Course and Contact Information

Course: CSCI-2541w -- Database Systems  
Semester: Spring, 2018  
3 credit hours  
Lecture duration: 2.5 hours, Lab duration: 75 minutes

Instructor

Name: B. Narahari  
Phone: 202 994 8323  
E-mail: narahari@gwu.edu  
Office hours: Tues, Thurs 1:30—2:30pm

TA

Name: Roxana Leontie  
Email: roxana@gwu.edu  
Office hours: TBD

Catalog Description

Design of relational database systems and big data database systems. Relational query languages including SQL, relational schema design and implementation of relational database applications. Introduction to Not just SQL (NoSQL) database systems, types of NoSQL databases, design of NoSQL databases, design and implementation of NoSQL database applications. Team-software development, integration and testing. Co-requisite CSci 2113, Pre-requisite: CSci 1311.

Required Text(s)

- No required text
- Notes will be posted online, and several online resources will be provided.
- Recommended References:

Learning Outcomes

Upon completion of this course students should:

- Design and evaluate relational database schemas, apply normalization techniques.
- Understand formal relational query languages, and understand and write queries in SQL.
- Experience programming in SQL using commercial relational database management systems.
- Understand different types of NoSQL databases and experience application development for NoSQL systems.
- Improve technical writing skills, and write technical reports.
- Give oral presentation and demonstration of term projects.
- Able to build web applications, including both front end and backend, using different types of database systems to solve real world problems.
- Work in teams to design, program, integrate and test a database application.

Class Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Text</th>
<th>HW/Project</th>
<th>Lab</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Course Overview and Introduction to Relational DB Model</td>
<td>HW1 (writing)</td>
<td>Web Front End development skills: HTML, CSS</td>
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<tr>
<td>2</td>
<td>Formal Query Languages: Relational Algebra &amp; Calculus</td>
<td>HW2 HW1</td>
<td>PHP</td>
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<td>3-4</td>
<td>SQL Language and Programming in SQL</td>
<td>HW3 HW2</td>
<td>MySQL, PHP</td>
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<td>5</td>
<td>Theory of relational database schema design, and normal forms.</td>
<td>HW4; Project Phase1 HW3</td>
<td>MySQL</td>
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<tr>
<td>6</td>
<td>The ER model and ER-to-Relational Mapping. Review of Relational Model</td>
<td>HW5(writing) HW4</td>
<td>Technical Writing review and feedback. Teamwork exercises</td>
<td></td>
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<tr>
<td>7</td>
<td>Exam 1, and Topics in relational databases: Views, Security, Recovery, Indexing</td>
<td>HW6 (writing) HW5 Project Phase1</td>
<td>Project Phase 1 discussions and status check</td>
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<td>8</td>
<td>Overview of file management and indexing</td>
<td>HW6 Project Phase1</td>
<td>Unstructured and semi-structured data management (JSON, XML, etc.)</td>
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<td>9</td>
<td>Spring break</td>
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<td>10</td>
<td>Transaction processing, Recovery in relational databases.</td>
<td>Project Phase2</td>
<td>Project phase 1 demos</td>
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<td>11</td>
<td>Information retrieval systems and search engines. Introduction to Data analytics.</td>
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<td>Project phase 2 discussions and status check</td>
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<td>12-14</td>
<td>Management of unstructured and semi-structured data: Big data, NoSQL databases. Mapreduce and Hadoop.</td>
<td>HW7 (writing), HW 8 HW6</td>
<td>NoSQL DBMS</td>
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<td>14</td>
<td>Summary</td>
<td>HW 7 HW 8</td>
<td>Project Phase 2</td>
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NOTE: There is no final exam; instead there will be a final programming assignment and Project demos due.
Assignments and Grades

Grading

- 33% homeworks (some homeworks include lab exercises) including 10% Writing assignments
- 33% Exams – two mid-term exams
- 24% team based projects
- 10% in-class team exercises, in-lab exercises.

University Policies

University Policy on Religious Holidays

1. Students should notify faculty during the first week of the semester of their intention to be absent from class on their day(s) of religious observance.

2. Faculty should extend to these students the courtesy of absence without penalty on such occasions, including permission to make up examinations.

3. Faculty who intend to observe a religious holiday should arrange at the beginning of the semester to reschedule missed classes or to make other provisions for their course-related activities

Support for Students Outside the Classroom

Disability Support Services (DSS)
Any student who may need an accommodation based on the potential impact of a disability should contact the Disability Support Services office at 202-994-8250 in the Rome Hall, Suite 102, to establish eligibility and to coordinate reasonable accommodations. For additional information please refer to: gwired.gwu.edu/dss/

Mental Health Services 202-994-5300
The University's Mental Health Services offers 24/7 assistance and referral to address students' personal, social, career, and study skills problems. Services for students include: crisis and emergency mental health consultations confidential assessment, counseling services (individual and small group), and referrals. counselingcenter.gwu.edu/

Academic Integrity Code [NOTE: reference to the code should be made and the url provided]
Academic dishonesty is defined as cheating of any kind, including misrepresenting one's own work, taking credit for the work of others without crediting them and without appropriate authorization, and the fabrication of information. For the remainder of the code, see: studentconduct.gwu.edu/code-academic-integrity