PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

HPC ARCHITECTURE & SYSTEM ADMINISTRATION
HPC 2300

Class Hours: 3.0  Credit Hours: 4.0
Laboratory Hours: 3.0  Revised: Spring 03

NOTE: This course is not designed for transfer credit.

Catalog Course Description:

This course will expand upon microprocessors. Topics include classification and management of clusters, an in-depth study of the system board components and memory management, supporting input and output devices, troubleshooting and disaster recovery techniques, working with high speed networks, distributed and shared memory systems, hardware design issues, vector parallel machines and communication issues of remote massively parallel machines and clusters, and the assembly and maintenance of PC clusters.

Entry Level Standards:

College level reading and math skills; keyboarding skills of at least 20 wpm; familiarity with the personal computer and an introduction to the Linux operating system; problem solving skills essential.

Prerequisites:

EET 2310 or consent of instructor

Textbook(s) and Other Reference Materials Basic to the Course:


I. Week/Unit/Topic Basis:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to High Speed Computing; Cluster Development and Predecessors</td>
</tr>
<tr>
<td>2</td>
<td>Cluster Comparison</td>
</tr>
<tr>
<td>3</td>
<td>Current and Future Cluster Application</td>
</tr>
<tr>
<td>4</td>
<td>Cluster Basic Concepts</td>
</tr>
<tr>
<td>5</td>
<td>Hardware and Software Parallelism</td>
</tr>
<tr>
<td>6</td>
<td>Node Hardware</td>
</tr>
<tr>
<td>7</td>
<td>Assemble node</td>
</tr>
<tr>
<td>8</td>
<td>Cluster Operating Systems</td>
</tr>
</tbody>
</table>
II. Course Objectives*:

A. Illustrate understanding of various personal computer processors, architectures, and busses and their interchangeability or lack of it in a cluster environment. II III IV

B. Participate in a group project to build, configure and operate a cluster. III IV

C. Working knowledge of and hands-on experience in troubleshooting basic PC and cluster problems. III IV V

D. Use knowledge of and hands-on experience in basic up-grading and reconfiguring a PC. III IV V

E. Demonstrate working knowledge of and hands-on experience in up-grading and reconfiguring a cluster. I II III IV V

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

III. Instructional Processes*:

Students will:

1. Use professional tools to produce a PC cluster with documentation. Technological Literacy Outcome, Personal Development Outcome, Transitional Strategy

2. Learn to analyze and solve problems using structured analytical techniques. Technological Literacy Outcome, Numerical Literacy Outcome, Personal Development Outcome, Problem Solving and Decision Making Outcome, Active Learning Strategy

3. Use professionally accepted methods and materials in completion of HPC cluster project. Technological Literacy Outcome, Personal Development Outcome, Transitional Strategy

4. Practice elements of the work ethic such as punctuality, professionalism, dependability, cooperation, and contribution. Personal Development, Transitional Strategy

*Strategies and outcomes listed after instructional processes reference Pellissippi State’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. Explain the processes of maintaining an inventory of cluster hardware/upgrades and a log of cluster problems and repairs. A, B, C, D, E

2. Diagnose various problems encountered in the cluster and repair or replace hardware components as needed. D, E

3. Analyze and evaluate the components of various architectures and buses and their advantages and disadvantages in the cluster environment. D, E

4. Describe various microprocessors and their relative advantages to a particular job or application. D, E

5. Describe the kind of hardware and configuration necessary for a particular cluster. E

6. Identify the function of various cluster hardware components and their interchangeability or lack of it. B, C, D, E

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

V. Evaluation:

A. Testing Procedures:

Two comprehensive exams will be given during the course of the semester.

B. Laboratory Expectations:

Several lab assignments will be made during the course of the semester. A late penalty may be imposed on any overdue assignment. Individual and/or group projects may be assigned to emphasize practical solutions to database problems. Failure to satisfactorily complete any assigned projects may result in a grade of F for the course.

C. Field Work:

N/A

D. Other Evaluation Methods:

This information, if applicable, will be provided by the instructor in full detail during the first week of class via syllabus supplement.

E. Grading Scale:

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>90-100</td>
<td>A</td>
</tr>
<tr>
<td>80-89</td>
<td>B</td>
</tr>
<tr>
<td>70-79</td>
<td>C</td>
</tr>
<tr>
<td>60-69</td>
<td>D</td>
</tr>
<tr>
<td>Below 60</td>
<td>F</td>
</tr>
</tbody>
</table>

VI. Policies:

A. Attendance Policy:

Class attendance may affect your grade. 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.

B. Academic Dishonesty:

Plagiarism, cheating, software piracy, non-educational use of computer systems and other forms of academic dishonesty are strictly prohibited. A student guilty of academic misconduct, either directly or indirectly through participation or assistance, is immediately responsible to the instructor of the class. In addition to other possible disciplinary sanctions that 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.

C. Other Policies:

All exams are required, and make-ups will be allowed only in the rarest of cases. In the event of an emergency, notification of the instructor must be made in advance.

It is the student's responsibility to request help from the instructor prior to an assignment's due date.