close files, end of file, and formatting output.

Assignments/Projects/Laboratory Projects/Homework

Write an interactive program that prompts the user for the number of pH values to be processed. The program reads the pH values and gives a count of the number of acid, neutral and alkaline substances. The program also displays the number of invalid entries. Values less than 0 or greater than 14 are invalid. Your program should also display the average pH value for the alkaline substances as well as the average pH value for the acidic substances.

The CEO of the engineering firm, Cooke, Dunn and Hinojosa, Inc., is considering giving the employees a raise. The CEO cannot decide between a 2% raise or a 3% raise across the entire company. A report that shows the current average salary and the average salaries with the applied 2% and 3% raises has been requested. She would also like to see an itemized list of the current salaries in increasing order with the new proposed salary amounts and ending with total salaries for each salary column. A single dimensional partially filled array must be used.

Curriculum Category Content (estimated in semester hours)

Area	Core	Advanced	Area	Core	Advanced
Algorithms	9	0	Data Structures	9	
Software Design	5	0	Prog. Languages	12	
Computer Arch.	3	0			

Relationship to Criterion 3 Outcomes

A	B	C	D	E	F	G	H	I	J	K
*		*		*				*		*

Math and Fundamentals:

Data Structures:
Use of lists, specifically single and multi-dimensional arrays, to solve unique problems; searching for unordered and ordered arrays, sorting– 9 hours
Algorithms and Software:
Problem Analysis – 5 hours
Solution Design including modular design– 6 hours

Computer Organization and Architecture:
Parts of a computer including the CPU (ALU and control unit), machine language, portability, decimal to binary, octal and hexadecimal conversions – 3 hours

Concepts of Programming Languages:
Character set, data types, variables, constants, arithmetic expressions, assignment statements, relational and logical operators, standard I/O streams, standard I/O streams, scope and lifetime of variables – 12 hours

Social and Ethical Issues:
Oral Communication (presentations):

Written Communication:
Students are required to submit well documented code including program headers, good variable names, comments before significant blocks of code, etc.

Course Coordinator: Coretta Douglas
Last Modified: