

**ITP489**  
**In-Memory DBMS for Real Time Analytics**

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**ITP 489**, Spring 2016

**Location:** KAP 107

Wed. 2:00-4:50 p.m.

**Office Hours:** Tues. 11:00 - 1:00 p.m.  
Wed. 10:00 - 12:00 p.m.  
Thurs. 11:00 - 1:00 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, 2<sup>nd</sup> 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:** *Note: While the subject matter may change, dates of the exams will not!*

Class	Topic	Suggested Reading	Assignment
1. Jan. 13	Course Overview Overview of In-Memory database management	Plattner: Introduction & Ch.1 Word: Ch. 1	Demo: Customer Usage Analytics
2. Jan. 20	Standard Relational Database Mgmt Systems	Class Notes	<b>Assignment #1</b> – Overview of RDBMS, due Jan. 27
3. Jan. 27	Architecture of In-Memory Database Management Systems	Plattner: Ch.4.1 – Ch.4.4 Berg: Ch. 5.6 Word: Ch. 2	<b>Assignment #2</b> – Overview of In- Memory DBMS, due Feb. 3
4. Feb. 3	Reporting and Analytics Intro to the Bus. Explorer	Berg: Ch.6	<b>Assignment #3</b> – Intro to HANA Explorer, due <u>Tuesday, Feb. 9, before 5:00 pm</u>
5. Feb. 10	<b>Exam #1</b>	--	No assignment
6. Feb. 17	<i>No class tonight</i>		
7. Feb. 24	Data Provisioning	Berg: Ch.10 Word: Ch. 6	<b>Assignment #4</b> – Data Pro-visualization, due Mar. 2
8. Mar. 2	Data Modeling with SAP HANA Studio Modeler	Berg: Ch.8 Word: Ch.7	<b>Assignment #5</b> – The Data Modeler I, due Mar. 9
9. Mar. 9	Data Modeling (continued)	Berg: Ch.8 (cont.) Word: Ch.7 (cont.)	<b>Assignment #6</b> – The Data Modeler II, due Mar. 23
Mar 14-18	<b><i>Spring Recess</i></b>		
10. Mar. 23	Data Modeling (continued) plus Introduction to the Information Composer	Berg: Ch.8 (cont.) Word: Ch.7 (cont.)	<b>Assignment #7</b> – The Data Modeler III, due <u>Tues, Mar. 29 by 5:00 pm</u>
11. Mar. 30	<b>Exam #2</b>	--	No assignment
12. Apr. 6	Predictive Analytics	Class notes	<b>Assignment #8</b> – Predictive Analytics, due Apr. 13
13. Apr. 13	Predictive Analytics (cont.)	Class notes	<b>Assignment #9</b> – Predictive Analytics II, due Apr. 20 <b>Final Project, Friday, Apr. 29, by 5:00 pm</b>

14. Apr. 20	Data Table and Memory Management	Word: Ch. 9	<b>Assignment #10</b> – Memory Mgmt, Apr. 27 Continue work on the Final Project.
15. Apr. 27	Class Review & work on Final Project	--	Final Project due <u>Friday, Apr 29, by 5:00</u>

### Computer Software

- The software which you will be using throughout the semester is located on Vitirbi's Virtual Lab system. By enrolling in the ITP course, you automatically have access to this system.
- Instructions on how to log in to the Virtual Lab system will be posted on the course Blackboard web page.

### Lab Assignments:

- Assignments will be available via the "Assignments" section of the class web site.
- It is **your** responsibility to turn in the lab assignments by the deadlines indicated above (or otherwise stated) **and** verify that your assignment is in the class "assignment box".
  - 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 assignments 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 assignments will be posted on the class web page after the due date of the assignments for your review.

### Late Assignments

- 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 assignments will be accepted for credit after 2 weeks beyond the assignment's original due date nor after the last day of classes, April 29<sup>th</sup>.**

### Handling Assignment 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. 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. There will be two parts: ① a closed book / closed notes exam and ② a lab portion following the closed book / closed notes exam. The questions will be of the form: multiple answer, short answer, and short problem solving. 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., Feb. 10, 2:00-4:50 p.m. KAP 107
- Exam 2: Wed., Mar. 30, 2:00-4:50 p.m. KAP 107
- Final Exam: Friday, May 6, 2:00-4:00 p.m. KAP 107

*This assigned time coincides with our Lab period, Wed. 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 Assignment scores	25%
Exam #1	15%
Exam #2	20%
Final Project	15%
Final Exam	<u>25%</u>
	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 will be 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.**