### Course Approval Form

**Action Requested:**
- [x] Create new course
- [ ] Inactivate existing course
- [ ] Modify existing course (check all that apply)
  - [ ] Title
  - [ ] Credits
  - [ ] Prereq/coreq
  - [ ] Schedule Type
  - [ ] Repeat Status
  - [ ] Grade Type

**Course Level:**
- [x] Graduate
- [ ] Undergraduate

**College/School:**
College of Science

**Department:**
CDS

**Subject Code:**
CDS

**Number:**
502

**Effective Term:**
- [x] Fall
- [ ] Spring
- [ ] Summer

**Title:**
Scientific Data and Databases

**Credits:**
- [x] 3

**Repeat Status:**
- [x] Not Repeatable (NR)

**Grade Mode:**
- [x] Regular (A, B, C, etc.)

**Schedule Type:**
- [x] Lecture (LEC)

**Prerequisite(s):**
- CDS 130 or CDS 101; or permission of instructor

**Restrictions Enforced by System:**
- Major, College, Degree, Program, etc. (include code)

**Equivalencies:**
- [ ] YES, course is 100% equivalent to:
- [ ] YES, course is being renumbered to/will replace the following:

**Catalog Copy for NEW Courses Only**
(Consult University Catalog for models)

**Description**
Data and databases used by scientists. Includes basics about database organization, queries, and distributed data systems. Student exercises will include queries of existing systems, along with basic design of database systems. Examples from different disciplines will be given.

**Hours of Lecture or Seminar per week:**
- [x] 3

**When Offered:**
- [x] Fall
- [ ] Summer
- [x] Spring

**Approval Signatures**

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<th>Unit Name</th>
<th>Unit Approval Name</th>
<th>Unit Approver’s Signature</th>
<th>Date</th>
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**For Graduate Courses Only**

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<th>Graduate Council Member</th>
<th>Provost Office</th>
<th>Graduate Council Approval Date</th>
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**For Registrar Office’s Use Only:**
Banner_________________ Catalog_________________

(revised 6/22/15)
Course Proposal Submitted to the College of Science Curriculum Committee (COSCC)

The form above is processed by the Office of the University Registrar. This second page is for the COSCC’s reference. Please complete the applicable portions of this page to clearly communicate what the form above is requesting.

FOR ALL COURSES
Course Number and Title: CDS 512- Scientific Data and Databases

Date of Departmental Approval: 09/03/2015

FOR INACTIVATED/REINSTATED COURSES  N/A

FOR MODIFIED COURSES N/A

FOR NEW COURSES
• Reason for the New Course: To provide these course topics at the graduate level. This new course will frequently be cross-listed with CDS 302- Scientific Data and Databases.

• Relationship to Existing Programs: A lower-level graduate course in scientific data and databases that can be within reach of graduate students outside of the CDS department (the only other graduate courses that cover this subject are at the 600-level and above which are quite challenging for students outside of CDS’s MS or PhD programs).

• Relationship to Existing Courses: Similar to CDS 302, but with graduate-level expectations.

• Semester of Initial Offering: Fall 2016
Prerequisites: MATH 125, STAT 354 or permission of instructor  
Credits: 3  
Instructor: TBD  
Office Hours: TBD

Course Description:  
This course will introduce databases, data concepts, and object-oriented data management. The first part of the course will present personal databases and commercial level databases including schema construction, query languages, complex query structures, database management and database programming. The second part of the course will review components of a programming language (Python, C++, Java or equivalent) for three purposes. The first is to create the ability to seamlessly employ database queries into client side programming, the second is to explore object-oriented data structures, and the third is to create a web-based interactive interface for clients.

Lecture Content:  
- Spreadsheets and Data Sets  
- Database Ideology, Personal Databases  
- Creating Databases and Tables, Schema Design, Language of Databases  
- Simple queries, SQL Commands, Data Types and Sorting  
- Complicated Queries  
- Views and SQL Programming  
- Introduction to a sequential programming language (Python, C++, Java, or equivalent), Connecting to MySQL  
- Object-Oriented Programming and Object-Oriented Data Management  
- GUI Interface  
- CGI and an Introduction to HTML  
- Link Analysis  
- Issues in Data Fusion  
- Student Presentations

Homework:  
Students will use on-line and computational resources to explore database queries, data management, algorithms and user interfaces.

Project:  
A semester project will allow the student to personally explore a single topic in data management and database queries. Students will deliver short oral presentations of their project to the class.
**Exams:**
Midterm and final exams will be given, based on the content of the lectures and the homework assignments. Short essays as well as analytic calculations about problem complexity, time, and simple examples from programs will be used.

**Grades:**
- Homework (25%)
- Projects (15%)
- Midterm (30%)
- Final Exam (30%)

**Required Text:**