PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

DATA STRUCTURES
CSIT 1400 (formerly CST 1400)

Class Hours: 3.0 Credit Hours: 4.0
Laboratory Hours: 3.0 Revised: Fall 05

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. This course is intended for University Parallel students.

Entry Level Standards:
The student is expected to be proficient in C programming components taught in CSIT 1020. 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 C program development in the Unix environment. The
student must have math, writing, verbal and English language skills at the college level.

Prerequisite:
CSIT 1020 or department approval

Textbook(s) and Other Course Materials:
Weiss, Mark Allen; Data Structures and Algorithm Analysis in C, 2nd Edition; Addison-Wesley; 1997

I. Week/Unit/Topic Basis:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>Introduction, Review of C: Arrays, Strings, Pointers, Pointer Arithmetic, Indirection, Double Indirection, Functions, Arguments and Scope of Variables, Prototypes, Program Structure, Make files</td>
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<tr>
<td>2</td>
<td>Review of C, Command Line Arguments</td>
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<td>3</td>
<td>Structures, Typedef, Dynamic Memory Allocation</td>
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<td>4</td>
<td>Lists, Stacks, Queues, Static and Dynamic Lists</td>
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<td>5</td>
<td>Doubly Linked Lists, In-memory Conversion</td>
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<tr>
<td>6</td>
<td>Overview of Algorithm Complexity, Binary trees, Tree Traversals, Insertions and Deletions</td>
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II. Course Objectives*:

A. Demonstrate proficiency in the C programming language. III VI VII IX XI

B. Demonstrate use of advanced C programming statements and able to use these statements in writing a large program. III VI VII IX XI

C. Demonstrate knowledge 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 XI XII

D. Demonstrate use of various searching and sorting methods and select most efficient algorithm. III V XI XII

E. Demonstrate use of various data structures in writing a large program with C. III V X XI XII

F. Write well-structured programming code using divide-and-conquer method. II III V VI VII IX X XI XII

G. Use recursive techniques to solve problems. V, VI, IX

*Roman numerals after course objectives reference goals of the CSIT program.

III. Instructional Processes*:

Students will:

1. Create a complex software package which implements multiple data structures. 
   
   Communication Outcome, Technological Literacy Outcome, Transitional Strategy, Active Learning

2. Examine and implement algorithms that are efficient and reliable. Technological Literacy Outcome, Transitional Strategy, Active Learning

3. Use professional tools to produce software components and documentation. Technological Literacy Outcome, Transitional Strategy, Active Learning

4. Participate in a software development team. Communication Outcome, Transitional
5. Participate in a peer review of term projects.  

6. Use professionally accepted methods and materials in completion of applications.

*Strategies and outcomes listed after instructional processes reference TBR’s goals for strengthening general education knowledge and skills, connecting coursework to experiences beyond the classroom, and encouraging students to take active and responsible roles in the educational process.

IV. Expectations for Student Performance*:

Upon successful completion of this course, the student should be able to:

1. Learn the syntax and semantics of C programming language. A
2. Utilize advanced C programming statements in large programs. B
3. Understand simple data types, arrays, structures and unions. B
4. Understand implementation of abstract data structures via pointers. B, C
5. Understand links, stacks, queues, linked-list and binary tree searching. C
6. Understand trees and tree traversal. C
7. Understand recursive functions. C, D
8. Understand various sorting and searching techniques. D
9. Understand hashing techniques. D
10. Understand 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

*Letters after performance expectations reference the course objectives listed above.

V. Evaluation:

A. Testing Procedures:

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:

Lab attendance is required. Assignments will be given and must be completed and handed in at the designated date and time.
C. Field Work:  
N/A

D. Other Evaluation Methods:  
Class participation, quizzes and homework will also comprise the final grade for the course.

E. Grading Scale:  
93 – 100 A  
88 – 92 B+  
83 – 87 B  
78 – 82 C+  
73 – 77 C  
65 – 72 D  
Below 65 F

VI. Policies:

A. Attendance Policy:  
Pellissippi State Technical Community College expects students to attend all scheduled instructional activities. As a minimum, students in all courses must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course. [NOTE: No differentiation is noted for excused/unexcused absences. These will be treated as an absence.] (Pellissippi State Catalog)

B. Academic Dishonesty:  
Plagiarism, cheating, and other forms of academic dishonesty are prohibited. Students guilty of academic misconduct, either directly or indirectly through participation or assistance, are immediately responsible to the instructor of the class. In addition to other possible disciplinary sanctions which may be imposed through the regular Pellissippi State procedures as a result of academic misconduct, the instructor has the authority to assign an F or a zero for the exercise or examination or to assign an F in the course. (Pellissippi State Catalog)

C. Accommodations for disabilities:  
If you need accommodations because of a disability, if you have emergency medical information to share, or if you need special arrangements in case the building must be evacuated, please inform the instructor immediately. Please see the instructor privately after class or in his/her office. Students must present a current accommodation plan from a staff member in Services for Students with Disabilities (SSWD) in order to receive accommodations in this course. Services for Students with Disabilities may be contacted by going to Goins 127 or 131 or by phone: 694-6751 (Voice/TTY) or 539-7153.

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)