

**Accounting**  
**Course Number: 33:010:416**  
**Course Title: Audit Analytics**

## **COURSE DESCRIPTION**

Audit analytics has attracted great attention in recent years, due to the increase in demand for audit quality by regulators, creditors, and investors. Audit firms and internal audit teams use audit analytics as part of their engagement. Such firms, who are the main employers of our students, have consistently expressed their desire to hire students who have audit analytics skills. To respond to this demand, this course is designed to familiarize our students with the concept of audit analytics, the basic audit analytical tools, the trending topics in this field, and the application of different analytical methods in the internal and external audit process. This is especially important as it is expected to give our students a competitive advantage in the job market.

The course first introduces various analytical methodologies that are frequently utilized in audit engagements. Next, the students learn some audit analytics methodologies that are frequently used in an audit engagement during preliminary analytical procedures. The methods emphasized at this stage consist of descriptive statistics and inferential statistics. Subsequently, the course examines basic analysis techniques in for use in the risk assessment phase of the audits, such as stratification, summarization, and aging analysis. After that, the students learn about Exploratory Data Analysis using Visualization, a methodology that is becoming increasingly popular. Students will learn how to use tools like Tableau in an applied manner using cases developed by EY ARC. Next the course introduces more advanced analytics for the substantive tests and test of controls phases of the audits, namely Benford's law analysis, sequence and gap analysis, duplicate records analysis, outlier detection (using cluster analysis), logistic regression, detection of internal control violations and fraudulent transactions (classification techniques such as decision trees and rule-based systems), and pattern recognition.

Finally, the course introduces the concept of continuous auditing and continuous control monitoring which was developed by an RBS faculty member.

This course is designed to familiarize our students with various analytical skills, and provide them with a practical demonstration in an auditing context. The course will be taught as a hybrid course. Students will read the assigned material prior to attending class. Every other week there will be an in-class session of problem solving. Students will work in breakout groups to replicate their assigned work. Subsequently the instructor goes over the correct solution.

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## **COURSE MATERIALS**

- The course does not use a specific textbook. Instead, the instructor will provide the students with pre-recorded lectures as well as data analytics cases (e.g. cases offered by EY ARC). Additional notes and documents might be provided online.
- Students will need to use software applications (educational versions) for assignments as well as in-class group breakout sessions. Given the popularity of visualization in the Auditing profession, we will focus on the use of Excel and Tableau (which offers a free Educational version). Moreover, the cases developed by EY focuses on these two software applications. The students will learn how to conduct analytics both conceptually as well as hands-on.

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## **COURSE TECHNOLOGY**

The course will be taught in a Hybrid mode:

- Canvas will be used to upload Recorded video materials, PowerPoint slides, and select readings.
- Students will be required to download and read the assigned material PRIOR to coming to class. The class will meet in-person every other session (the other session being replaced by the aforementioned pre-class preparation and online videos). During the live in-class session, the students will form breakout groups and discuss the homework assignments and projects. Finally, the instructor and the students will go over the solution to the homework assignments.
- The midterm exam and final exam will both be computer-based and will be administered in a computer lab.

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## **LEARNING GOALS AND OBJECTIVES**

Upon completion of this the course, students will be able to:

- Gain an overview of analytical techniques useful for audit engagements.
- Understand ways in which information systems and analytics are used in audit engagements.
- Gain understanding of the evolving scenario of big data analytics in auditing.
- Perceive the progressive convergence of analytics methods, information processing, and telecommunication technologies.
- Link audit analytics to corporate continuous monitoring and business process support.
- Obtain hands-on experience of using state-of-the-art audit analytical tools.

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## **PREREQUISITES**

33:010:415 *Concepts of Auditing*

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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/>)

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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## **ATTENDANCE POLICY**

- Attendance consistent with university policy is mandatory. After two absences one point will be deducted for every class missed. Excessive absence will result in an “F”. Attendance will be taken by sign-in sheet.
- Class will be held unless the campus is closed due to weather, holiday or other reason.

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## **EXAMS AND ASSIGNMENTS**

**Subject to change at the instructor’s discretion:**

***Assignments:***

There will be weekly computer-based assignments. Some of these assignments will be multiple choice questions, others will be based on applied cases. Students are required to come to the in-class sessions well prepared.

***Quizzes:***

Quizzes will be given regularly at the beginning of class periods to test your preparation for the day.

***End of term Group Project:***

The students will be assigned to teams, and each team will work on a project that will be presented in class at the end of the semester in Weeks 13 and 14 (see Tentative schedule below). More details to be given during the semester.

***Scheduling***

Final exam scheduling conflicts will be managed in strict adherence to university regulations. A student with a final exam conflict must e-mail a screenshot of their entire final exam schedule for the semester a week before the last day of classes.

***Midterm Exam:***

The midterm exam will take place in class during Week 8 (see Tentative schedule below).

***Final Exam:***

The final exam will take place in class during our scheduled final exam period. If you have exam conflicts you must make them known to me at least one week prior to the final exam. The final will be cumulative.

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## GRADING POLICY

Grade is final except in the case of an arithmetic error.

• Homework Assignments and Quizzes	200 pts	20%
• Group Project (Report & Presentation)	200 pts	20%
• Class Participation (including in-class work)	100 pts	10%
• Midterm Examination	250 pts	25%
• Final Examination	250 pts	25%

### Final Grade

Over 90 Points	A
85-89.99	B+
80-84.99	B
75-79.99	C+
65-74.99	C
60-64.99	D
Below 60	F

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## COURSE SCHEDULE

Below is a *tentative* course schedule. Depending on the progress of the class and weather or other emergencies, it may prove necessary to deviate from this planned schedule.

Week #	Topic	Within Week Material Complete <u>BEFORE</u> Class
1	<p><b>Course overview:</b></p> <ul style="list-style-type: none"> <li>• Introduction to audit analytics in audit engagements -</li> <li>• Software installation</li> </ul>	<ul style="list-style-type: none"> <li>• Read Analytical Mindset slides</li> <li>• Read Analytics Mindset-Competency Framework</li> </ul>
2	<p><b>Pre-planning and planning phases of Audits:</b></p> <p><b>Preliminary analytical procedures:</b></p> <ul style="list-style-type: none"> <li>• Descriptive statistics</li> <li>• Inferential Statistics</li> </ul>	<ul style="list-style-type: none"> <li>• Read Descriptive Statistics Slides</li> <li>• But I need a Trial Balance Tutorial (Pivot Tables)</li> <li>• DuPont Case-Part 1 (Excel)</li> </ul>
3	<p><b>Risk assessment: Basic data analysis in auditing:</b></p> <ul style="list-style-type: none"> <li>• Stratify &amp; classify</li> <li>• Summarize</li> <li>• Exploratory Data Analysis using Visualization</li> </ul>	<ul style="list-style-type: none"> <li>• Read Data Visualization Slides</li> <li>• Short Tableau Tutorials –Part 1</li> <li>• <b>ASSIGNMENT 1:</b> DuPont Case-Parts 2, 3, 4</li> </ul>
4	<p><b>The Analytics Mindset:</b></p> <ul style="list-style-type: none"> <li>• Ask the right questions</li> <li>• Extract, transform, and load relevant data</li> <li>• Apply appropriate data analysis techniques</li> </ul>	<ul style="list-style-type: none"> <li>• Short Tableau Tutorials –Part 2</li> <li>• <b>ASSIGNMENT 2:</b> Gamification Case-Part 1</li> </ul>
5	<p><b>Unstructured Data Analysis – Text Analytics</b></p>	<ul style="list-style-type: none"> <li>• Short Tableau Tutorials –Part 3</li> <li>• Read Text Analysis slides</li> <li>• <b>ASSIGNMENT 3:</b> Gamification Case-Part 2</li> </ul>
6	<p><b>Robotic Process Automation</b></p>	<ul style="list-style-type: none"> <li>• RPA Case (Read the case before class)</li> </ul>
7	<p><b>Emerging Auditing Technologies</b></p> <ul style="list-style-type: none"> <li>• Continuous Auditing</li> <li>• Exceptional Exceptions</li> <li>• Blockchain</li> <li>• Drones</li> </ul>	<ul style="list-style-type: none"> <li>• Read Continuous Assurance slides</li> <li>• Read Blockchain material</li> </ul>
8	<b>Midterm Exam</b>	
<b>NO CLASS</b>		
9	<p><b>Substantive tests and test of controls: Advanced audit analytics:</b></p> <ul style="list-style-type: none"> <li>• Benford’s law analysis</li> <li>• Sequence &amp; gap analysis</li> <li>• Aging analysis</li> </ul>	<ul style="list-style-type: none"> <li>• Discuss the changes to the course (due to the current situation)</li> <li>• Discuss the group project</li> <li>• Install IDEA</li> <li>• Read IDEA Workbook Section 1</li> </ul>
10	<ul style="list-style-type: none"> <li>• Duplicate invoices and other duplicate records analysis</li> </ul>	<ul style="list-style-type: none"> <li>• Read IDEA Workbook Section 1</li> <li>• <b>ASSIGNMENT 4:</b> IDEA Workbook Section 2</li> </ul>

11	<ul style="list-style-type: none"> <li>Outliers detection using cluster analysis</li> <li>Detection of internal control violations and Fraudulent transactions using classification methodologies such as rule-based systems</li> </ul>	<ul style="list-style-type: none"> <li>Advanced Excel Functions: Index-Match, Vlookup (if time permits)</li> <li><b>ASSIGNMENT 5: IDEA Workbook Section 3</b></li> </ul>
12	<ul style="list-style-type: none"> <li>Pattern recognition</li> </ul>	<ul style="list-style-type: none"> <li>Outliers</li> <li><b>ASSIGNMENT 6: IDEA Workbook Section 4</b></li> </ul>
13		<ul style="list-style-type: none"> <li><b>ASSIGNMENT 7: Techwear Case</b></li> </ul>
14	<b>Final exam Review</b>	<b>Group Project Slides and Reports due (Based on PSU Tableau Case)</b>
<b>Final Exam</b>		

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## 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. More information can be found at [ods.rutgers.edu](http://ods.rutgers.edu).

[Rutgers University-New Brunswick ODS phone (848)445-6800 or email [dsoffice@echo.rutgers.edu](mailto:dsoffice@echo.rutgers.edu)]

[Rutgers University-Newark ODS phone (973)353-5375 or email [ods@newark.rutgers.edu](mailto:ods@newark.rutgers.edu)]

If you are *pregnant*, the Office of Title IX and ADA Compliance is available to assist with any concerns or potential accommodations related to pregnancy.

[Rutgers University-New Brunswick Title IX Coordinator phone (848)932-8200 or email [jackie.moran@rutgers.edu](mailto:jackie.moran@rutgers.edu)]

[Rutgers University-Newark Office of Title IX and ADA Compliance phone (973)353-1906 or email [TitleIX@newark.rutgers.edu](mailto:TitleIX@newark.rutgers.edu)]

If you seek *religious accommodations*, the Office of the Dean of Students is available to verify absences for religious observance, as needed.

[Rutgers University-New Brunswick Dean of Students phone (848)932-2300 or email [deanofstudents@echo.rutgers.edu](mailto:deanofstudents@echo.rutgers.edu)]

[Rutgers University-Newark Dean of Students phone (973)353-5063 or email [DeanofStudents@newark.rutgers.edu](mailto:DeanofStudents@newark.rutgers.edu)]

If you have experienced any form of *gender or sex-based discrimination or harassment*, including sexual assault, sexual harassment, relationship violence, or stalking, the Office for Violence Prevention and Victim Assistance provides help and support. More information can be found at <http://vpva.rutgers.edu/>.

[Rutgers University-New Brunswick incident report link: <http://studentconduct.rutgers.edu/concern/>. You may contact the Office for Violence Prevention and Victim Assistance at (848)932-1181]

[Rutgers University-Newark incident report link: [https://cm.maxient.com/reportingform.php?RutgersUniv&layout\\_id=7](https://cm.maxient.com/reportingform.php?RutgersUniv&layout_id=7) . You may also contact the Office of Title IX and ADA Compliance at (973)353-1906 or email at [TitleIX@newark.rutgers.edu](mailto:TitleIX@newark.rutgers.edu). If you wish to speak with a staff member who is confidential and does **not** have a reporting responsibility, you may contact the Office for Violence Prevention and Victim Assistance at (973)353-1918 or email [run.vpva@rutgers.edu](mailto:run.vpva@rutgers.edu)]

If students who have experienced a temporary condition or injury that is adversely affecting their ability to fully participate, you should submit a request via <https://temporaryconditions.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.

[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.

[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/>

Students experiencing difficulty in courses due to *English as a second language (ESL)* should contact the Program in American Language Studies for supports.

[Rutgers–Newark: [PALS@newark.rutgers.edu](mailto:PALS@newark.rutgers.edu)]

[Rutgers–New Brunswick: [eslpals@english.rutgers.edu](mailto:eslpals@english.rutgers.edu)]

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

[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/>]

[Optional items that many faculty include:

- Students must sign, date, and return a statement declaring that they understand the RU Academic Integrity Policy.
- Students must sign, date, and return a statement declaring that they understand this syllabus.]