

**22: 010: 688: 95: Audit Analytics**

Spring 2018

Rutgers Online Learning Center

<https://onlinelearning.rutgers.edu/canvas>**Instructor: Qiao Li**

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Email: [qiao.li1218@rutgers.edu](mailto:qiao.li1218@rutgers.edu)**COURSE DESCRIPTION**

Audit Analytics is the first course of the Audit Analytics Certificate Program. There are two main purposes of this course: (1) introduce basic application of analytics in both internal and external audit processes in current ubiquitous computer-based information systems, and (2) introduce the application of audit analytics in organizations. The Audit Analytics Certificate Program is in conjunction with the Master of Accountancy in Financial Accounting (MAccy) Program. This program is designed to be a self-contained set of non-matriculated courses that can be taken by self-actualizing professionals that need to update their analytic skills and promote change in the profession towards a modern audit<sup>1</sup>. MAccy students may take these courses as electives, while non-matriculated students may take the four-course certificate independently.

In recent years, audit analytics has drawn great attention in the accounting profession due to the increase in demand for enhancing audit quality by regulators, creditors, and investors; many audit firms and internal auditors have applied audit analytics to their audit processes. In response to this trend, this course aims at introducing our students the concept of audit analytics, the basic audit analytical tools, and the application of various analytical methods in both internal and external audit processes. Please note that this course mainly emphasizes on the usage of statistics and the interpretation of results rather than the mathematics of specific tools or techniques; in other words, this course does not primarily focus on the technical aspects of analytical methods.

**COURSE MATERIALS**

We do not assign any specific textbook to this course. All of the lectures will have a set of slides associated to them and some of them have corresponding videos. Students will be able to view the posted slides and videos on Canvas in the beginning of each week.

Teaching 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 comprehend these resources and relate them to traditional sources.

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<sup>1</sup> [http://raw.rutgers.edu/audit\\_analytics\\_certificate.html](http://raw.rutgers.edu/audit_analytics_certificate.html)

## **LEARNING GOALS AND OBJECTIVES**

This course is intended to provide students 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. Students who complete this course are expected to:

1. Gain a managerial overview of 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.
  6. Obtain hands-on experience of using state-of-the-art audit analytical tools.
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## **PREREQUISITES**

This course is the first course in the Audit Analytics Certificate Program; therefore, there are no prerequisites for this course. It would be helpful if students have some basic knowledge of auditing and statistics.

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## **ACADEMIC INTEGRITY**

*I do NOT tolerate cheating.* Students are responsible for understanding the RU Academic Integrity Policy ([http://academicintegrity.rutgers.edu/files/documents/AI\\_Policy\\_2013.pdf](http://academicintegrity.rutgers.edu/files/documents/AI_Policy_2013.pdf)). I will strongly enforce this Policy and pursue *all* violations. On all examinations and assignments, students must sign the RU Honor Pledge, which states, “On my honor, I have neither received nor given any unauthorized assistance on this examination or assignment.” [I will screen all written assignments through *SafeAssign* or *Turnitin*, plagiarism detection services that compare the work against a large database of past work.] Don’t let cheating destroy your hard-earned opportunity to learn. See [business.rutgers.edu/ai](http://business.rutgers.edu/ai) for more details.

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## GRADING POLICY

The course grades are based on the following four criteria:

Class participation	30%
Assignments	20%
Course project	25%
Final exam	25%

Letter Grade	Score
A	90-100
B	80-89
C	70-79
D	60-69
F	0-59

### **Class Participation:**

Online discussion in Canvas is the primary way for the students to communicate with instructors and other students. Class participation will be evaluated according to students' participation in each week's discussion. Students can participate in the discussion by (1) answering the instructor's questions, (2) posting their own questions, and/or (3) answering other students' questions in the chat room. The instructor will post one to two questions each week, and the students should answer the question once they finish each week's lecture. The evaluation of class participation is based on both the quantity and the quality of the questions and answers.

### **Assignments:**

- There will be 3 individual assignments throughout the semester (Please see the distribution dates and due dates of assignments in the course outline below)
- The assignments will require you to do some analytic tasks using the tools covered in class.
- Students should upload their assignments to Canvas prior to the deadline.

### **Course Project:**

- Students can choose to do the course project individually or in groups. Each group can have up to three students. If you are part of a group in the course project, please explicitly state which part of the project that you contributed to.
- The topic of course project can be of your choice, however, it should be related to the class topics. During the course presentation week, students should prepare a presentation that is between 15

minutes to 20 minutes in length. Each student/group should record your presentations and upload the videos to Canvas.

- I will evaluate the presentations based on the content, organization, originality, and delivery.
- Make sure that you reference the materials that you have retrieved or drawn from the Internet or from other sources.

### Final Exam

- The final exam will be a remote exam for three hours. The exam will be sent to students via Canvas, and the students need to complete the exam in Canvas within three hours.
- The content of the final exam will include the materials covered in the lecture slides, projects and class discussions.
- The students can access to any materials including the Internet during the exam, however, please follow the following two rules during the final exam: (1) the students cannot discuss or share your answers with others during the exam, (2) please properly cite the resources (textbook, link, notes..., etc.) that you use for answering the exam.
- All students are expected to take the final exam at the same time. If a student has valid excuse which complies with University regulations for missing an examination, the student must inform the instructor and obtain permission to miss the examination before the examination. Failure to obtain the necessary permission will result in a zero grade.

### COURSE SCHEDULE (Tentative)

- Due to the state-of-the-art nature of the course, course materials and slides will be updated during the semester.
- Please note that this is a tentative course schedule. The contents of the lectures will be slightly adjusted during the semester based on the progress of the course.

Lecture	Outline	Material	Authors
1. 01/16	Introduction: <ul style="list-style-type: none"> <li>❖ Competing on analytics</li> <li>❖ Big data</li> <li>❖ Data Analytics in auditing &amp; Continuous auditing (application, evolving approaches, and benefits)</li> </ul>	Super Crunchers – Ian Aires Competing on Analytics: The New Science of Winning- Thomas H. Davenport and Jeanne G. Harris	Miklos Vasarhelyi Qiao Li
2. 01/23	Audit Analytics and big data (I) Introduction to big data <ul style="list-style-type: none"> <li>❖ What is big data</li> <li>❖ How it is evolving today</li> <li>❖ How it relates to auditing</li> </ul>		Qiao Li

3. 01/30	<p>Audit Analytics and big data (II)</p> <ul style="list-style-type: none"> <li>❖ Big data and audit evidence</li> </ul> <p>Special topic</p> <ul style="list-style-type: none"> <li>❖ XBRL, Assurance and Analytics</li> </ul>		<p>Miklos Vasarhelyi Eric Cohen Qiao Li</p>
4. 02/06	<p>Audit Analytics related software &amp; tools</p> <ul style="list-style-type: none"> <li>❖ Audit software (ACL / IDEA)</li> <li>❖ Statistical packages (R / WEKA)</li> <li>❖ Visualization package (TABLEAU)</li> </ul>		<p>Qiao Li</p>
5. 02/13	<p>Audit Analytics in preliminary analytical procedures (I)</p> <ul style="list-style-type: none"> <li>❖ Descriptive statistics (demonstration using R)</li> </ul> <p><b>Assignment 1</b></p>	<p>Sample data</p>	<p>Qi Liu Qiao Li</p>
6. 02/20	<p>Audit Analytics in preliminary analytical procedures (II)</p> <ul style="list-style-type: none"> <li>❖ Data Visualization: motivation, demonstration, and interpretation</li> </ul>	<p>Sample data</p>	<p>Qi Liu Qiao Li</p>
7. 02/27	<p>Audit Analytics in preliminary analytical procedures (III)</p> <ul style="list-style-type: none"> <li>❖ Basic data analysis (demonstration using ACL) <ul style="list-style-type: none"> <li>• Stratify &amp; Classify</li> <li>• Summarize &amp; Age analysis</li> <li>• Exam sequence &amp; Look for gap</li> <li>• Relate Table &amp; Join Table</li> </ul> </li> </ul> <p><b>Assignment 2</b></p>	<p>Sample data</p>	<p>Qiao Li</p>
8. 03/06	<p>Audit Analytics in risk assessment (I)</p> <ul style="list-style-type: none"> <li>❖ Benford analysis (demonstration using ACL&amp;IDEA)</li> <li>❖ Duplicate analysis</li> </ul> <p><b>Assignment 1 due</b></p>		<p>Qiao Li Hussein Issa</p>
03/13	<p>(Spring Break)</p>		
9. 03/20	<p>Audit Analytics in risk assessment (II)</p> <ul style="list-style-type: none"> <li>❖ Ratio analysis</li> </ul>		<p>Helen Brown Qiao Li</p>
10. 03/27	<p>Predictive audit (I)</p> <ul style="list-style-type: none"> <li>❖ Regression <ul style="list-style-type: none"> <li>• Simple linear regression</li> <li>• Audit Risk Model</li> </ul> </li> </ul> <p><b>Assignment 3</b> <b>Assignment 2 due</b></p>		<p>Trevor Stewart Qiao Li</p>

11. 04/03	Predictive audit (II) ❖ Expert System <ul style="list-style-type: none"> <li>• Introduction</li> <li>• How to use expert systems to audit and monitor transaction</li> <li>• Example expansion</li> </ul>		Miklos Vasarhelyi Qiao Li
12. 04/10	Advanced Audit Analytics Techniques (I) ❖ Clustering <ul style="list-style-type: none"> <li>• Introduction (concepts and, how to use in audit)</li> <li>• Different clustering techniques (partitional, hierarchical)</li> </ul> ❖ Example		Qiao Li
13. 04/17	Advanced Audit Analytics Techniques (II) Text Mining Cognitive Computing  <b>Final Exam Content Review</b> <b>Assignment 3 Due</b>		Kevin Moffitt Qiao Li
14. 04/24	Project Presentation		
05/05	Final Exam		

## SUPPORT SERVICES

If you need accommodation for a *disability*, obtain a Letter of Accommodation from the Office of Disability Services. The Office of Disability Services at Rutgers, The State University of New Jersey, provides student-centered and student-inclusive programming in compliance with the Americans with Disabilities Act of 1990, the Americans with Disabilities Act Amendments of 2008, Section 504 of the Rehabilitation Act of 1973, Section 508 of the Rehabilitation Act of 1998, and the New Jersey Law Against Discrimination. <https://ods.rutgers.edu>

If you are a military *veteran* or are on active military duty, you can obtain support through the Office of Veteran and Military Programs and Services. <http://veterans.rutgers.edu/>

If you are in need of *mental health* services, please use our readily available services. [Select for inclusion in syllabus based on course location]

[Rutgers University-Newark Counseling Center: <http://counseling.newark.rutgers.edu/>]

[Rutgers Counseling and Psychological Services – New Brunswick: <http://rhscaps.rutgers.edu/>]

If you are in need of *physical health* services, please use our readily available services.

[Select for inclusion in syllabus based on course location]

[Rutgers Health Services – Newark: <http://health.newark.rutgers.edu/>]

[Rutgers Health Services – New Brunswick: <http://health.rutgers.edu/>]

If you are in need of *legal* services, please use our readily available services: <http://rusls.rutgers.edu/>

If you are in need of additional *academic assistance*, please use our readily available services.

[Select for inclusion in syllabus based on course location; undergraduate only]

[Rutgers University-Newark Learning Center: <http://www.ncas.rutgers.edu/rlc>]

[Rutgers University-Newark Writing Center: <http://www.ncas.rutgers.edu/writingcenter>]

[Rutgers University-New Brunswick Learning Center: <https://rlc.rutgers.edu>]

