University of California, Davis
Accounting 455
Audit Data Analytics
Spring 2018

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BUSINESS NEED/COURSE DESCRIPTION

In the era of "big data", auditing entities of all types/sizes are analyzing large and diverse amounts of data. As a result, aspects of the financial statement audit need to change, if this service is to remain relevant and valued. This means auditors must use more technology-enabled data analytics in conducting audits. Those who fail to do so may put their firms at a disadvantage.

> The American Institute of Certified Public Accountants (AICPA) has stated: "Audit data analytics is the science and art of discovering and analyzing patterns, identifying anomalies, and extracting other useful information in data underlying or related to the subject matter of an audit through analysis, modeling, and visualization for the purpose of planning or performing the audit."[1]

The goal of this course is to synthesize data analytics theory and application to prepare students for the dynamics of real-world audit practice. Topics covered include diagnosing problems and issues (often in the face of uncertainty), analyzing relevant information, making responsible and ethical decisions, and reporting decision results and recommendations. The course focuses on analytical techniques and provides hands-on experience to develop skills with data analytics technologies related to auditing.

COURSE LEARNING OUTCOMES

Upon completing this course, students should be able to:
1. Apply critical thinking to identify and frame business problems for analysis.
2. Solve accounting and business related problems using appropriate analytics tools.
3. Create data visualizations to provide clear insights into accounting and other business data, to effectively communicate those insights, and to support recommendations in conducting audits.
4. Recommend appropriate actions to address real-world problems in accounting practice.
5. Write effectively to communicate analysis results in the framework of the business problem.

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[1] American Institute of Certified Public Accountants, Inc., *Audit Analytics and Continuous Audit, Looking Toward the Future*. (New York: AICPA, 2015), pp 92-93.

PREREQUISITE
ACC 253. Accounting Information and Control Systems

TEXTBOOKS

Required
1. *Data Analytics for Auditing Using ACL,* 4th Ed., by Arens, Elder and Borsum, Publisher: Armond Dalton Publishers, 2017, ISBN # 978-0-912503-62-2
2. Articles and links on audit data analytics posted on Canvas

Optional
The Case Study Handbook: How to Read, Discuss, and Write Persuasively About Cases, by William Ellet, Harvard Business School Press, 2007, ISBN 978-1-4221-0158-2.

You can purchase the above textbooks from the UC Davis bookstore (http://ucdavisstores.com/SelectTermDept) or from other providers such as Amazon that a Google search (with the given ISBNs) will reveal.

PROPOSED ACC 455 SCHEDULE

Session	Discussion Topics	Assignments
1	*Course Overview*: • What is Data Analytics & how is it important to auditors? • Advanced data modeling concepts • Data Analytics in auditing & continuous auditing	Summary on articles: • Analyzing Big Data • The Evolution of Auditors • Big Data and Analytics in Audit • UML Case 1 (due on session 2)
2	Review: Data sources, data modeling, databases AICPA Audit Data Standards (ADS) Software and tools related to audit analytics: • Specialized audit software (ACL)	Exercises on (1) Advanced Excel (Power Pivot), and (2) Tableau Assignment 1 UML Case 2
3	Audit Analytics in analytical procedures	ACL Assignments 1 and 2
4	Financial Reporting & Analysis: slicing & dicing, queries, reports	ACL Assignments 3 and 4
5	Data Visualization for Auditing: charts, dashboards (TABLEAU and Power BI assignment)	Case Study 1
6	Data Visualization for Auditing: advanced visualization techniques (TABLEAU and Power BI)	**Presentations 1 and 2**
7	Data Mining, Descriptive Models for Decision Making in continuous audit	**Presentations 3, 4 and 5**
8	Data Mining, Descriptive Models for Decision Making in continuous audit	ACL Assignment 5 – Fraud Investigation

Session	Discussion Topics	Assignments
9	Advanced Audit Analytics Techniques and Big Data • Clustering: concepts and how to use in audit • Clustering techniques • Text mining	Case Study 2 (term project) working session
10	Interpretation & Evaluation of results for Internal & External Reporting and Audit	Case Study 2 (term project) working session
11	Final Exam	Term Project

UNIVERSITY DATES
March 29 Spring quarter begins
June 14 Spring quarter ends
Please see https://registrar.ucdavis.edu/calendar/quarter.cfm for other key dates.

USE OF TECHNOLOGY
This is not a computer-skills course. However, it does require extensive use of the computer, as a tool, which all class assignments will involve. To achieve the course objectives, you will spend time (in/out of class) learning and using applications that support audit data analytics.

A PC-based computer is preferable to those with Apple/Mac operating systems as some of the software will work better on a PC or will not work on an Apple machine at all. However, if you still must use a Mac (due to the time/costs of switching to a PC, etc.), **you can install a Windows virtual machine on your computer such as Parallels or VMWare Fusion.** The virtual machine (VM) will simulate the Windows operating system on your Mac so you can run programs that are only available for PCs. VM software (e.g., Parallels) can be obtained from a site such as estore.onthehub.com.

During the quarter, you will be asked to download data and install software on your computer or to access systems online. Everyone's computer is set up a bit differently and you may experience technical difficulties. Therefore, do not assume that everything will always run smoothly. **Start assignments early to allow enough time to work through any technical glitches.**

Software Tools Used in this Class:
The following is a list of software we may use during the quarter:

- ACL (Audit Command Line) and/or IDEA Data Analysis software, available for download at www.audimation.com, for audit analytics
- Microsoft Excel 2013 or newer, with Solver and Power Pivot add-ins for data staging and other advanced applications
- Microsoft Power BI for continuous audit (free download at https://powerbi.microsoft.com/en-us/)

- R statistical computing software (www.r-project.org) for data mining, descriptive and predictive modeling (open source). R is available to download at https://cran.r-project.org.
- TABLEAU for visualizations (free download for faculty and students at https://www.tableau.com/academic/students)

EXAM AND QUIZZES

The final exam will be a case study. You will use the audit analytical tools and skills, which you acquired during the quarter, to analyze the case, answer questions, and solve problems.

Quizzes are administered throughout the quarter. Typically, they will ask questions about the reading materials but they may cover other topics as well.

COURSE ASSIGNMENTS

Assignments are designed to reinforce concepts from the lectures, discussions, and reading as well as to exercise your critical thinking and problem-solving skills. Some assignments may be done as part of a team or individually.

Grading criteria will be provided for each assignment. **In general, be sure to support your answers with references, diagrams and figures, tables, and other documentation (to backup findings/results).** If you are unfamiliar with how to analyze a case or unstructured problem, you may wish to refer to "The Case Study Handbook" by William Ellet (listed above as the Recommended Reference Text).

Complete all assignments in a professional manner so that the physical appearance is neat and orderly, and your thoughts are organized in a logical sequence. Unless otherwise indicated, handwritten documents are unacceptable.

Follow assignment instructions carefully to maximize your grade. **To receive credit for an assignment you must complete the assignment in the proper format and submit the assignment electronically before the deadline.** Failure to do so will result in a zero score on the assignment.

PRESENTATION

Students will be assigned to teams of three (3) students to present and lead class discussion on topics chosen from the list below. Each presentation is to examine the topic's impact on the accounting profession.

- **Presentation 1:** Continuous Audit and Analytics
- **Presentation 2:** Cybersecurity & Privacy (AICPA Cybersecurity Risk Management)
- **Presentation 3:** Third-party Risk Management and SOC reports (by AICPA)
- **Presentation 4:** Artificial Intelligence and IoT (Internet of Things)
- **Presentation 5:** Current Development and Issues in Blockchain Technology

Each team will give a 30-40 minute PowerPoint or Prezi presentation on your chosen topic. All team members should become 'experts' on the chosen topic (i.e., this should not merely be a 'divide and conquer' exercise). Presentations must consist of the following:

- Topic Overview (2-5 min)
- Key Area Deep Dives (20 min)
- Class Exercises (5 min)
- Q&A Class Discussion (5-10 min)

The presentations have already been scheduled so you need to be ready to present your topic at the scheduled session (see the proposed schedule above). A ***detailed outline*** of your presentation will be due for review ***10 days prior*** to your group's scheduled presentation date. Students will also be asked to evaluate the other groups' presentations based on a rubric (to be distributed in class prior to the presentations).

COMPOSITION OF COURSE GRADE

Because activities may be added, changed, or omitted during the semester, the following point assignments are *approximate*.

No.	Items	Percent	Points
1	Audit Data Analytics Assignments	55%	330
2	Presentation	10%	60
3	Case Studies (including the term project)	25%	150
4	In-class Assignments and Quizzes	10%	60
	Total		**600**

ACADEMIC INTEGRITY
Any observed or reported instance of academic dishonesty, as defined in the University of California, Davis Student Handbook, will be prosecuted to the fullest extent possible. During **any stage of the quarter**, if you deviate from the standards of academic integrity, you will receive a grade of *F* for the course. The University adheres to a strict policy regarding cheating and plagiarism. These activities will not be tolerated in this class. Become familiar with the policy (see UC Davis Code of Academic Conduct at http://sja.ucdavis.edu/cac.html).

STUDENTS WITH DISABILITIES

If you believe you have a disability that requires an accommodation, please contact the Student Disability Center at https://sdc.ucdavis.edu/ and notify me. I will be happy to work with you to provide a learning environment with reasonable accommodation.