

Objective While the increased capacity and availability of data gathering and storage systems have allowed enterprises to store more information than ever before, most organizations still lack the ability to effectively consolidate, arrange and analyze this vast amount of data. “Big Data” analytics has become a highly sought after skill in business, engineering, services, science, health and other industries. This course will explore the theory and practice of two major areas –

- Data warehouses for Enterprises
- Business Intelligence for Enterprise Resource Planning Systems (ERP)

After completing the course, students will be able to

- Describe the components of an Enterprise data warehouse
- Model the relational database required for an enterprise data warehouse
- Extract, cleanse, consolidated, and transform heterogeneous data into a single enterprise data warehouse
- Analyze data to generate information and knowledge that lead to informed decisions for businesses
- Author enterprise dashboards that are used to summarize and visualize data in a way that supports insight into trends. Also the ability to perform “what-if” analysis in real time.
- Show how ERP business intelligence can be derived from data warehouses
- Create standard reports for business users
- Derive insightful trends using data mining techniques

Concepts *Enterprise Data warehouses* aim at physically framing multiple sources of data (e.g., databases and file collections) in an architecture that requires the mapping of data from one or more operational data sources to a target database management system (DBMS, e.g., Oracle) that supports the many decision making processes and business intelligence (BI) systems of an enterprise.

Business Intelligence for ERP is the user-centered process of exploring data, data relationships and trends - thereby helping to improve overall decision making for enterprises. This involves an iterative process of accessing data (ideally stored in the enterprise data warehouse) and analyzing it, thereby deriving insights, drawing conclusions and communicating findings.

ERP System **SAP** is the leading vendor of Enterprise Resource Planning Systems in the world. ITP/USC has a *University Academic Alliance* with SAP America for the past 19 years. Several ITP courses utilize the SAP system as a tool and platform for class projects and homework.

ITP 487 uses the SAP BW (Business Information Warehouse) tool extensively. All projects and exercises are conducted within the system. Students have the prerequisite exposure to SAP in their prior class. The data that is analyzed in ITP 487 comes from SAP ERP which is a transactional system. The tight integration of data between SAP ERP and SAP BW is key to skill building exercises in the course.

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Office Hours TBA

Lecture/Lab 2 – 4:50 pm, Monday, KAP 160

Lab Asst/Grader TBA

Website blackboard.usc.edu

All lecture notes, assignments, news, announcements and grades will be posted on USC Blackboard. Students are expected to check the class website frequently. **Use the discussion boards to ask and answer questions.**

Prerequisite ITP 320

Required Text Book Practical Analytics, Nitin Kale and Nancy Jones, First Edition, Epistemy Press 2016
<http://store.epistemypress.com/books/analytics.html>
A discount code will be given to students during lecture.

Software Most of the SAP software required for the class is **Windows** based. The software will be provisioned through the Viterbi Virtual Lab. Specifically, you will be using

- SAP GUI 7.40 for Windows
- SAP BW
- SAP Business Explorer Query Designer
- SAP Crystal Reports
- SAP Cloud for Analytics
- SAP BusinessObjects Analysis
- SAP Predictive Analytics
- SAP Design Studio
- Microsoft Excel and Access
- Teradata

Grading The final grade will be based upon the total percentage earned. The weight of graded material during the semester is listed below. **No extra credit assignments will be offered.**

| | |
|-----------------|------|
| Weekly Homework | 30% |
| Final Project | 10% |
| Midterm | 25% |
| Final Exam | 35% |
| Total | 100% |

Grading scale (percentage):

| | |
|----|-------------|
| A | 100-95 |
| A- | 95-92 |
| B+ | 92-89 |
| B | 89-86 |
| B- | 86-83 |
| C+ | 83-80 |
| C | 80-77 |
| C- | 77-74 |
| D+ | 74-71 |
| D | 71-68 |
| D- | 68-65 |
| F | 65 or below |

Course Policies

- Projects turned in after the deadline will automatically have 10 points per day deducted.
- No make-up exams (except for medical or family emergencies) will be offered nor will there be any changes made to the Final Exam schedule.
- Before logging off a computer, students must ensure that they have saved their work (on their personal email accounts or flash drives) created during class. Any work saved to the computer will be erased after restarting the computer. ITP is not responsible for any work lost.
- ITP offers Open Lab use for all students enrolled in ITP classes. These open labs are held beginning the second week of classes through the last week of classes.

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 TA) 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."

Policy on Religious Holidays

University policy grants students excused absences from class for observance of religious holy days. Students should contact instructor IN ADVANCE to request such an excused absence. The student will be given an opportunity to make up work missed because of religious observance.

Students are advised to scan their syllabi at the beginning of each course to detect potential conflicts with their religious observances. Please note that this applies only to the sort of holy day that necessitates absence from class and/or whose religious requirements clearly conflict with aspects of academic performance. Please refer to the Holy Days Calendar <http://orl.usc.edu/religiouslife/holydays/>

Emergency Preparedness/Course Continuity in a Crisis

In case of emergency, when travel to campus is difficult, if not impossible, USC executive leadership will announce a digital way for instructors to teach students in their residence halls or homes using a combination of the Blackboard LMS (Learning Management System), teleconferencing, and other technologies. Instructors should be prepared to assign students a "Plan B" assignment that can be completed 'at a distance.' For additional information about maintaining your classes in an emergency, please access: <http://cst.usc.edu/services/emergencyprep.html>

Statement on Academic Conduct and Support Systems

Academic Conduct

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Section 11, *Behavior Violating University Standards* <https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions/>. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct/>.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* <http://equity.usc.edu/> or to the *Department of Public Safety* <http://capsnet.usc.edu/departments/departments-public-safety/online-forms/contact-us>. This is important for the safety whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *The Center for Women and Men* <http://www.usc.edu/student-affairs/cwm/> provides 24/7 confidential support, and the sexual assault resource center webpage sarc@usc.edu describes reporting options and other resources.

Support Systems

A number of USC’s schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* <http://dornsife.usc.edu/ali>, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information* <http://emergency.usc.edu/> will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.

Data Warehouses and Business Intelligence

ITP 487 (3 Units)

Week 1- Course Introduction

- Course objectives and outcomes
- Making the case for analytics
- Data driven decision making

Reading: *Chapter 1*

Week 2 - Data provisioning

- Source systems
- Data collection and staging
- Data representation for structured and unstructured data

Reading: *Chapter 2*

Week 3 - Holiday

Week 4 - Data modeling for data staging

- Transactional systems vs. informational systems
- Data warehouses
- Multidimensional modeling
- Star schema and snowflake schema
- Fact and dimension tables

Reading: *Chapter 3*

Week 5 - Extraction, transformation and loading

- Extraction from source systems
- Data cleansing and transformation
- Loading data and automation

Reading: *Chapter 4*

Week 6 - Slicing and Dicing

- Basics of slicing and dicing
- Pivot tables
- Working with aggregation functions, hierarchies
- Exceptions and conditions
- Slicing and dicing multidimensional data (from cubes)

Reading: *Chapter 5*

Week 7 - Reporting

- What are reports? Where are they used?
- Building reports from one or more data sources
- Formatting reports
- Creating summaries

Reading: *Chapter 6*

Week 8 - Data Visualization: Basic Charts

- Visualization as a powerful tool for analytics

- Types of charts
- How to choose the right chart for displaying data
- Multi variable data display

Reading: *Chapter 7*

Week 9 - Exam I

Week 10 - Dashboards:

- What are dashboards, cockpits, scorecards?
- How to author dashboards?
- Adding interactivity
- Deploying dashboards
- Mobile Apps for Analytics

Reading: *Chapter 8*

Week 11 - Advanced Visualization:

- Advanced chart types
- Infographics: How to tell a data driven story
- Mashups

Reading: *Chapter 9*

Week 12 - Knowledge Discovery

- Data mining
- Accuracy in data mining
- Data mining process
- Machine learning
- Descriptive vs. predictive analytics

Reading: *Chapter 10*

Week 13 - Descriptive data mining

- Models for descriptive data mining
- Clustering
- Association analysis

Reading: *Chapter 11*

Week 14 - Predictive data mining

- Models for predictive data mining
- Regression
- Decision trees
- Classification
- Forecasting, time series analysis

Reading: *Chapter 12*

Week 15 – Exam II

Week 16 – Final Project due