MIS5208 – Data Analytics for IT Auditors
Spring 2014, CRN 23191, Section 001
Tuesday, 5:30 – 8:00pm, Alter Hall, Room 602

Instructor
Steven L. Johnson (steven.l.johnson@gmail.com)
Assistant Professor, Management Information Systems
Office hours: Tuesday, Speakman Hall 201C, 3:00pm to 5:00pm, other times by appointment
Course website: http://community.mis.temple.edu/mis5208spring14johnson/

Course Description
MIS 5208 examines the emerging approach of continuous-audit. This approach relies heavily on data analytics to examine datasets produced by audit and security controls (for instance, network log files). Basic data analysis concepts are presented and then applied to security or audit problems. Audit-specific tools like ACL will be used in addition to general tools like Excel.

Learning Objectives
• Understand how control data is organized to be analyzed
• Understand the principles of transaction-oriented data, and how information is stored and retrieved from a data source.
• Identify ways in which data quality can be compromised and apply remedies.
• Identify and compare sources and methods of capturing data throughout a business process.
• Use data mining techniques to identify associations and trends among data.
• Apply data mining techniques to examine control efficacy.
• Integrate data across multiple sources, transforming it into a single view.
• Understand and select appropriate data visualization techniques to effectively communicate results.
• Communicate analysis results back to management for ongoing quality assurance and process improvement.

Required Materials
The assigned readings in this course come from two required textbooks, material posted to the course website, and articles available online. The two texts are:

Computer-Aided Fraud Prevention and Detection by David Coderre (2009)
Security Metrics: Replacing Fear, Uncertainty, and Doubt (2007)

The Learning Environment

Your contributions directly impact the value you and your fellow students gain from this course. To that end, you can contribute to a supportive learning environment by meeting these expectations:

• Arrive on time and stay until the end of class.
• Turn off cell phones, pagers and alarms while in class.
• Limit the use of electronic devices (e.g., laptop, tablet computer) to class-related usage such as taking notes. Restrict the use of an Internet connection (e.g., checking email, Internet browsing, sending instant messages) to before class, during class breaks, or after class.
• During class time speak to the entire class (or breakout group) and let each person “take their turn.”
• Be fully present and remain present for the entirety of each class meeting.

The learning environment extends beyond our weekly class meeting. In addition, you are expected to:

• Provide substantive comments on the class blog.
• Extend online discussions by reading and commenting on other students blog entries.
• Fulfill commitments to group members to successfully complete group projects.

Evaluation and Grading

This course offers students multiple opportunities to demonstrate learning and achievement. Grading is based on the following criteria:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Grade</th>
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</thead>
<tbody>
<tr>
<td>The assignment consistently exceeds expectations. It demonstrates originality of thought and creativity throughout. Beyond completing all of the required elements, new concepts and ideas are detailed that transcend general discussions along similar topic areas. There are few mechanical, grammatical or organizational issues that detract from the presented ideas.</td>
<td>A- or A</td>
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The five major components of the course grade are:

<table>
<thead>
<tr>
<th>Deliverable</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Participation (class and blog)</td>
<td>20%</td>
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<tr>
<td>Assignments (6 @ 5% each)</td>
<td>30%</td>
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<tr>
<td>Group Project</td>
<td>25%</td>
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<tr>
<td>Final Exam</td>
<td>25%</td>
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</table>

Each component is described in detail below.

Participation

Much of your learning will occur as you prepare for and participate in discussions about the course material. The course material has been carefully chosen to bring the real world into class discussion while also illustrating fundamental concepts. Learning is something you do, not something that happens to you.

To encourage participation, 20% of the course grade is earned through preparation for class, participation during class, and participation between classes. Evaluation is based on a consistent demonstrated engagement with the process of learning. That is, rather than an assessment of what you know the participation assessment is based on what you contribute.

1) **Preparation for class** – at the beginning of each class you will turn in a brief summary of the reading assigned for that class period. To facilitate discussion, please keep a copy for yourself in addition to the copy you turn in!

Your weekly summary will briefly address these three questions:
a. For each assigned reading of the week, including the case(s), what is one key point you took away for that reading? Provide one point per reading.
b. Thinking about everything you’ve read in the past week, what stands out the most? Provide one point for the week.
c. If you were in charge of this week’s discussion, what is one insightful question that you would pose to the class? Provide one question for the week.

2) Participation during class – We will typically start each class with “opening” questions about the assigned readings. Students called up to answer should be able to summarize the key issues from the reading. All students should be prepared to be answer these questions. If for some reason you feel unprepared to respond to a question, you may say “pass” and I will call on another student. To earn full participation credit, keep the total number of “passes” to a minimum over the course of the semester. Another important aspect of class participation is completion of in-class assignments and contribution to break-out group activities.

3) Participation between classes – To facilitate on-going learning of course material, we will also discuss course material on the class blog in between class. Each of you will have author access to the course blog. If you wish to make a blog post on a topic related to the course, you are invited to do so. I will post a discussion question on the class blog 24-48 hours after each class meeting. The question will relate to the assigned reading, a topic discussed in class, or a relevant current event. Every student is expected to read and contribute to the online class discussion each week.

Overall criteria for participation includes attendance, punctuality, level of preparation, professionalism, posing and answering questions, discussing readings, contributing to group activities and contributing to a positive learning environment. Recognizing that students sometimes have unavoidable conflicts, the baseline for expected participation is assessed on one less week than the number of scheduled class meetings.

Individual Assignment
As shown on the course calendar, individual assignments are due throughout the semester. A detailed description of each assignment will appear on the class website.

Group Project Report and Presentation
A detailed description of this assignment will be discussed in class and will also appear appear on the class website.

Final Exam
There will be one final exam during the final exam period at the end of the semester. It will be comprised of short-answer questions, longer open-ended questions, and an in-class data analysis.
A missed exam can only be made up in the case of documented and verifiable extreme emergency situations.

**Late Assignment Policy**

An assignment is considered late if it is turned in after the assignment deadlines stated above. No late assignments will be accepted without penalty. All assignments will be assessed a 10% penalty (subtracted from that assignment’s score) each day they are late. No credit will be given for assignments turned in more than one week past the due date. However, you must submit all assignments, even if no credit is given. If you skip an assignment, an additional 10 points will be subtracted from your **final grade** in the course.

Plan ahead and backup your work. **Equipment failure is not an acceptable reason for turning in an assignment late.**

**Schedule**

Complete all readings in advance of the referenced class meeting. The assigned readings may be changed with prior notice based upon the pace and needs of the class and other unforeseen circumstances. Any change or other information about the class will be announced in class or on the class website.

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>In-Class Activity</th>
<th>Assignment Due</th>
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<tbody>
<tr>
<td>1</td>
<td>Course Introduction and Syllabus Continuous Audit, Risk Management and Security</td>
<td>Simple Audit Case using Data</td>
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<tr>
<td>2</td>
<td>What is continuous audit? Intro to Risk Management, Fraud, and Data Analytics</td>
<td>Data Access</td>
<td>Weekly write-up</td>
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<tr>
<td>3</td>
<td>Data, Information, and Knowledge</td>
<td>Data, Information, and Knowledge</td>
<td>Weekly write-up Group Member List</td>
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<td>4</td>
<td>What makes a good metric?</td>
<td>Metrics</td>
<td>Weekly write-up Assignment #1 (Fraud Scenario Analysis)</td>
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<td>5</td>
<td>Data Sources and Quality Introduction to ACL</td>
<td>ACL Exercise</td>
<td>Weekly write-up Group Project Outline</td>
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<td>6</td>
<td>The Relational Data Model</td>
<td>ER Modeling Exercise</td>
<td>Weekly write-up Assignment #2 (Security Scenario Analysis)</td>
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<td>7</td>
<td>Introduction to SQL (SELECT and joins)</td>
<td>ACL Exercise</td>
<td>Weekly write-up Assignment #3 (ER Modeling)</td>
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<tr>
<td>Week</td>
<td>Topic</td>
<td>Subtopics</td>
<td>Weekly Activity</td>
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<td>8</td>
<td>Visualization</td>
<td>Crafting Better Visualizations Tableau</td>
<td>Weekly write-up Assignment #4 (SQL Query)</td>
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<td>9</td>
<td>More Analysis Techniques</td>
<td>Visualizations (cont.)</td>
<td>Weekly write-up</td>
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<tr>
<td>10</td>
<td>Fraud Analysis</td>
<td>ACL Exercise</td>
<td>Weekly write-up Assignment #5 (Visualization)</td>
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<td>11</td>
<td>Automating Analytics</td>
<td>ACL Exercise</td>
<td>Weekly write-up</td>
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<td></td>
<td>Data Integration and Extract, Transform, Load</td>
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<tr>
<td>12</td>
<td>Dimensional Modeling and Online Analytical Processing</td>
<td>Pivot Tables and Charts</td>
<td>Weekly write-up Assignment #6 (TBA)</td>
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<tr>
<td>13</td>
<td>Dashboards</td>
<td>Visualizations (cont.)</td>
<td>Weekly write-up</td>
</tr>
<tr>
<td>14</td>
<td>Course Summary and Group presentations</td>
<td></td>
<td>Group Project Due</td>
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</tbody>
</table>

**Reading List**

This is a list of the reading materials that we will be using throughout the course.

- Each set of readings is to be read – and summarized for the weekly write-up – for the specified week (i.e., the first set of readings should be read before the week 2 class meeting).
- The assigned readings may be changed with prior notice based upon the pace and needs of the class and other unforeseen circumstances. Any change or other information about the class will be announced in class or on the class website.
- For the book chapters items noted as "C#" are chapters in the Coderre book; the "J#" ones from the Jaquith book.)

**Week 2**

Continuous Auditing From a Practical Perspective


J1 - Introduction (Risk Management)
C1 - What Is Fraud?
C2 - Fraud Prevention and Detection.
C3 - Why Use Data Analysis to Detect Fraud?

**Week 3**


Olavsrud, T. (March 19, 2013). Data-Driven Companies Outperform Competitors Financially. CIO.

The Differences Between Data, Information and Knowledge
http://www.infoqineering.net/data-information-knowledge.htm

The Problem with the Data-Information-Knowledge-Wisdom Hierarchy
http://blogs.hbr.org/cs/2010/02/data_is_to_info_as_info_is_not.html

Wired.
http://www.wired.com/opinion/2013/06/phew-it-was-just-metadata-not-think-again

C4 - Solving the Data Problem.

Week 4
Recommendations for an Effective Continuous Audit Process

J2 - Defining Security Metrics
J3 - Diagnosing Problems and Measuring Technical Security
J4 - Measuring Program Effectiveness

Week 5
Complete ACL introductory tutorial prior to class
C5 - Understanding the Data.
C6 - Overview of the Data.
J5 - Analysis Techniques

Week 6
Chapters 7 (Data Modeling) and 8 (Normalization and Other Data Modeling Methods)
Available online (for free) at http://proquest.safaribooksonline.com/9780471715368/

Week 7
Review the MySQL and Workbench slides before the class.
C7 - Working with the Data.

Chapter 10 (Implementation: Building the Database)
Available online (for free) at http://proquest.safaribooksonline.com/book/databases/data-warehouses/9780470176382/building-the-project/implementation_colon_building_the_databa

Taber, D. 2010. Stupid Data Corruption Tricks: Take Our CRM Quiz
http://www.cio.com/article/632156/Stupid_Data_Corruption_Tricks_Take_Our_CRM_Quiz
Week 8
J6 - Visualization
Chapter 1 (On Beauty). Available online (for free) at:

Week 9
C8 - Analyzing Trends in the Data.
http://www.cio.com/article/16544
Computerworld.

Week 10
C9 - Known Symptoms of Fraud.
C10 - Unknown Symptoms of Fraud.

Week 11
J7 - Automating Metrics Calculations
C11 - Automating the Detection Process.
C12 - Verifying the Results.

Week 12
Jackson, J. (August 25, 2011). NoSQL Offers Users Scalability, Flexibility, Speed. CIO.
http://www.cio.com/article/688631
Schuff, D. Pivot Table Tutorial (posted to Community site).
Pivot Table Reports 101 (expand sections at bottom of page to read entire page.)
Chapter 4 (Hacking Pivot Tables) Available online (for free at)

Week 13
J8 - Designing Security Scorecards
http://blogs.hbr.org/cs/2013/04/how_p_and_g_presents_data.html
Week 14
Continuous Auditing: Implications for Assurance, Monitoring, and Risk Assessment

Citation Guidelines
If you use text, figures, and data in assignments that was created by others you must identify the source and clearly differentiate your work from the material that you are referencing. If you fail to do so you are plagiarizing. There are many different acceptable formats that you can use to cite the work of others (see some of the resources below). The formats are not as important as the intent. You must clearly show the reader what is your work and what is a reference to someone else’s work.

Academic Honesty
Source: Temple University Graduate Bulletin, 2008-2009. Available online at:
http://www.temple.edu/grad/policies/index.htm

Academic honesty and integrity constitute the root of the educational process at Temple University. Intellectual growth relies on the development of independent thought and respect for the thoughts of others. To foster this independence and respect, plagiarism and academic cheating are prohibited.

Plagiarism is the unacknowledged use of another individual’s ideas, words, labor, or assistance. All coursework submitted by a student, including papers, examinations, laboratory reports, and oral presentations, is expected to be the individual effort of the student presenting the work. When it is not, that assistance must be reported to the instructor. If the work involves the consultation of other resources such as journals, books, or other media, those resources must be cited in the appropriate style. All other borrowed material, such as suggestions for organization, ideas, or actual language, must also be cited. Failure to cite any borrowed material, including information from the internet, constitutes plagiarism.

Academic cheating results when the general rules of academic work or the specific rules of individual courses are broken. It includes falsifying data; submitting, without the instructor’s approval, work in one course that was done for another; helping others to plagiarize or cheat from one’s own or another’s work; or undertaking the work of another person.

The penalty for academic dishonesty can vary from a reprimand and receiving a failing grade for a particular assignment, to a failing grade in the course, to suspension or expulsion from the University. The penalty varies with the nature of the offense.
Students who believe that they have been unfairly accused may appeal through their school/college’s academic grievance procedure and, ultimately, to the Graduate Board if academic dismissal has occurred.

Of course, behavior like this will not be tolerated in this class. In cases of cheating, both parties will be held equally responsible, i.e. both the student who shares the work and the student who copies the work. Penalties for such actions are given at my discretion, and can range from a failing grade for the individual assignment, to a failing grade for the entire course.

Student and Faculty Academic Rights and Responsibilities

The University has adopted a policy on Student and Faculty Academic Rights and Responsibilities (Policy # 03.70.02) which can be accessed through the following link: http://policies.temple.edu/getdoc.asp?policy_no=03.70.02

Special Needs and Accommodations

If you have any special needs or accommodations, please address them with the instructor during the first two weeks of the semester.