PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

HPC DATA MINING
HPC 2700

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

NOTE: This course is not designed for transfer credit.

Catalog Course Description:

Data Mining is the automated extraction of hidden predictive information from databases. This technology is used to recognize patterns in data in order to discover new knowledge. This course provides an introduction into the use of existing tools developed for specific applications and background information about the development of new tools. Special emphasis will be placed on case studies using high performance computing (HPC) methods and techniques including pattern recognition, analysis and visualization. Class projects are designed to utilize HPC hardware and software.

Entry Level Standards:

College level reading and math skills; keyboarding skills of at least 20 wpm; familiarity with the Linux operating system as well as parallel computing methods and software languages; problem solving skills essential.

Prerequisites:

CSIT 1541 and HPC 1010 (NETW 2530); or consent of instructor

Textbook(s) and Other Course Materials:

Data Mining: Concepts and Techniques, Jiawei Han and Micheline Kamber, Morgan Kaufmann Publishers, August 2000, 550 pages. ISBN 1-55860-489-8

I. Week/Unit/Topic Basis:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Introduction and Data Mining Overview</td>
</tr>
<tr>
<td>2</td>
<td>The Role of HPC in Data Mining</td>
</tr>
<tr>
<td>3</td>
<td>The Basic Data Mining Toolbox</td>
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<tr>
<td>4</td>
<td>The Basic Data Mining Toolbox</td>
</tr>
<tr>
<td>5</td>
<td>Exploring and Visualizing Data</td>
</tr>
<tr>
<td>6</td>
<td>Exploring and Visualizing Data</td>
</tr>
</tbody>
</table>
II. Course Objectives:

A. Understand data mining in the context of high performance computing technology. II III IV VII IX XI XII

B. Recognize the tools of data mining their applicability and importance. III IV VII XI

C. Recognize the components of the various data mining models and appreciate how implementations may vary from the model. III IV VII IX XI XII

D. Understand the factors involved in the transformation of a conceptual data mining plan and prototype into a final working model. III IV VII IX XI XII

E. Appreciate the analysis and visualization functions. I II III IV V IX XI XII

F. Use a data mining tools package. III IV VI VIII IX

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

III. Instructional Processes:

Students will:

1. Use professional tools to produce software components and documentation. \textit{Technological Literacy Outcome, Personal Development Outcome, Transitional Strategy}

2. Learn to analyze and solve problems using structured analytical techniques. \textit{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 applications. \textit{Technological Literacy Outcome, Personal Development Outcome, Transitional Strategy}

4. Practice elements of the work ethic such as punctuality, professionalism, dependability, cooperation, and contribution. \textit{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 data mining in the context of high performance computing. A, B, C, D, E
2. Make practical use of the tools of data mining. D, E
3. Analyze and evaluate the components of data mining tools and models. D, E
4. Describe the basic factors operating in the functioning of data mining tools. D, E
5. Describe the internal functioning of data mining tools and systems. E
6. Understand the requirements for new data mining tools and systems. F
7. Identify and modify data mining tools and systems. B, C, D, E
8. Understand and be able to apply a data mining tools package. 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>Score Range</th>
<th>Grade</th>
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</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>
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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.