Syllabus: IIM-I 340
Database Systems
Indiana University East
Fall, 2010

Course Web Site: http://mypage.iu.edu/~gdweber/iim/i340/

Scheduling Information

Location and time: HY 024, Tu Thu 5:30–6:45 p.m.
Frequency: Every spring semester
Start date: Tuesday, January 19
Last date to register: September 3
Final exam: Thursday, May 6

Introduction

Course Description

I340 Database Management [Systems] (3 cr.).
Prerequisites: IIM-I300 and either CSCI C243 or C343. Theory and principles of data management and database management systems. Relational DBMS, Structured Query Language [SQL], system development and programming techniques.

Prerequisite

In spite of the official prerequisites, there is very little dependence on CSCI-C 243 and none at all on IIM-I 300. Students entering this course should have had some experience of programming and developing software projects of moderate complexity and knowledge of the Java programming language; students concurrently enrolled in INFO-I 211 should be fine. Students who have taken
CSCI-C 243 will know something about the data structures that are used for indexing a database (search trees, hash tables), but that knowledge is only mildly beneficial in this course. We’re not going to be learning to make database system software like Oracle Corp., but rather learning to use it in developing application software.

Comments

1. This course is an introduction to database systems intended for those who will design and develop applications using an industrial-strength database management system.

2. It is not a management course.

3. It is not a systems programming course.

4. It is not a course in Microsoft Office Access.

This course is required for the MIS concentration in the BS in Business. It will be replaced by INFO-I 308 Information Representation, a required course for the BS in Informatics.

Learning Objectives

Campus Learning Objectives

These course learning objectives relate to the campus learning objectives (see Indiana University East Catalog, 2009–2010, page 13) as follows:

- “2. [Depth] Educated persons should have achieved depth in some field of knowledge. . . .” (depth in MIS or Informatics)
- “4. [Computation] Educated persons should be able to relate computational skills to all fields so that they are able to think with numbers. . . .” (relational algebra)
- “7. [Moral Knowledge] Educated persons should be expected to have some understanding of and experience in thinking about moral and ethical problems. . . .” (privacy of personal data)

Course Learning Objectives

(Letters D, C, and M reference the campus learning objectives above.) Students who successfully complete this course will be able to:

- Understand the relational model as the foundation of modern database systems; manipulate expressions in the relational algebra (D, C).

1http://www.iue.edu/catalog/
• Interpret and write SQL queries (D).

• Design a relational database for an enterprise, applying the entity-relationship model and the theory of normal forms (D).

• Understand and use other important aspects of database systems, including integrity constraints, security, index structures, and transactions (D).

• Understand the fundamentals of deductive database systems (D).

• Understand the differences and the merits of relational, object-relational, and object-oriented databases (D).

• Understand the role of XML in structuring data, and be able to work with XML files (D).

• Make ethical decisions concerning the use of databases (M).

• Understand the role of databases in decision support systems (DSS) and data mining (D).

Learning Resources


Coursepack (required) Available online.

Course web site (required) http://mypage.iu.edu/~gdweber/iim/i340/ Also accessible through Oncourse. Some parts of the web site may be password protected.

Oncourse https://oncourse.iu.edu/

Software (required) See links on the course web site.

Learning Activities and Measurement of Learning

There will be several individual homework assignments, a team project, midterm and final exams. Students may choose to do an additional, individual project.

Reading

Each student is expected to read the assigned chapters of the textbook before they are discussed in class. Read carefully. Take notes. Write down questions about anything you do not understand, and ask them in class.
Individual labs

Some assignments will be problems to be solved with pencil and paper; others will require work on the computer.

Optional individual project or paper

Students have the option of writing a term paper or doing a term project. A one-page proposal must be submitted to the instructor by the class day after the midterm exam and must be approved by the instructor. Two weeks before classes end, students will submit a 10- to 15-page paper or project report to the instructor, and in the final two weeks of the semester, give a 10 to 20-minute presentation of their work to the class.

Suggested topics for term papers:

1. Review of one or more database products.
2. Survey of a particular aspect of database systems, e.g., object-oriented or distributed databases.
3. Case study of the use of database systems in a particular industry or firm.

Projects may involve designing and implementing some kind of database application.

Required Team Project

The team project will involve design and implementation of a database, as directed by the instructor. If a team has two members, both will receive the same grade for the project. If a team has three or more members, each individual’s contribution to the project will be assessed, based on information from other team members, and will be a factor in the individual’s grade for the team project.

Exams

A midterm exam will cover the first half of the course. The final exam will emphasize material covered in the second half of the course, but will at least implicitly cover all previous material.

Makeup exams are given only for serious and documented reasons. The student must request the makeup using the same procedure and form as for extending the deadline of an assignment. In all cases, the request for a makeup should be made before the exam is given, or in case of emergency, by the end of the day of the exam.
<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual homework</td>
<td>200</td>
<td>25</td>
</tr>
<tr>
<td>Team project</td>
<td>200</td>
<td>25</td>
</tr>
<tr>
<td>Optional term paper/project</td>
<td>0 (100)</td>
<td>0 (10)</td>
</tr>
<tr>
<td>Midterm exam</td>
<td>100</td>
<td>25 (20)</td>
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<tr>
<td>Final exam</td>
<td>100</td>
<td>25 (20)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>600 (700)</td>
<td>100 (100)</td>
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Table 1: Estimated Point Distribution

<table>
<thead>
<tr>
<th>Percent Grade</th>
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<th>Percent Grade</th>
<th>Grade</th>
<th>Percent Grade</th>
<th>Grade</th>
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</thead>
<tbody>
<tr>
<td>96.667–100.000</td>
<td>A+</td>
<td>93.333–96.666</td>
<td>A</td>
<td>90.000–93.332</td>
<td>A−</td>
</tr>
<tr>
<td>86.667–89.999</td>
<td>B+</td>
<td>83.333–86.666</td>
<td>B</td>
<td>80.000–83.332</td>
<td>B−</td>
</tr>
<tr>
<td>76.667–79.999</td>
<td>C+</td>
<td>73.333–76.666</td>
<td>C</td>
<td>70.000–73.332</td>
<td>C−</td>
</tr>
<tr>
<td>66.667–69.999</td>
<td>D+</td>
<td>63.333–66.666</td>
<td>D</td>
<td>60.000–63.332</td>
<td>D−</td>
</tr>
<tr>
<td>0.000–59.999</td>
<td>F</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Grading Scale

**Activities Summary: Determination of Course Grade**

Table 1 shows an estimate of the number of pieces of graded work of each type and how they contribute to the course grade. (Students choosing the optional term paper or project use the points and percentage weights in parentheses.) Table 2 shows the grading scale.

**Advice**

1. *Read* the book. Take notes as you do so. Have a list of questions about anything you did not understand, ready to ask in class. The instructor will not read the textbook for you!

2. *Ask* the instructor if you need help.

**Lab**

The Linux Lab, in Tom Raper Hall 102, currently runs Fedora 11 Linux. The lab is reserved for CSCI-A 110 Thursdays 9:30 a.m. – 12:05 p.m., and may be reserved for other classes; please check the schedule by the lab door.

Students using a secure shell client may log in remotely to the Linux server, mis.iue.edu (= merlin.iue.edu), but not to the workstations in the lab. With VNC you can have a graphical remote login, but this works poorly with a slow Internet connection.

Please contact the IT Help Desk (Hayes Hall 169, telephone 765-973-8375) for any problems of lab access including locked doors, login and password. The lab should be open (unlocked) on
the same schedule as other campus computer labs: Monday–Thursday 8 a.m.–9 p.m. and Friday 8 a.m.–5 p.m.

Please see the Linux Lab Manual\(^2\) for further information.

**Notices**

**Late Homework**

One characteristic of good software is that it is delivered “on time,” and the same is true of homework, such as labs. Work that is turned in on time may earn full credit. Work turned in late will earn partial credit, up to 90\% for one week late, up to 80\% for two weeks late. I do not normally accept assignments that are more than two weeks late; however, in case of extraordinary circumstances, discuss the situation with me (earlier is better) and we may work something out.

**Attendance**

IU requires students to attend class.

*Merely not attending does not* withdraw a student from a course; see “Withdrawal” below.

Students who fail the course due to non-attendance will receive a grade of FN or FNN; these grades can result in termination and reversal (paying back) of financial aid.

**Lab Attendance**

Lab attendance is ordinarily required. However, you may be excused from lab if you have turned in all current assignments, and if there is no quiz or presentation of new material. Check with the instructor to be sure.

**Withdrawal**

Withdrawal from a course requires a withdrawal form. Normally, withdrawal must take place on or before the “last date for withdrawal with an automatic W”, which this semester is October 29. Withdrawal after that date requires the instructor to determine the grade as W, meaning the student was passing at the time of withdrawal, or WF, meaning the student was failing.

\(^2\)http://mypage.iu.edu/~gdweber/doc/labman/xhtml/index.html
Helping, Cheating, and Academic Honesty

See the IU East Standards of Student Conduct Policy\(^3\) and the Indiana University Code of Student Rights, Responsibilities and Conduct,\(^4\) especially the section “Academic Misconduct.”\(^5\)

Strict academic honesty is expected of all students. The IU code of student conduct provides serious penalties for cheating. All work turned in for credit must be substantially the work of the student (or students, if teamwork is authorized) turning it in. Other students needing help, except for simple questions, should be referred to the instructor.

It is part of my responsibility as instructor to help students who are having difficulty with their assignments. Don’t be ashamed or embarrassed to ask me for help! I want to help! (By the way: usually, I will try to help a student to think through the solution rather than directly provide an answer.)

Copying another person’s work is cheating, and so is providing the original work to another student for copying. In such cases, both students are equally guilty and will be equally punished. Do not share your work with other students or leave it lying around for anyone to pick up. There are usually many different ways to solve a problem; therefore, identical or very similar solutions are _prima facie_ evidence of cheating.

Disabilities

Students with disabilities (including physical, mental, sensory, and learning impairment) and wishing to receive auxiliary aids and services (“accommodations”) should fill out a Disability Accommodations Request Form\(^6\) and send it to the Student Support Services Office, early in the semester, and inform their instructor if appropriate. See the Services for Students with Disabilities Policy\(^7\) or contact Student Support Services for additional information.

Religious Observances

Students needing an accommodation for a religious observance (for example, rescheduling an exam from a date on which work is prohibited) should communicate their needs to the instructor, in accordance with the IU East “Religious Observances Policy”.\(^8\)

Student Athletes

Student athletes who are unable to attend class(es) because of any IU East athletic events must inform the instructor, during the first week of class, about the conflicting dates. The instructor

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\(^3\)http://www.iue.edu/organizations/senate/documents/Policies/studentaffairs/StudentConductPolicy090407.pdf
\(^4\)http://www.iu.edu/~code/
\(^5\)http://www.iu.edu/~code/code/responsibilities/academic/index.shtml
\(^6\)http://www.iue.edu/support/documents/DisabilityAccommodationsRequestForm.pdf
\(^7\)http://www.iue.edu/support/manual.php
\(^8\)http://www.iue.edu/organizations/senate/documents/Policies/studentaffairs/ReligiousObservancesPolicy090303.pdf
will inform students if accommodations can be made, the nature of the accommodations, and
the accommodations will be written and signed by instructor and student, with a copy available
for the coach. For details, see the IU East “Policy for the Approved Absence of Students
Participating in Athletic Events”.

**Contacting the Instructor**

**Name:** Gregory D. Weber

**Office** Locations: HY 238 (may vary to computer lab)

**Walk-in consulting hours:** ***TO BE ANNOUNCED***

**Additional times:** by arrangement

**Email:** Please use Oncourse Messages for class-related communications.

**Jabber/XMPP chat:** magister.informaticae@jabber.org

**SIP phone:** magister.informaticae@ekiga.net

**Personal home page:** [http://mypage.iu.edu/~gdweber/](http://mypage.iu.edu/~gdweber/) (this is not the course web site)

**Telephone:** (765) 973-8420 (voice); (765) 973-8550 (FAX).

**Schedule**

Tentative schedule, subject to change:

Readings are given by chapter; C = course pack; D = *Database System Concepts*. Please read
before class.

Projects/homework: I = individual, T = team. Exact dates for projects will be announced.

<table>
<thead>
<tr>
<th>Dates</th>
<th>Topics and Activities</th>
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<tbody>
<tr>
<td>Jan 19</td>
<td>C 1; D 1. Introduction.</td>
</tr>
<tr>
<td>Jan 21, 26</td>
<td>C 2; D 2. The relational model. I1 (two parts).</td>
</tr>
<tr>
<td>Jan 28; Feb 2, 4</td>
<td>C 3; D 3. SQL. I2.</td>
</tr>
<tr>
<td>Feb 9, 11</td>
<td>C 4; D 4. Advanced SQL. I3.</td>
</tr>
<tr>
<td>Feb 16, 18</td>
<td>C 5; D 5. Other database languages.</td>
</tr>
<tr>
<td>Mar 2, 4</td>
<td>Review and <strong>midterm exam</strong>. Begin T1.</td>
</tr>
<tr>
<td>Mar 9, 11, 16</td>
<td>C 7; D 7. Logical database design.</td>
</tr>
<tr>
<td>Mar 18</td>
<td>C 8; D 8. Application design and development, JDBC (new), beginning. T1 due, begin T2. Optional term project proposals due.</td>
</tr>
<tr>
<td>October 29</td>
<td>Last date to withdraw with an automatic W</td>
</tr>
<tr>
<td>March 23–28</td>
<td>Spring break; no class</td>
</tr>
<tr>
<td>Mar 30; Apr 1</td>
<td>C 8; D 8. Application design and development, JDBC (new), continuation. T2 due, begin T3.</td>
</tr>
<tr>
<td>Apr 6, 13</td>
<td>D 10. XML. I5.</td>
</tr>
<tr>
<td>Apr 13, 15</td>
<td>XML programming interfaces (new).</td>
</tr>
<tr>
<td>Apr 20</td>
<td>C 9; D 11–12. Physical database design. Optional written term paper or project report due.</td>
</tr>
<tr>
<td>Apr 22</td>
<td>C 10; D 15. Transactions. T3 due. Project presentations begin.</td>
</tr>
<tr>
<td>Apr 27</td>
<td>C 11; D 18. Data analysis and mining. Project presentations end.</td>
</tr>
<tr>
<td>Apr 29</td>
<td>Review.</td>
</tr>
<tr>
<td>May 4</td>
<td>(No class)</td>
</tr>
<tr>
<td>May 6</td>
<td><strong>Final exam.</strong> Exam will emphasize material covered during the second half semester, but understanding of earlier material is presupposed.</td>
</tr>
</tbody>
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