# Course Title: Audit Analytics I

Instructor’s Name: Qi Liu

With many participants of the AIS Group at Rutgers

### Course Number: 22:010:688

### Sponsored by Ernst and Young

Date: Fall 2012

### Introduction

This year Rutgers Business School is introducing a certificate in “analytic auditing” associated to its MACCY Program[[1]](#footnote-1). This certificate is of dual purpose. MACCY students may specialize in the area taking these courses as optionals while non-enrolled students may take the 4 course certificate independently. The courses will be mainly distance-based but each will have 2 days of residency. A limited number of students that are not able to be physically present will be allowed to participate through virtual presence.

### Background

For reasons that are well known, there is a renewed focus on audit quality in the CPA profession. The PCAOB regulatory regime, the formation of the Center for Audit Quality (CAQ), initiatives at major firms, and other indicators attest to this. The profession is more focused on more effective audit methodologies than it has been for decades.

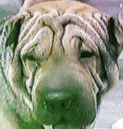
The development of new methodologies needs to be preceded by basic and applied research that establishes a sound theoretical foundation and demonstrates that they will work. The need for such research represents an opportunity for universities to work with audit firms, software vendors and others.

The following are examples, in no particular order, of the types of areas that are likely to prove fruitful in the field of analytical auditing: Analytical procedures, Other data Analytics, Continuous Auditing Integration, Audit Risk/Assurance Model, Elicitation, quantification and expression of professional judgment, Audit optimization, Fraud detection processes, Systems analysis and internal control evaluation and Smart navigation of GAAP

**Date:** Spring 2012

# Course Description and Objectives:

This course, is intended to provide you with the basics of the application of analytics in the (internal and external) audit process in current ubiquitous computer-based information systems and their application in organizations. Specifically, you will have an opportunity to begin to:



1. gain a managerial overview analytical techniques
2. understand ways in which information systems are used in organizations and industries.
3. gain understanding of the evolving scenario of big data analytics auditing
4. perceive the progressive convergence of analytics methods, information processing, and telecommunication technologies.
5. link audit analytics to corporate continuous monitoring and business process support

The module does not primarily focus on the technical aspects of analytic methods, though these topics will be discussed largely in the context of case examples: thus, the emphasis is on the usage of statistics and the interpretation of results rather than the mathematics of specific tools and techniques.

# Course Structure

This is a seminar course. Your input/ participation is essential and historical class participation is the major determinant of the grade.

# Grading: A module evaluation will be performed based on:

* + - * Assignments 40%
      * Exam 20%
      * Participation 40%

# *Background Textbook References:*



Materials will be drawn from many sources including the Internet, professional articles, academic articles. and books. The WWW is the Universal Library. Part of the learning of this course should be to understand how to mine this resource and join it to more traditional sources. Make sure that you reference the materials you draw from the Internet or from other sources.

## Assignments: Each session will have a theme. Students are required to prepare for class. Assignments are due at the beginning of the class

Legend:

**R**  = Reading

**H**  = Assignment to hand in

**O**  = Optional reading

**T**  = Team Presentation

**C**  = Assignment to be discussed in the classroom

Recommended or Optional readings are just a guidance. Students should find their own sources and share it with the class.

**NOTE:** Most lectures will have a set of slides associated to it. I will post materials on Blackboard and have them available on a stick. However, you must realize that based on how the course progresses I may change those slides somewhat. Furthermore, content evolves rapidly and I may add or subtract content out of the course based on class progress.

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| --- | --- | --- | --- |
| Lecture | Outline | Material | Authors |
| 1 | Introduction   * Competing on analytics * Big data * Data Analytics in auditing (application areas, evolving approaches, and benefits) | Super Crunchers – Ian Aires  Competing on Analytics: The New Science of Winning- Thomas H. Davenport and Jeanne G. Harris  [Video](http://raw.rutgers.edu/docs/audit_analytics_videos/lecture%2001%20analytics%20human%20and%20big%20data.mp4) | Qi Liu |
| 2 | Audit Analytics related software & tools   * A survey of tools available * Audit software –what they do (ACL/IDEA) * Statistical packages (SAS, R, WEKA) | [Video](http://raw.rutgers.edu/docs/audit_analytics_videos/Lecture%2002%20software%20analytics%20tools.mp4) | Qi Liu |
| 3 | Audit Analytics in audit planning -- Preliminary analytical procedures (I)   * Descriptive statistics (demonstration using SAS) * Data Visualization (demonstration using SAS) | Sample data  [Video1](http://raw.rutgers.edu/docs/audit_analytics_videos/lecture%2003%20descriptive%20analytics.mp4)  [Video2](http://raw.rutgers.edu/docs/audit_analytics_videos/lecture%2004%20data%20avisualization.mp4) | Qi Liu |
| 4 | Audit Analytics in audit planning -- Preliminary analytical procedures (II)   * Basic data analysis (demonstration using ACL)   + Stratify & Classify   + Summarize & Age analysis   + Exam sequence & Look for gap | Sample data  [Video](http://raw.rutgers.edu/docs/audit_analytics_videos/lecture%2005%20basic%20data%20analysis.mp4) | Qi Liu |
| 5 | Audit Analytics in audit planning – Audit Risk assessment (I)   * Duplicate detection   + Field matching (demonstration using ACL)   + Fuzzy logic * Benford analysis (demonstration using ACL) | Sample data  [Video](http://raw.rutgers.edu/docs/audit_analytics_videos/lecture%2006%20benfords%20law%20acl%20and%20idea.mp4)1  [Video](http://raw.rutgers.edu/docs/audit_analytics_videos/Lecture%2007%20Hussein%20Issa%20duplicate%20detection%20Qi-Audit%20Analytics.mp4)2 | Hussein for Fuzzy logic duplicate detection |
|  | Audit Audit Analytics in audit planning – Audit Risk assessment (II)   * Belief function * Concepts * How to use belief function to evaluate audit evidence * Example | Mock et al.,- Audit Program Planning Using A Belief Function Framework |  |
| 7. | Audit Analytics in audit planning – Audit Risk assessment (III)   * Clustering   + Concepts   + Using Clustering to assess fraud risk   + Example | Thiprungsri et al., - Cluster Analysis for Anomaly Detection in Accounting Data: An Audit Approach1  [Video](http://raw.rutgers.edu/docs/audit_analytics_videos/lecture%2013%20clustering%20qi.mp4) | Qi Liu |
| 8. | Audit Analytics in audit planning – Audit Risk assessment (IV)   * Text mining   + Text evidences in auditing   + Concepts of text mining   + Using text mining to predict audit risk   + Demonstration of SPLICE | [Video](http://raw.rutgers.edu/docs/audit_analytics_videos/Lecture%2014%20text%20mining.mp4) | Kevin Moffitt |
| 9. | Audit Analytics in Audit Planning– Audit Risk Assessment (V)   * Process mining * Concepts * Using process mining to assess/improve internal control * Example | Jans et al. 2010 -Internal fraud risk reduction-Results of a data mining case study |  |
| 10. | Audit analytics in substantive analytical procedures   * Regression   + Introduction (concepts and different regression models that can be used in auditing)   + Selection of regression models   + Example | [Video](http://raw.rutgers.edu/docs/audit_analytics_videos/lecture%2010%20trevor%20stewart%20regression.mp4) |  |
| 11. | Audit analytics in substantive test of transactions   * Sampling (probabilistic sample selection methods) * Rule-based method   + How to use rule-based method to audit and monitor transaction   + RME-EP: Audit-rule Specification Language |  |  |
| 12. | Audit analytics in test of details of balances   * Sampling * Monetary unit sampling * Variables sampling * Neural Network   + Concepts   + Example | Eija Koskivaara - Artificial Neural Network Models for Predicting Patterns in Auditing Monthly Balances  [Video](http://raw.rutgers.edu/docs/audit_analytics_videos/lecture%2009%20audit%20sampling.mp4) |  |
| 13. | Audit analytics in Continuous Auditing   * Introduction to CA * Analytical procedures in CA * Continuity Equations | Kogan et al. – Analytical Procedures for Continuous Data Level Auditing: Continuity Equations  [Video](http://raw.rutgers.edu/docs/audit_analytics_videos/Lecture%2011%20Siripan%20Predictive%20Audit.mp4) | Alex Kogan |
|  |  | Other videos：  [Video: ratio analysis of financial statements](http://raw.rutgers.edu/docs/audit_analytics_videos/lecture%2008%20ratio%20analysis%20of%20financial%20statements.mp4)  [Video: expert systems](http://raw.rutgers.edu/docs/audit_analytics_videos/lecture%2012%20vasarhelyi%20expert_systems.mp4)  [Video: XBRL lecture](http://raw.rutgers.edu/docs/audit_analytics_videos/lecture%2015%20Eric%20cohen%20XBRL%20lecture.mp4) |  |
|  | STUDENT PROJECT PRESENTATIONS |  |  |
|  | FINAL EXAM |  |  |

**Issue Presentation:**

Each group will choose, research, and present a discussion of one ISSUE relevant to this course. As the course is very compact you should start now choosing your group and deciding on the topic. The issues on the syllabus are only suggestions. The group has wide latitude to choose but I have to approve the topic. Please e-mail me.

The group will have 25 minutes maximum to present including 10 minutes for questions. All members of the group should present.

**Final Project:**

We envisage this project being on the application of advanced audit analytics on process or sub-process in the financial related area (e.g. continuous reporting, continuous audit, loans, treasury, financial analysis, xbrl, etc) but you have wide latitude to present a topic.

You should prepare a powerpoint deck with fully explanatory notes

The presentation will be evaluated on:

1. Technical quality of the content
2. Interest to the audience
3. Originality
4. Quality of the presentation
5. Other

In general it should contain:

1. Description of the analytic being used
2. Technology being used
3. Nature and characteristics of the transformed process
4. Example(s)
5. Others

1. http://business.rutgers.edu/finmaccy/students [↑](#footnote-ref-1)