Introduction to Database Design

CST 1810

Class Hours: 3.0
Laboratory Hours: 3.0
Credit Hours: 4.0
Date Revised: Spring 02

Catalog Course Description:
A study of database management systems and their impact on information technology. Topics include database models, data modeling techniques, conceptual and physical design, storage techniques and data administration. Special emphasis will be put on relational systems and application of query languages using relational operations. Laboratory exercises will include database application design and development using desktop development tools.

Entry Level Standards:
The entering student should have a familiarity with the MS-DOS and the Windows environment. The student is expected to have moderate programming abilities in a high-level language. Problem solving skills will be essential. The student should be able to keyboard at least 23 words per minute.

Prerequisite:
CST 1540

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, Database Concepts, Processing and Development</td>
</tr>
<tr>
<td>2</td>
<td>The Database Environment, Database Models</td>
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<td>3</td>
<td>The Relational Model</td>
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<td>4</td>
<td>Database Planning, Design and Administration</td>
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<tr>
<td>5</td>
<td>The Entity-Relational Model</td>
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<td>6</td>
<td>Design Using the Entity-Relational Model, Exam I</td>
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<tr>
<td>7</td>
<td>Normalization</td>
</tr>
<tr>
<td>8</td>
<td>Normalization, Queries, Relational Algebra</td>
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</tbody>
</table>
II. Course Objectives*:

A. Understand the advantages and disadvantages of using a database management system rather than conventional filing methods. II III IV VII IX XI XII

B. Recognize the language of data definition and data manipulation and its importance. III IV VII XI

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

D. Understand the factors involved in the transformation of a conceptual design into a logical database design and to a physical database design. III IV VII IX XI XII

E. Appreciate the database administration function. I II III IV V IX XI XII

F. Use a database management package including use of a query language. III IV VI VIII IX

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

III. Instructional Processes*:

Students will:

1. Use professional tools to produce software components and 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 applications. 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 similarities and differences of hierarchical, network, and relational data models. C, D, E

2. Perform database normalization. D, E

3. Develop Entity-Relationship Models. D, E

4. Create a data dictionary. D, E

5. Describe the functions of data base administration. E

6. Develop applications using a development tool. F

7. Define schema and subschema and explain the generic terminology associated with them. B, C, D, E

8. Read a program specification block and construct the corresponding application program view of the data. E

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

V. Evaluation:

A. Testing Procedures:

Three comprehensive exams will be given during the course of the semester. Dates will be announced in class and each test will count 200 points of the final grade—600 points total. During summer semester, two 300-point exams will be given.

Quizzes and Homework Assignments: Unannounced quizzes and homework assignments will be given. These will count 100 points of the final grade.

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. Lab projects will count 300 points of the final grade.

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>Component</th>
<th>Points</th>
<th>Percentage</th>
<th>Grade Range</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Exam</td>
<td>200</td>
<td>(20%)</td>
<td>900-1000</td>
<td>A</td>
</tr>
<tr>
<td>Second Exam</td>
<td>200</td>
<td>(20%)</td>
<td>800-899</td>
<td>B</td>
</tr>
<tr>
<td>Final Exam</td>
<td>200</td>
<td>(20%)</td>
<td>700-799</td>
<td>C</td>
</tr>
<tr>
<td>Lab Assignments</td>
<td>300</td>
<td>(30%)</td>
<td>600-699</td>
<td>D</td>
</tr>
<tr>
<td>Quiz/Homework</td>
<td>+100</td>
<td>(10%)</td>
<td>Below 600</td>
<td>F</td>
</tr>
</tbody>
</table>
Total 1000 Points

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 caught cheating or infracting specific rules will be given a grade of "F" for 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.