ITP499 - In-Memory DBMS and Analytics

Instructor: Richard W. Vawter
Office: OHE 530B
E-Mail: vawter@usc.edu
Phone: (213) 740-9541

ITP 499, Fall 2013
Location: OHE 542
Mon. 2:00-4:50 p.m.

Office Hours: Tues. 11:00 - 12:00 p.m.
Wed. 10:00 - 12:00 p.m.
Thurs. 11:00 - 12:00 p.m.
or by appointment

Class Web Page:
https://blackboard.usc.edu/
or
http://www-bcf.usc.edu/~vawter/classes.html

Course Description:

Recent breakthroughs in multi-core architectures and the availability of large amounts of main memory at low costs have made in-memory database management possible, thus enabling enterprises to collect and analyze vast amounts of data in real time, transforming the way we perform analytics. This course is designed to provide the student with a thorough understanding of the architecture, tools, capabilities, and use of in-memory database applications. Students will be presented with examples of how organizations analyze their business operations,

Objective:

At the completion of the course, students will be able to…

- Explain the architecture of in-memory database management systems
- Model and prepare for data population
- Graphically represent the data using dashboards
- Make strategic business decisions based upon analytic results
- Administer and operate an in-memory database management system

Suggested Textbooks:

- In-Memory Data Management, 2nd edition, by Hasso Plattner and Alexander Zeier, Springer, ©2012, ISBN: 978-3-642-29574-4
- SAP HANA, An Introduction, by Bjarne Berg and Penny Silvia, SAP Press, ©2012, ISBN: 978-1-59229-434-3
- SAP Hana Essentials, by Jeffrey Word, , ebook version: http://www.saphanabook.com/

Suggested References

- University Alliance – SAP HANA Academy: http://scn.sap.com/community/uac/hana
- SAP HANA Academy: http://www.saphana.com/community/implement/hana-academy
- Online course in In-Memory Computing by Dr. Hasso Plattner: https://openhpi.de/course/imdb

Class Schedule:

Class	Topic	Suggested Reading	Assignment
1. Aug. 26	Course Overview Overview of In-Memory database management	Plattner: Introduction & Ch.1 Word: Ch. 1	Demo: Customer Usage Analytics
2. Sept. 2	***Labor Day Holiday***		
3. Sept. 9	Standard Relational Database Management Systems	Class Notes	**Project #1** – Overview of RDBMS, due Sept. 16
4. Sept. 16	Architecture of In-Memory Database Management Systems	Plattner: Ch.4.1 – Ch.4.4 Berg: Ch. 5.6 Word: Ch. 2	**Project #2** – Overview of In-Memory DBMS, due Sept. 23
5. Sept. 23	Reporting and Analytics Intro to the Bus. Explorer	Berg: Ch.6	**Project #3** – Intro to HANA Explorer, due Sunday, Sept. 30, before 5:00 pm
6. Sept. 30	**Exam #1** Data Provisioning	Berg: Ch.10 Word: Ch. 6	**Project #4** – Data Provisioning, due Oct. 7
7. Oct. 7	Data Modeling with SAP HANA Studio - Modeler	Berg: Ch.8 Word: Ch.7	**Project #5** – The Data Modeler I, due Oct. 14
8. Oct. 14	Data Modeling (continued)	Berg: Ch.8 (cont.) Word: Ch.7 (cont.)	**Project #6** – The Data Modeler II, due Oct. 28
9. Oct. 21	*No class Monday*	--	Continue work on Project #6, due Oct. 28
10. Oct. 28	The Information Composer	Berg: Ch.7	**Project #7** – The Information Composer, due Sunday, Nov. 3 by 5:00
11. Nov. 4	**Exam #2**	--	No assignment
12. Nov. 11	System and User Management	Berg: Ch.11.2 Word: Ch. 9	**Project #8** – System & User Mgmt, Nov. 18
13. Nov. 18	Table and Memory Management	Word: Ch. 9 (cont.)	**Project #9** – Memory Mgmt, due Nov. 25 **Final Project**, Friday, Dec 6, by 5:00 pm
14. Nov. 25	Data Management	Class notes	Continue work on Final Project.
15. Dec. 2	More uses for in memory systems & Class Review	Class notes	Final Project due Friday, Dec 6, by 5:00.

Lab Policies

- The SAP GUI is installed on the computers in the ITP computer labs. In the third week of class, ITP computer labs and hours will be posted at: http://itp.usc.edu/labs/
- Lab assistants are not familiar with SAP, nor with class assignments, so please don't expect them to be able to help answer questions regarding the projects.
- **Note**: Before logging off any lab computer, you must ensure that you have either emailed or saved your work on a flash drive which you created during your time in the lab. Any work saved to the computer **will be erased** each evening and after restarting the computer. The School of Engineering is not responsible for any work lost.

Lab Projects:

- Projects will be available via the "Assignments" section of the class web site.
- It is **your** responsibility to turn in the lab projects by the deadlines indicated above (or otherwise stated) **and** verify that your assignment is in the class "assignment box".
  - You are to only turn in the "Answer sheet" and "Summary" portion of the project write-up as one document.
  - You are to submit your "Answer sheet / Summary" document via the "Assignments" section of the class web site (from where you originally obtained the project write-up).
  - You are to ① verify that your document is in the class "assignment box" and to ② double-click on the file to open it up. If you can't see or open your document, then neither can the grader!
  - **Failure to correctly submit projects will result in a 5% penalty.** This includes asking either the TA or myself to remove your submission so that you can submit another version of your answers.
- Answers to the projects will be posted on the class web page after the due date of the projects for your review.

Late Projects

- The "Assignments" section of the class web site "closes" after the due date and time and is replaced by the answer key.
  - You will no longer be able to submit your write-up and your assignment will be considered late.
  - Late assignments must be e-mailed to me directly (vawter@usc.edu); **not the grader!**
  - I will then make a note of receiving your late assignment and then forward the assignment on to the class grader for grading.
- **Assignments that are turned in after the deadlines will automatically have ½ of the possible points deducted prior to grading**. No excuses!! So, please turn in your assignments before the beginning of lecture on the dates indicated above!
- **No projects will be accepted for credit after 2 weeks beyond the project's original due date nor after the last day of the semester.**

Handling Project Questions (in order of steps to be taken)

1. Re-read the instructions carefully.
2. Review the "Discussion Board" section of the class web site's forum for other students' questions and comments or post a question yourself to begin the forum.
3. E-mail the class TA your question, being sure to be clear in your question and detailed in your explanation of the situation. Replies may take some time, since e-mail is really not an efficient method for working a "help desk".
4. And, of course, you are always welcome and encouraged to stop by my office during my office hours or to contact me and arrange for an appointment.

Please note: **I do not address "project problems" via e-mail**. I am happy to discuss the problems with you in person, and guide you to solving them yourself during my office hours; but **my e-mail address is not to be used as a simple "help desk"**.

Examinations: Exams cover material from the reading assignments, lectures, and assignments. The questions will be of the form: multiple answer, short answer, and short problem solving. The exams are all closed book and closed notes. The exams will include material presented up to the date of the exam. The "Final" exam will be comprehensive and cover material presented throughout the semester, though emphasis will be placed upon the latter part of the course.

- Exam 1: Wed., Sept. 30, 2:00-3:20 p.m. OHE 542
- Exam 2: Wed., Nov. 4, 2:00-4:30 p.m. OHE 542
- Final Exam: Monday, Dec. 16, 2:00-4:00 p.m. OHE 542

This assigned time coincides with our Lab period, Mon. 3:30 - 4:50 pm

Note: **No make-up exams will be offered nor will there be any changes made to the Final Exam schedule as established by the University**.

Grading:

Grading will be on a straight scale (as opposed to a class curve/average).

Final grades will be based strictly upon the total percentage earned. **No exceptions! Nor, will any extra credit assignments will be offered.**

94% and above	A
90% - 94% (not including 94%)	A-
87% - 90% (not including 90%)	B+
83% - 87% (not including 87%)	B
80% - 83% (not including 83%)	B-
77% - 80% (not including 80%)	C+
etc.	

Grades will be calculated by weighing the following work as described here:

Average of Lab Project scores	25%
Exam #1	15%
Exam #2	20%
Final Project	15%
Final Exam	25%
	100%

Students with Disabilities:

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (or to your lab assistant) as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m. - 5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776.

Student Conduct:

Excerpt taken from *SCampus Student Guidebook:*

> *The use of unauthorized material, communication with fellow students during an examination, attempting to benefit from the work of another student, and similar behavior that defeats the intent of an examination or other class work is unacceptable to the University. It is often difficult to distinguish between a culpable act and inadvertent behavior resulting from the nervous tension accompanying examinations. When the professor determines that a violation has occurred, appropriate action, as determined by the instructor, will be taken.*

Although I encourage working together, all work claimed as yours must in fact be of your own effort. Students who plagiarize the work of other students or provide material for another student to copy, will receive zero points and **will immediately be referred to** the Student Judicial Affairs and Community Standards (SJACS) board for further action. If SJACS determines the student violated the ethics codes, **the student will receive an F** in the course as suggested by the University. This is non-negotiable!!

The School of Engineering adheres to the University's policies and procedures governing academic integrity as described in SCampus. Students are expected to be aware of and to observe the academic integrity standards described in SCampus, and to expect those standards to be enforced in this course.

All students must read, understand, and abide by the University Student Conduct Code listed in SCampus, and available at:

http://www.usc.edu/student-affairs/SJACS/nonacademicreview.html

Additional excerpts taken from *SCampus Student Guidebook, 2012-13*:

§11.00 Behavior Violating University Standards and Appropriate Sanctions
"…individual work will be submitted [by the student], and [it's the student's] obligation both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own."

§11.11 Plagiarism (Definition)
"The submission of material authored by another person but represented as the student's own work, whether that material is paraphrased or copied in verbatim or near verbatim form."

§11.14 Plagiarism (Definition continued)

"Obtaining for oneself or providing for another person a solution to homework a project or other assignments, or a copy of an exam or exam key without the knowledge and expressed consent of the instructor."

Any violation <u>will be</u> immediately reported to the Office of Student Judicial Affairs and Community Standards. The alleged violation will then be reviewed by the board. If the student is determined to be responsible for the violation, appropriate disciplinary action will be determined and then implemented by the University.