PELLISIPPI STATE COMMUNITY COLLEGE
MASTER SYLLABUS

COMPUTER SCIENCE II
CISP 1020

Class Hours: 3.0          Credit Hours: 4.0
Laboratory Hours: 3.0      Date Revised: Spring 2015

Note: This course is designed for transfer credit.

Catalog Course Description:

Advanced problem solving and algorithm development, structured programming, data structures and applications, I/O techniques, lists, queues, trees, algorithms, and files. Program development using Unix operating system.

Entry Level Standards:

The student is expected to be proficient in programming components taught in CISP 1010. These include functions, arrays, string handling, argument passing, indirect addressing and elementary file I/O. The student is also expected to have a working knowledge of the Unix operating system, a Unix-based editor such as vi or emacs and program development in the Unix environment. The student must have math, writing, verbal and English language skills at the college level.

Prerequisites:

CISP 1010

Textbook(s) and Other Course Materials:

Recommended:


I. Week/Unit/Topic Basis:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction, Review of C++: I/O, Functions, Arrays, C++ string Objects and C-strings, Structures, Pointers.</td>
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<tr>
<td>2</td>
<td>Typedef, Structures, Program structure (header files, source files, Makefiles). Pointer arithmetic and double-indirection</td>
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<td>3</td>
<td>Command line arguments. Binary search, Recursion, Stacks as Arrays</td>
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<td>4</td>
<td>Elementary File I/O, Queues, Circular Queues. Unions. Enumerated Types</td>
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<tr>
<td>5</td>
<td>Dynamic Memory Allocation, Dynamic Linked Lists, Doubly-Linked Lists</td>
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<tr>
<td></td>
<td>C++ Custom classes</td>
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<tr>
<td>7</td>
<td>C++ Custom Classes</td>
</tr>
<tr>
<td>8</td>
<td>C++ Standard Template Library (STL), Mid-term Exam</td>
</tr>
<tr>
<td>9</td>
<td>C++ STL, Binary trees, Algorithm Complexity</td>
</tr>
<tr>
<td>10</td>
<td>AVL Trees</td>
</tr>
<tr>
<td>11</td>
<td>AVL Trees, Splay Trees</td>
</tr>
<tr>
<td>12</td>
<td>Hashing, Binary Heaps, Priority Queues</td>
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<tr>
<td>13</td>
<td>Sorting, Algorithm Complexity</td>
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<tr>
<td>14</td>
<td>Pointers to Functions, Bitwise Operators, Test2</td>
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<tr>
<td>15</td>
<td>Final Exam</td>
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</tbody>
</table>

**II. Course Goals***:

The course will:

A. Enhance effective use of the C++ programming languages. II, III, IV, V

B. Enhance effective use of advanced C++ programming statements and be able to use these statements in writing a large program. I, II, III, IV, VI, V

C. Expand student understanding of data abstraction, specification, refinement and implementation, understanding of specific structures such as lists, stacks, queues, linked-lists, hash tables and binary trees. III, IV, V

D. Guide students to understand various searching and sorting methods and select most efficient algorithm. III, IV, V

E. Guide students to use of various data structures in writing a large program with C++. I, II, III, IV, V

F. Guide students to write well-structured programming code using divide-and-conquer method. II, III, IV, V

G. Guide students to use recursive techniques to solve problems when appropriate. II, V

*Roman numerals after course objectives reference goals of the Computer Science and Information Technology program.

**III. Expected Student Learning Outcomes***:

Students will be able to:

1. Apply the syntax and semantics of C++ programming languages. A
2. Utilize advanced C++ programming statements in large programs. B
3. Construct simple data types, arrays, structures and unions. B
4. Implement and address abstract data structures via pointers. B, C
5. Construct links, stacks, queues, linked-list and binary tree searching. C
6. Employ trees and tree traversal. C
7. Implement and utilize recursive functions. C, D
8. Demonstrate various sorting and searching techniques. D
9. Demonstrate hashing techniques. D
10. Demonstrate heaps and their applications. D
11. Write a large program using various data structures. E, F
12. Use recursion as an alternative to linear solutions. A, B, C, G
13. Use make files to manage projects. F

* Capital letters after Expected Student Learning Outcomes reference the course goals listed above.

IV. Evaluation:

A. Testing Procedures: at least 40% of grade

A minimum of two tests is recommended. Tests will cover material presented in class. Tests are not to be missed without a valid excuse.

B. Laboratory Expectations: at least 40% of grade

Lab attendance is required. Assignments will be given and must be completed and handed in at the designated date and time.

C. Field Work: 0% of grade

None is required.

D. Other Evaluation Methods: 20% of grade at the discretion of the instructor

Quizzes and/or homework may also comprise part of the final grade for the course.

E. Grading Scale:

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Grade</th>
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<tbody>
<tr>
<td>93 – 100</td>
<td>A</td>
</tr>
<tr>
<td>88 – 92</td>
<td>B+</td>
</tr>
<tr>
<td>83 – 87</td>
<td>B</td>
</tr>
<tr>
<td>78 – 82</td>
<td>C+</td>
</tr>
<tr>
<td>73 – 77</td>
<td>C</td>
</tr>
<tr>
<td>65 – 72</td>
<td>D</td>
</tr>
<tr>
<td>Below 65</td>
<td>F</td>
</tr>
</tbody>
</table>

V. Policies:
A. Attendance Policy:

Pellissippi State expects students to attend all scheduled instructional activities. As a minimum, students in all courses (excluding distance learning courses) must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course. Individual departments/programs/disciplines, with the approval of the vice president of Academic Affairs, may have requirements that are more stringent. In very specific circumstances, an appeal of the policy may be addressed to the head of the department in which the course was taken. If further action is warranted, the appeal may be addressed to the vice president of Academic Affairs.

B. Academic Dishonesty:

Academic misconduct committed either directly or indirectly by an individual or group is subject to disciplinary action. Prohibited activities include but are not limited to the following practices:

- Cheating, including but not limited to unauthorized assistance from material, people, or devices when taking a test, quiz, or examination; writing papers or reports; solving problems; or completing academic assignments.
- Plagiarism, including but not limited to paraphrasing, summarizing, or directly quoting published or unpublished work of another person, including online or computerized services, without proper documentation of the original source.
- Purchasing or otherwise obtaining prewritten essays, research papers, or materials prepared by another person or agency that sells term papers or other academic materials to be presented as one’s own work.
- Taking an exam for another student.
- Providing others with information and/or answers regarding exams, quizzes, homework or other classroom assignments unless explicitly authorized by the instructor.
- Any of the above occurring within the Web or distance learning environment.

Please see the Pellissippi State Policies and Procedures Manual, Policy 04:02:00 Academic/Classroom Conduct and Disciplinary Sanctions for the complete policy.

C. Accommodations for disabilities:

Students that need accommodations because of a disability, have emergency medical information to share, or need special arrangements in case the building must be evacuated should inform the instructor immediately, privately after class or in her or his office. Students must present a current accommodation plan from a staff member in Disability Services (DS) in order to receive accommodations in this course. Disability Services may be contacted by sending email to disabilityservices@pstcc.edu, or by visiting Alexander 130. More information is available at http://www.pstcc.edu/sswd/.

D. Other Policies:

**Computer Usage Guidelines:**

College-owned or -operated computing resources are provided for use by students of Pellissippi State. All students are responsible for the usage of Pellissippi State’s computing resources in an effective, efficient, ethical and lawful manner. (Pellissippi State Catalog).

Students are expected to promptly attend all lecture and lab classes. If a class is missed, it is the student’s responsibility to make up all work and get notes and/or handouts. In the event that a student has an emergency beyond his/her control, he/she must notify the instructor as soon as possible.