IS 525: Data Warehousing and Business Intelligence
Course Syllabus for Spring 2022

Last modified: January 6, 2022

School of Information Science University
of Illinois at Urbana-Champaign

NOTE: Details here will be altered during the semester if necessary. Any substantive changes will be announced in class and/or via our Class Forums.

IS 525 A class meets Tuesdays 4:00pm-6:00pm
IS 525 B class meets Thursdays from 2:00pm-4:00pm

Instructor: Michael Wonderlich, mcwonder@uillinois.edu, (217) 265-6513

Please check Course Web Site for my office hours.

TOPICAL HIGHLIGHTS (not necessarily in this order)

- The course will focus on data warehousing and business intelligence fundamentals while learning general-purpose, portable skills that have widespread usage and support across fields of data analytics, data processing, web applications, and scalable "big data" systems. This is both to enable the students' work in subsequent iSchool technical courses and to develop a marketable job skill.
- Learn the basics of business intelligence and information presentation, to help understand why/how to choose delivery method for a given purpose.
- Learn to use the fundamental data types and most common data structures (e.g. numeric types, strings, Booleans) with some typical patterns for use. Learn their relationship to analytics.
- Learn how to read and create data models.
- Learn standard practices for ETL. Hands-on practice with Talend Open Studio.
- Perform basic statistical analysis and graphing on data sets.
- Learn best practices for data visualization.
- Learn the steps involved in a data acquisition project for a data warehouse or data mart.
- Learn how to interpret functional requirements to produce effective Business Intelligence products.
- Hands-on practice with Business Intelligence development products (e.g. Business Objects Web Intelligence, Tableau Desktop, Microsoft Power BI)

LEARNING OBJECTIVES

- Building a data warehousing and business intelligence environment
  - What are the primary components
  - What are the key services/technology
  - What are the primary roles in the project
- Defining the Data Warehouse/Business Intelligence Project
  - Requirements gathering
  - Requirements analysis
  - Understanding the goals
- Designing a Data Warehouse
  - Which modelling methodology

        - Kimball
        - Inmon
    - Organizing the data warehouse
    - Security the data
    - Creating the data model
- Loading the Data Warehouse
    - Source-to-Target Maps
    - Extract, Transform, Load
    - Data Cleansing
    - Data Quality
    - Talend Open Suite
- Basic SQL
- What is Business Intelligence
    - Reporting
    - Data Analysis
    - Data Visualization
    - Dashboards
    - Predictive Analytics
- Hands-On Practice with
    - Dimensional Modeling
    - Talend Open Studio
    - SAP Business Objects Web Intelligence
    - Microsoft Power BI
    - Tableau Desktop/Server
- Best practices in data visualization
    - Creating effective data visualizations
    - Using the best tool for the task
    - Designing effective dashboards and scorecards
- New technologies in data organization
    - Hadoop
    - NoSQL
    - Unstructured Data
    - Data Warehouse Appliances
- Final Project in Data Warehousing or Business Intelligence

REQUIRED TEXTBOOK

Storytelling With Data: A Data Visualization Guide for Business Professionals, by Cole Nussbaumer Knaflic

ISBN 978-1119002253 Price on Amazon is $19.25

SUGGESTED TEXTBOOKS (not required, but excellent sources of information)

The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling, 3rd Edition, by Richard Kimball and Margy Ross

The Data Warehouse Lifecycle Toolkit, 2nd Edition, by Richard Kimball and Margy Ross

Data Warehouse Design Solutions, by Christopher Adamson and Michael Venerable

Information Dashboard Design: Displaying Data for At-a-Glance Monitoring**,** by Stephen Few

Practical Business Intelligence, by Ahmed Sherif

SAP BusinessObjects Reporting Cookbook, by Yoav Yahav

Tableau 10 Business Intelligence Cookbook, by Donabel Santos

Data Mining for Dummies, by Meta S. Brown

Instant Weka How-to, by Boštjan Kaluža

The Big Book of Dashboards, by Steve Wexler, Jeffrey Shaffer and Andy Cotgreave

The Wall Street Journal Guide to Information Graphics: The Dos and Don'ts of Presenting Data, Facts, and Figures*, by Dona M. Wong*

Performance Dashboards – Measuring, Monitoring, and Managing your business*, 2nd Edition, by Wayne Eckerson*

Data Science for Business: What you need to know about data mining and data-analytic thinking*, by Foster Provost and Tom Fawcett*

Too Big to Ignore: The Business Case for Big Data*, by Phil Simon*

Successful Business Intelligence: Unlock the Value of BI & Big Data*, 2nd Edition, by Cindi Howson*

Business Intelligence Roadmap: The Complete Project Lifecycle for Decision-Support Applications*, by Larissa T. Moss and Shaku Atre*

Business Intelligence Guidebook: From Data Integration to Analytics*, by Rick Sherman*

Library Resources

http://www.library.illinois.edu/lis
lislib@library.illinois.edu
Phone: 217-300-8439

TECHNOLOGY REQUIREMENTS

Participation in IS525 will require you to bring your own laptop computer to class on some days (announced in advanced). It needs to be reasonably current hardware and operating system in properly functioning condition, or it will be a source of frustration for you and the class. Some of the software is Microsoft Windows specific, but some is available for Mac OS X and Microsoft Windows. If you have a Mac, accommodations will be made for the Windows specific software. However, iPads and most other tablet

computers are not capable of running the software we'll be using, even with a keyboard. If you have any doubts, please consult the instructor.

All the software we'll use in the class will either be free open source, commercial with licenses making it free for academic use, or provided free through the University's WebStore. You will receive instructions on installation and use of the software as part of the course.

READINGS AND COURSE CALENDAR

This information will be maintained in the Moodle course site.

COURSE GRADING

The components of the course grade are 35% for regular assignments combined, 30% for quizzes, 25% for the final project, 5% discussion forum contributions, 5% class participation. The homework assignments will vary in complexity, so they may be weighted accordingly. There will be no traditional in-class final exam – instead, the final project is due during finals week.

For the assignments requiring problem solutions to be submitted, late submissions may be accepted. Late submissions will have significant penalties. Some assignments will not be accepted late except in cases of emergency. (Reason: Late submissions make it impossible to post or discuss solutions with the class on a timely basis.) If you have an emergency, contact the instructor as early as possible to avoid impacting your grade.

There may be some suggested exercises that will be self-evaluated. In other words, you should do them for learning and reinforcement practice, but they won't be graded.

Grade scale:
A 94-100; A- 90-93.9; B+ 87-89.9; B 83-86.9; B- 80-82.9; C+ 77-79.9; C 73-76.9; C- 70-72.9; D 65-69.9; F < 65.

Qualitative Grading: When subjective evaluation is used to assign a score for an assignment or part thereof, this qualitative scale will be used as a guide:

- A: Demonstrates solid understanding of the material, followed instructions carefully, and completed the work with zero or minor errors/omissions. Where applicable, shows creativity or ingenuity in appropriately adapting course concepts to realistic scenarios.
- B: Demonstrates good understanding of the material, completed the assignment and made a few minor or moderate errors/omissions. Shows some ingenuity where applicable.
- C: Demonstrates partial understanding of the material, completing the work with some notable problems.
- D-F: Demonstrates very poor understanding of the relevant material and/or did not follow instructions well to substantially complete the work. Zero credit for problems/sections not performed.

NO COURSE INCOMPLETES

Do not plan on requesting an incomplete status for this course. If you are unable to keep up with the classwork even with moderate assistance, please notify the instructor and drop the course before the last date permitted. ***The instructor will only grant incompletes for justifiably dire, unavoidable, and documented reasons such as protracted hospitalization.***

CLASSROOM CONDUCT

Class sessions will include lectures and respectful, relevant orderly discussion is encouraged and expected. Cell phones should be turned off or silent. The use of computers in the classroom is expected for course-relevant purposes such as using our Moodle site, consulting on-line documentation, taking notes, and of course doing the in-class exercises. However, unrelated activities such as texting, instant messaging, emailing, gaming, Facebook, and other recreational web browsing are limited to outside the class or during designated break times. Even if you have mastered the material being discussed at the time, those activities will be distracting to other students and/or the instructor.

Food & Drink: Given that we'll have many computers in our classroom, please avoid having food at the tables and make sure any liquids are in spill-resistant containers.

If you need the restroom or have a personal crisis during class, quietly dismiss yourself as necessary. Your instructor also understands that personal and family emergencies can occur.

ASSIGNMENTS

Assignments will be posted as we discuss the relevant subject matter in class or earlier and are due typically about 6 days thereafter (before the next class). Due dates for assignments will be shown in Moodle. All submissions must be uploaded to the Moodle space unless otherwise indicated. Please include your name inside all submitted files.

If you have a serious health or personal crisis affecting your performance, please let the instructor know as soon as possible.

ATTENDANCE AND CLASS PARTICIPATION

The students who actively engage with the material in class typically understand and retain much more of the material than those who are just passive. Also, the class is far more interesting and educational to everyone when students share their knowledge and questions in class. To encourage this critical participation, there is an adjustment made to the final course grade based on your participation level.

Expectations include asking and answering questions in class, actively contributing to in-class discussions and group activities, aiding other students via the Moodle forums, and sharing other relevant and helpful information. Some of the assignments/activities will involve posting your individual or group work to the forums, which then provides more opportunities to constructively comment on and learn from each other's work.

Enrollment in the course includes the expectation of regular attendance. If you must miss class (especially more than once), please notify the instructor. If your absence may impact your ability to submit an assignment or complete a quiz/exam on time, you must talk to the instructor a **minimum of three days before** the due date unless the absence is due to an unexpected emergency. Then you must contact the instructor at the earliest opportunity.

For all group assignments, every group member is expected to contribute substantially to the work, shared as equitably as feasible. If a situation arises where a group member does not participate and contribute substantially, inform the instructor so compensation can be made as necessary.

LECTURE RECORDINGS

Privacy Notification and Policy for Video Recording of Synchronous Class Sessions

We will be recording the class sessions, or portions of the class, for students who are unable to attend synchronously. The recording feature for others is disabled so that no one else will be able to record this session through Zoom or Blackboard Collaborate. Recording by other means is not permitted. The recorded class sessions will be posted on our Moodle class website unless otherwise notified.
If you have privacy concerns and do not wish to appear in the recording, turn OFF your video and notify me in writing (via email) prior to the next class session. If you prefer to use a pseudonym instead of your name, please let me know what name you will be using, so that I can identify you during the class session. If you would like to ask a question, you may do so privately through the chat feature by addressing your question to me or your TA only (and not to "everyone"), or you may contact me or your TA by another private method, which we will agree upon in advance of class. If you have questions or concerns about this video recording policy, please contact me before the end of the first week of class.

PREREQUISITES AND ASSIGNED READINGS

You should read the assigned material *before* the class, so you can ask better questions and participate thoroughly in discussions. Some sections may require multiple readings supplemented with class participation to fully understand.

There are no mathematics, programming, or computer science prerequisites for this course, so the instructor aims to present the essential topics and tools in an accessible and pragmatic manner.

ASSISTANCE, STUDY GROUPS, AND INDIVIDUAL WORK

Some of the material is abstract or technical and can be difficult for some students at first. Despite this, with diligence and study you can learn everything you need to be successful in the class.

The instructor can provide additional assistance outside the classroom as described above. Also, your instructor permits and encourages students to study together in person or have discussions through Moodle forums to help each other learn and puzzle through the concepts of the course and to help troubleshoot technical problems that may occur using the software. Please take care that your assistance does not go so far as blatantly sharing the answers to assignments.

Individual study and skills practice is also critical to developing complete understanding so you can apply these skills in later courses or non-academic computing work. Exceptions: Any assignments for which group submissions are permitted will clearly say so in the instructions.

ACADEMIC INTEGRITY

Please review and understand the academic integrity policy of the University of Illinois at http://admin.illinois.edu/policy/code/article1_part4_1-401.html. By submitting course materials for grading, you certify that all work presented is your own and has been done by you independently, or as a member of a designated group (for group assignments only).

If, in the course of your writing, you use the words or ideas of another writer, proper acknowledgement must be given. Not to do so is to commit plagiarism, a form of academic dishonesty. If you are not absolutely clear on what constitutes plagiarism and how to cite sources appropriately, now is the time to learn. Please ask me!

Be aware that the consequences for plagiarism, exam cheating, or other forms of academic dishonesty can be severe. Students who violate University standards of academic integrity are subject to disciplinary action, including a reduced grade, failure in the course, and suspension or dismissal from the University.

Criteria for grading homework assignments include (but are not limited to) creativity and the amount of original work demonstrated in the assignment. However, students are permitted to use and adapt the work of others, provided that the following guidelines are followed:

- Use of other people's material must not infringe the copyright of the original author, nor violate the terms of any licensing agreement. Know and respect the principles of fair use with respect to copyrighted material.
- Students must scrupulously attribute the original source and author of whatever material has been adapted for the assignment. Summarize the changes or adaptations that have been made. Make plain how much of the assignment represents original work.

STATEMENT OF INCLUSION

http://www.inclusiveillinois.illinois.edu/chancellordivstmtswf.html#ValueStmt

As the state's premier public university, the University of Illinois at Urbana-Champaign's core mission is to serve the interests of the diverse people of the state of Illinois and beyond. The institution thus values inclusion and a pluralistic learning and research environment, one which we respect the varied perspectives and lived experiences of a diverse community and global workforce. We support diversity of worldviews, histories, and cultural knowledge across a range of social groups including race, ethnicity, gender identity, sexual orientation, abilities, economic class, religion, and their intersections.

ACCESSIBILITY STATEMENT

To obtain disability-related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor and the Disability Resources and Educational Services (DRES) as soon as possible. To contact DRES you may visit 1207 S. Oak St., Champaign, call 333-4603 (V/TTY), or e-mail to disability@illinois.edu.

This syllabus may be obtained in alternative formats upon request. Please contact the instructor.