University of Wisconsin-Whitewater

Curriculum Proposal Form #3

## New Course

**Effective Term:**

**Subject Area - Course Number:** **COMPSCI 366 Cross-listing:**

(See Note #1 below)

**Course Title:** (Limited to 65 characters) Introduction to Database Design and Development

**25-Character Abbreviation:** Introduction to Database

**Sponsor(s):** Jiazhen Zhou and Sobitha Samaranayake

**Department(s):** Mathematical and Computer Sciences

**College(s):**

# **Consultation took place**: [x]  NA [x]  Yes (list departments and attach consultation sheet)

Departments: Information Technology and Supply Chain Management

**Programs Affected:** **Computer Science Program**

**Is paperwork complete for those programs?** (Use "Form 2" for Catalog & Academic Report updates)

[ ]  NA [x]  Yes [ ]  will be at future meeting

**Prerequisites:** COMPSCI 223

**Grade Basis:** [x]  Conventional Letter [ ]  S/NC or Pass/Fail

**Course will be offered:** [ ]  Part of Load [ ]  Above Load

 [x]  On Campus [ ]  Off Campus - Location

**College:**  **Dept/Area(s):** Computer Science

**Instructor:** Jiazhen Zhou and Sobitha Samaranayake

 *Note: If the course is dual-listed, instructor must be a member of Grad Faculty.*

**Check if the Course is to Meet Any of the Following:**

[ ]  Technological Literacy Requirement [ ]  Writing Requirement

[ ]  Diversity [ ]  General Education Option:

Note: For the Gen Ed option, the proposal should address how this course relates to specific core courses, meets the goals of General Education in providing breadth, and incorporates scholarship in the appropriate field relating to women and gender.

**Credit/Contact Hours:** (per semester)

Total lab hours: 0 Total lecture hours: 48

Number of credits: 3 Total contact hours: 48

**Can course be taken more than once for credit? (Repeatability)**

[x]  No [ ]  Yes If "Yes", answer the following questions:

No of times in major:       No of credits in major:

No of times in degree:       No of credits in degree:

Proposal Information: ([***Procedures for form #3***](http://acadaff.uww.edu/UCC/Curriculum_Handbook_09/Procedures_form3.docx))

**Course justification:**

A database course is a core course of the Computer Science major in almost every university. Database related software development has some of the fastest job growth in computer science areas. Having such a core course not only fulfills a strong computer science program, but also provides our graduates better career chances. The course aims to find a balance between theoretical fundamentals and application development, which will prepare students for both research and development of database systems. Compared with ITSCM314 - Advanced Database Design and Administration, this course puts more emphasis on fundamental understanding of the theory and practice of data representation, query languages, and their interrelationships. It also addresses advanced database system design and analysis topics such as storage and indexing, query evaluation, transaction management, and concurrency control.

**Relationship to program assessment objectives:**

The following Computer Science program objectives are at least partially addressed by this course.

To provide students with:

* Technical, analytic, problem solving skills required for an entry-level position.
* Hands-on experience with appropriate technology.
* High level of adaptability to new technology and a commitment to continual learning.
* Group and individual communication skills.
* Professional and personal development skills.

**Budgetary impact:**

**(1) Staffing:** Several members of the current Computer Science staff have the expertise necessary to staff this course. It is anticipated that Dr. Jiazhen Zhou and Dr. Sobitha Samaranayake will initially be the instructors. Computer laboratory space on campus is already sufficient to run this course. However, as a core course in general computer science major and comprehensive major, this course will be offered once a year. Additional staffing budget is needed, but can be addressed by hiring adjunct faculties to cover lower level computer science courses to enable the current faculties to teach more high level courses.

**(2) Academic unit library and service & supply budget:** It is not anticipated that this course will affect the department’s service & supply or library budget.

**(3) Impact on campus instructional resource units:** This course will serve as a course for the comprehensive computer science major and the general computer science major.

**(4) Laboratory facilities:** adequate lecture space is available. This course can be taught in any classroom or lab rooms such as McGraw 115 or Hyer 210.

**Course description:** (50 word limit)

### This is an introductory database systems course. It offers students an introduction to the design, analysis, and programming of database systems. The main contents include entity-relationship, the relational model, SQL, JDBC, web database applications, data storage and indexing, query evaluation, transaction management, and physical database design and tuning.

**If dual listed, list graduate level requirements for the following:**

1. **Content** (e.g., What are additional presentation/project requirements?)

2. **Intensity** (e.g., How are the processes and standards of evaluation different for graduates and undergraduates? )

3. **Self-Directed** (e.g., How are research expectations differ for graduates and undergraduates?)

**Course objectives and tentative course syllabus:**

The objectives of this course include:

* Fundamental understanding of the theory and practice of data representation, query languages, and their interrelationships.
* Theoretical understanding of algorithms, performance optimization, and data structures for data storage, query evaluation, transactional consistency, and concurrency control.
* Hands-on experience with database programming that involves JDBC and XML.
* Hands-on experience with developing database management systems.

**Bibliography:** (Key or essential references only. Normally the bibliography should be no more than one or two pages in length.)

1. Modern Database Management (11th edition) by J. Hoffer, V. Ramesh, and H. Topi, Prentice Hall, 2012
2. Database System Concepts (6th edition) by A. Silberschatz, H. Korth, and S. Sudarshan, McGraw-Hill, 2012
3. Database Systems: Design, Implementation, and Management (10th edition) by C. Coronel, S. Morris, and P. Rob, Cengage Learning, 2012

The University of Wisconsin-Whitewater is dedicated to a safe, supportive and    non-discriminatory learning environment.  It is the responsibility of all undergraduate and graduate students to familiarize themselves with University policies regarding [Special Accommodations](http://www.uww.edu/StdRsces/csd/academic_index.php), [Academic Misconduct](http://www.uww.edu/Catalog/02-04/Legal/legal1.html#Misconduct), [Religious Beliefs Accommodation](http://www.uww.edu/Catalog/02-04/Legal/legal5.html), [Discrimination](http://www.uww.edu/Catalog/02-04/Legal/legal6.html) and [Absence for University Sponsored Events](http://www.uww.edu/Catalog/02-04/Legal/legal1.html#Misconduct) (for details please refer to the Schedule of Classes; the [“](file:///C%3A%5CZhou%5C2014%5CTenureTrack%5Cwww.uww.edu%5CCatalog%5C02-04%5CLegal%5CLegal1.html)[Rights and Responsibilities](http://www.uww.edu/Catalog/02-04/Legal/Legal1.html)[”](file:///C%3A%5CZhou%5C2014%5CTenureTrack%5Cwww.uww.edu%5CCatalog%5C02-04%5CLegal%5CLegal1.html) section of the [Undergraduate Catalog](http://www.uww.edu/Catalog); [the Academic Requirements](http://www.uww.edu/gradstudies/catalog0608/Gradpolicies.php#academicinformation) and Policies and the [Facilities and Services](http://www.uww.edu/gradstudies/catalog0608/Gradpolicies.php#facilitiesandservices) sections of the [Graduate Catalog](http://www.uww.edu/gradstudies/catalog0608/gradcat0608.php); and the “[Student Academic Disciplinary Procedures](http://www.uww.edu/stdhdbk/uwsystem.html) (UWS Chapter 14); and the “[Student Nonacademic Disciplinary Procedures](http://www.uww.edu/stdhdbk/uwsystem.html)" (UWS Chapter 17).

## COMPSCI 366: Introduction to Database Design and Development

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| --- |
| Dr. Jiazhen Zhou Email: zhouj@uww.edu Office: Laurentide 2226 Office Hours: MTWR 10:00 AM – 10:50 AM or by appointmentPhone: (262) 472-5172 Class website: D2L |

### Course Description

### This is an introductory database systems course that combines system analysis and application development. It offers students an introduction to the design and programming of database systems. The main contents include: database fundamentals that cover the entity-relationship, the relational model, and the relational algebra; database application development centered around query language SQL that involves JDBC and web database applications; and analysis on advanced database management that include data storage and indexing, query evaluation and optimization, transaction management, and physical database design and tuning.

Prerequisite: COMPSCI 223

**Objective**

* Fundamental understanding of the theory and practice of data representation, query languages, and their interrelationships.
* Theoretical understanding of algorithms, performance optimization, and data structures for data storage, query evaluation, transactional consistency, and concurrency control.
* Hands-on experience with database programming that involves JDBC and XML.
* Hands-on experience with developing database management systems.

### Text Books

* R. Ramakrishnan and J. Gehrke , *Database Management Systems, 3rd ed.* , McGraw-Hill, 2003. ISBN-10: 0072465638

### Tentative Schedule

|  |  |  |  |
| --- | --- | --- | --- |
| **Week** | **Topics Covered** | **Reading** | **Activities** |
| **1** | Introduction  | Chapter 1  |  |
| **2** | Entity-Relationship (ER) Model  | Chapter 2  |  |
| **3** | Relational Model  | Chapter 3  |  |
| **4** | Relational Database Design  | Chapter 3  |  |
| **5** | Relational Algebra and Calculus | Chapter 4  |  |
| **6** | Basic SQL  | Chapter 5  |  |
| **7** | Triggers in SQL  | Chapter 5  | Project 1 due |
| **8** | Midterm  |  |  |
| **9** | JDBC | Chapter 6 |  |
| **10** | Internet Applications, XML | Chapter 7 | Project 2 due |
| **11** | Storage and Indexing | Chapter 8 |  |
| **12** | Query Evaluation | Chapter 12 |  |
| **13** | Transaction Management | Chapter 16 |  |
| **14** | Concurrency control | Chapter 16 |  |
| **15** | Physical Database Tuning | Chapter 20 | Project 3 due |
| **16** | Final Week |  |  |

# **Grading** **Policy**

|  |  |
| --- | --- |
| **GRADABLE** | **Percentage** |
| Project development | 40% |
| Labs | 20% |
| Midterm | 15% |
| Final Exam | 25% |
| **Total** | **100%** |

The final grades will be awarded on the following basis:

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Percentage** | 93 - 100% | 90 - 92% | 87 - 89% | 83 - 86% | 80 - 82% | 77 - 79% | 73 - 76% | 70 - 72% | 67 - 69% | 63 - 66% | 60 - 62% | 0 - 59% |
| **Grade** | A | A- | B+ | B | B- | C+ | C | C- | D+ | D | D- | F |

**Attendance and participation**

Class participation is very important and will be based on class attendance, punctuality, ability to contribute in class discussions, answer questions and coming prepared to class with assigned readings. All students are expected to prepare for and participate in all of classes except absences for university-sponsored events, absences caused by medical reasons in which cases, doctor’s notes are required, or absences by family emergencies which will be determined on case-by-case basis.

**Absence for University-Sponsored Events:**

University policy adopted by Faculty Senate and the Whitewater Student Government states that students will not be academically penalized for missing class in order to participate in university-sanctioned events. They will be provided an opportunity to make up any work that is missed; and if class attendance is a requirement, missing a class in order to participate in a university-sanctioned event will not be counted as an absence. A university-sanctioned event is defined to be any intercollegiate athletic contest or other such event as determined by the Provost. Activity sponsors are responsible for obtaining the Provost’s prior approval of an event as being university-sanctioned and for providing an official list of participants. Students are responsible for notifying their instructors in advance of their participation in such events.

**University Statement**

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