

COURSE OUTLINE: AB5103 Audit Analytics

Academic Year	2022/23	Semester	2
Course Coordinator	Tee Chong Yu		Other Instructors : Varella Gino Lee : Neo Aik Cheong
Course Code	AB5103		
Course Title	Audit Analytics		
Co-requisites	AC2104		
No of AUs	3		
Contact Hours			
A) Course Aims/Description			
<p>With a rapidly changing regulatory environment, stakeholders are demanding more confidence and value from audit, particularly with the emergence of technologies such as data analytics. Data analytics is significantly changing the way auditors approach and conduct audit, where data is now brought to life to allow an in-depth risk assessment and more continuous real-time audit procedures to be performed – subjecting entire populations to audit procedures, not just samples.</p> <p>This course examines the application of data analytics in audit based on an underlying risk-based methodology with real-life examples. This course is designed for students who are keen to apply what they have learnt in other courses as well as within the course to real-life examples as they learn about practical aspects in the audit analytics process such as extraction, transformation and loading of data as well as the actual execution of audit analytics tests and visualisation of the results in software such as Tableau.</p>			
B) Intended Learning Outcomes (ILO)/Objectives			
<p>By the end of this course, you should be able to:</p> <ol style="list-style-type: none"> 1) Describe what is data analytics in audit 2) Apply basic skills on SQL to develop insights in audit 3) Apply basic skills on a visualisation tool like Tableau to develop insights in audit 4) Evaluate the practical considerations when applying data analytics in audit 5) Conceptualise the application of audit analytics in real-life companies through development of prototype dashboards. 			
C) Course Content			
<ul style="list-style-type: none"> • Introduction to the course <ul style="list-style-type: none"> - What is Data Analytics - Phases of the Audit - Types of Data Analytics • Application of Data Analytics in Audit <ul style="list-style-type: none"> - Plan the audit <ul style="list-style-type: none"> - Exploratory data analytics - Obtain understanding of entity and its environment - Perform preliminary analytical procedures 			

- Identify and assess risk of material misstatement
- Design tailored audit procedures
- Obtain an understanding of a population

- Tests of operating effectiveness of controls
 - Inspect or re-perform controls
 - Evaluate deficiencies in controls

- Perform substantive procedures
 - Test of details
 - Substantive analytical procedures
 - Automation of manual procedures
 - Iterative uses of data analytics

- Evaluate results
 - Types of misstatements
 - Exceptions due to imprecision in expected outcome
 - Deviations in a nonmonetary test
 - Errors identified through other types of testing
 - Concluding analytical procedures

- Audit Analytics Process
 - Extract the data
 - Understanding of relational tables in database
 - Methods of data extraction
 - Data storage and security

 - Prepare the data for use
 - Data formats
 - Conversion of data formats
 - Use of SQL

 - Run the analytics tests
 - Use of SQL

 - Interpret the outputs
 - Use of Tableau

- Team meeting with audit partner(s) for understanding of the real-life company assigned

- Team meeting with audit partner(s) for proposal of audit analytics scope

- Development of prototype dashboard(s) and consultation for final project and presentation

- Final presentation to audit partners on the audit analytics solutions proposed

D) Assessment (includes both continuous and summative assessment)

Component	ILO Tested	NBS Learning Goal	Weight age	Team/ Individual	Assessment Rubrics
1. Seminar Participation	ILO1 – 5	Acquisition of knowledge, Critical Thinking, Creative Thinking, Problem Solving & Decision Making, Oral Communication	10%	Individual	Seminar Participation Rubric (See Appendix A)
2. Seminar Activities/ Assignments	ILO2 – 3	Acquisition of knowledge, Critical Thinking, Problem Solving & Decision Making	20%	Individual	N/A
3. In-Class Quiz	ILO2 – 3	Acquisition of knowledge, Critical Thinking, Problem Solving & Decision Making	20%	Individual	N/A
4. Team Project Final Presentation & Demo	ILO2 – 5	Acquisition of knowledge, Problem Solving & Decision Making, Teamwork & Interpersonal Skills, Oral Communication	25%	Team (All students will need to present)	Presentation Rubric (See Appendix B)
5. Team Project Final Report	ILO2 - 5	Acquisition of knowledge, Problem Solving & Decision Making, Teamwork & Interpersonal Skills,	25%	Team	Final Report Rubric (See Appendix C)
Total			100%		

1. Seminar Participation (10%)

Seminar participation refers to both professional in-class behavior (in terms of attendance, punctuality and engagement) as well as *voluntary* individual contributions to discussions in seminars. The former will constitute 20% and the latter 80% of the overall 10% marks allocated to seminar participation (see Appendix A). Individual contributions to discussions in seminars can take the form of an insightful question, comment, or response, and are assessed on both the quality and consistency of participation.

2. Seminar Activities/Assignments (20%)

The seminar activities/assignments simulate actual audit analytics processes. They serve to reinforce learning and prepare students for the in-class quiz and team project. The individual activities/assignments are to be submitted through NTULearn as the classes progress from week 3 onwards.

3. In-class Quiz (20%)

Individual **open-book** in-class quiz will put to test the skills taught to you in the area of SQL and visualisation to ensure that the Learning Outcome(s) have been achieved. The responses to the in-class quiz should be submitted individually through NTULearn after the completion of the quiz in week 7.

4. Team Project (50%)

Each student will be assigned to a team comprising four to five members. Each team will be assigned a real-life case to analyze. During week 9, the team will present a progress report on the case, which serves as a progress health check for the team's proposal. In week 13, each team will be given 30 minutes to make the final presentation to the audit partners on the audit analytics solutions proposed (25%). A final report is to be submitted in week 13 (25%). More specific guidelines on the team presentation/report will be provided at the start of the course on the AC5103 NTULearn main site. Refer to the section on 'course policies and student responsibilities' for free-riding issues.

E) Formative feedback

Feedback is central to this course.

In the process of conceptualization the application of audit analytics in your group assignment, you will have a few touch-points with the instructor(s) and partner(s) from Deloitte, who will be giving you real-time verbal feedback on your proposal, aligning them to practical real-life scenarios such that your final deliverable and presentation will meet the course requirements.

You will also have feedback on your seminar activities/assignments and in-class quiz, which will test you on the technical skillsets taught in class (such as SQL).

F) Learning and Teaching approach	
Approach	How does this approach support you in achieving the learning outcomes?
Seminars (Application of Data Analytics in Audit)	<p>The interactive seminar session where the teaching team will share with you how data analytics is applied in the various phases of the audit, together with real-life examples on such applications. We will also be having open discussion on conceptual questions surrounding such applications, something that is not set in stone at the moment by the profession.</p> <p>The seminars are meant to show you the possibilities of what you can do with data analytics, and will help give you context as you try to conceptualise its application in your team project.</p>
Meetings with partner(s) from Deloitte	The various touch points that you have with the partner(s) from Deloitte allows you to hear directly from a senior industry practitioner on their experience as well as to guide you in the course of your preparation toward the final deliverable and presentation.
Seminars (Audit Analytics Process)	The interactive seminar session where you will learn some basic skills in Structured Query Language (SQL) as well as certain visualisation tool to prepare you for the individual in-class quizzes and be able to apply the skillsets learned in the team project.
Seminar activities/ assignments	The seminar activities/assignments will allow you to have a hands-on experience on the audit analytics process skills and theories taught during the respective learning weeks. They will also simulate simple examples of actual audit analytics processes and also serve as a preparation for the in-class quiz.
Individual in-class quiz	The individual in-class quiz will put to test the skills taught to you in the area of SQL and visualisation to ensure that the Learning Outcome(s) have been achieved.
All seminars will be conducted online, unless otherwise communicated by the instructors.	
G) Reading and References	
<p><u>Textbook:</u> ADAG: Audit Data Analytics Guide, Association of International Certified Professional Accountants (AICPA), 2017.</p> <p><u>Other Resources:</u></p>	

The Singapore Standards on Auditing (SSAs) and other pronouncements related to auditing and data analytics issued by the Institute of Singapore Chartered Accountants (ISCA) are available at: <http://isca.org.sg/tkc/aa/standards/standards/>

Audit Guidance Statement (AGS) 13 *Data Analytics in a Financial Statements Audit* is available at: [ags-13.pdf \(isca.org.sg\)](#)

Articles and other required readings will be assigned over the course of the semester and posted on NTULearn site.

H) Course Policies and Student Responsibilities

(1) General

You are expected to complete all assigned pre-class readings and activities, attend all seminar classes punctually and take all scheduled assignments by due dates. You are expected to take responsibility to follow up with course notes, assignments and course related announcements for seminar sessions you have missed. You are expected to participate in all seminar discussions and activities.

(2) Absenteeism

Absence from class without a valid reason will affect your overall course grade. Valid reasons include falling sick supported by a medical certificate and participation in NTU's approved activities supported by an excuse letter from the relevant bodies.

If you miss a seminar, you must inform the course instructor via email prior to the start of the class.

(3) Free-riding

For the team project, members of each team are strongly encouraged to discuss and agree on each member's tasks and responsibilities early, and to amiably resolve any subsequent dispute(s) as a team prior to consulting their course instructor. Do flag out free-riding to the instructor and if the problem persists despite corrective intervention by team members and/or instructor, disciplinary repercussions may include grade penalty and/or other consequences correspond to the severity of the misbehaviour. Thus, the overall mark for a team member is subject to downward moderation based on the team's peer evaluation. For example, if a member's average rating does not exceed 3, 4 or 5 on a scale ranging from 1 to 10, the member will receive 30%, 50% or 80% of the overall mark awarded to team presentation respectively. A score exceeding 5 is commensurate with 100% of the overall mark awarded.

Each member should complete an online peer assessment via [eUreka](#) **within two days** after the submission of the final report (see rubric in Appendix D)

I) Academic Integrity

Good academic work depends on honesty and ethical behaviour. The quality of your work as a student relies on adhering to the principles of academic integrity and to the NTU Honour Code, a set of values shared by the whole university community. Truth, Trust and Justice are at the core of NTU's shared values.

As a student, it is important that you recognize your responsibilities in understanding and applying the principles of academic integrity in all the work you do at NTU. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, collusion and cheating. Please refer to [NTU Academic Integrity Handbook](#) for further guidance on academic integrity.. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

J) Course Instructors

Instructor	Office Location	Phone	Email	Consultation Hours
Varella Gino Lee	Deloitte Singapore	6800 2608	ginlee@deloitte.com	By appointment via email
Neo Aik Cheong	Deloitte Singapore	6800 2021	aneo@deloitte.com	
Tee Chong Yu (Course Coordinator)	Deloitte Singapore	6216 3207	ctee@deloitte.com	

K) Planned Weekly Schedule

Week	Topic	ILO	Readings /Activities
1	Introduction to the course <ul style="list-style-type: none"> • What is Data Analytics • Phases of the Audit • Types of Data Analytics (in Audit) 	ILO1	ADAG: Ch 1 AGS 13
2	Audit Analytics Process (1) <ul style="list-style-type: none"> • Extract the data <ul style="list-style-type: none"> • Understanding of relational tables in database • Methods of data extraction • Data storage and security • Prepare the data for use <ul style="list-style-type: none"> • Data formats • Conversion of data formats • Use of SQL 	ILO2	N/A

3	Audit Analytics Process (2) <ul style="list-style-type: none"> Run the analytics tests <ul style="list-style-type: none"> Use of SQL 	ILO2	N/A
4	Audit Analytics Process (3) <ul style="list-style-type: none"> Interpret the outputs <ul style="list-style-type: none"> Use of Tableau 	ILO3	N/A
5	Application of Data Analytics in Audit (1) <ul style="list-style-type: none"> Plan the audit <ul style="list-style-type: none"> Exploratory data analytics Obtain understanding of entity and its environment Perform preliminary analytical procedures Identify and assess risk of material misstatement Design tailored audit procedures Obtain an understanding of a population 	ILO4, ILO5	ADAG: Ch 2 AGS 13 SSA 315 & 500
6	Mock assessment Team meeting with audit partner(s) for understanding of the real-life company assigned	ILO4, ILO5	In-class mock assessment Meeting with audit partner(s)
7	In-class quiz	ILO4, ILO5	In-class Quiz
	Recess Week		
8	Application of Data Analytics in Audit (2) <ul style="list-style-type: none"> Tests of operating effectiveness of controls <ul style="list-style-type: none"> Inspect or re-perform controls Evaluate deficiencies in controls Perform substantive procedures <ul style="list-style-type: none"> Test of details Substantive analytical procedures Automation of manual procedures Iterative uses of data analytics 	ILO4, ILO5	ADAG: Ch 3 AGS 13

9	Team meeting with audit partner(s) for proposal of audit analytics scope	ILO4, ILO5	Project progress presentation
10	Application of Data Analytics in Audit (3) <ul style="list-style-type: none"> • Evaluate results <ul style="list-style-type: none"> • Types of misstatements • Exceptions due to imprecision in expected outcome • Deviations in a nonmonetary test • Errors identified through other types of testing • Concluding analytical procedures 	ILO4, ILO5	ADAG: Ch 4 AGS 13
11	Development of prototype dashboard(s) and consultation for final project and presentation (1)	ILO2, ILO3, ILO4, ILO5	N/A
12	Development of prototype dashboard(s) and consultation for final project presentation (2)	ILO2, ILO3, ILO4, ILO5	N/A
13	Final presentation to audit partners on the audit analytics solutions proposed (30 mins per group)	ILO2, ILO3, ILO4, ILO5	Final presentation and submission of report.

Appendix A: Assessment Rubric for Seminar Participation

Traits	Weightage	Performance	
Frequency/ Quality of Participation	80%	Scant Does not <i>voluntarily</i> speak up/contribute in class. No contributions/ contributions lack substance.	Substantially Developed <i>Voluntarily</i> speaks up/contributes regularly in most classes. Contributions are constructive and insightful.
		Evaluation: Scant <u>1 2 3 4 5 6 7 8 9 10</u> Substantially Developed	
Professional Behaviour <ul style="list-style-type: none"> • Attendance • Punctuality • Engagement 	20%	Scant Missed most classes or consistently late without valid reason. Hardly focuses during class (not listening when others are speaking/presenting, not participating during team discussions, unnecessary chit-chatting, using mobile phone/ surfing the internet)	Substantially Developed Punctual and full attendance in class. Almost always engages fully in class (listens attentively when others speak/present, participates actively during team discussions, does not unnecessarily chit-chat, does not use mobile phone or surf the internet)
		Evaluation: Scant <u>1 2 3 4 5 6 7 8 9 10</u> Substantially Developed	

Appendix B: Assessment Rubric for Group Presentation

Traits		Weightage	Performance	
Design Factors (Group/ Individual)	Content (Group) <ul style="list-style-type: none"> Presents relevant information Supports main points with strong evidence 	40%	Scant Content is erroneous or irrelevant; references and supporting materials are absent. Lacks of depth in content and little insights are exhibited. Presentation falls outside set time parameters.	Substantially Developed Content is accurate, thorough, and directly on point; strong support and references are provided. Exhibits depth and insight in content. Effective use of time and stays within time parameters.
			Evaluation: Scant <u>1 2 3 4 5 6 7 8 9 10</u> Substantially Developed	
	Quality of Slides (Group) <ul style="list-style-type: none"> Information clear and concise Slides are visually appealing 	10%	Scant The slides are difficult to read and too much information is presented in each slide. Lacks visual appeal. Use of animation (if any) is distracting.	Substantially Developed Information is clear and concise on each slide. Slides are visually appealing. Use of animation (if any) is appropriate.
			Evaluation: Scant <u>1 2 3 4 5 6 7 8 9 10</u> Substantially Developed	
	Verbal (Individual) <ul style="list-style-type: none"> Speaks at appropriate speed and volume Uses correct grammar and pronunciation 	20%	Scant Grammar, pronunciation and word choice are deficient. Vocal delivery is too soft or too fast to understand; gap-fillers interfere with expression.	Substantially Developed Free of errors in grammar and pronunciation; good choices of word enhance clarity of expression. Vocal delivery is varied and dynamic. Speech rate, volume, and tone facilitate audience comprehension. Minimal gap fillers.
			Evaluation: Scant <u>1 2 3 4 5 6 7 8 9 10</u> Substantially Developed	
	Non-Verbal (Individual) <ul style="list-style-type: none"> Establishes eye contact Uses gestures and movement to convey energy and confidence 	20%	Scant Eye contact, posture, gestures, movement and facial expressions are inappropriate and significantly distracting.	Substantially Developed Eye contact, posture, gestures, movement and facial expressions make the presentation compelling, and speaker appears polished and confident.
			Evaluation: Scant <u>1 2 3 4 5 6 7 8 9 10</u> Substantially Developed	

Situational Factors (Individual)	<ul style="list-style-type: none"> • Constructive replies/response to questions • Ability to handle opposing views 	10%	Scant Replies/response to questions posed is scant and do not effectively address opposing views.	Substantially Developed Strong ability to provide constructive replies/response to questions posed and handle opposing views.
			Evaluation: Scant <u>1 2 3 4 5 6 7 8 9 10</u> Substantially Developed	

Appendix C: Assessment Rubric for Group Report

Traits	Weightage	Performance	
Define the Problem (Group)	25%	Scant Does not identify the problem clearly; demonstrates limited understanding of the problem or related contextual factors	Substantially Developed Identifies the problem clearly and thoroughly; demonstrates the ability to construct a clear and insightful problem statement with evidence of all relevant contextual factors
		Evaluation: Scant <u>1 2 3 4 5 6 7 8 9 10</u> Substantially Developed	
Devise Approaches to Solve the Problem (Group)	25%	Scant Selects an approach without regard to fit; does not demonstrate the ability to consider new approaches even if the group approach is clearly not appropriate; identifies alternatives that reflect limited understanding of the situation	Substantially Developed Identifies approach for solving the problem within a specific context; demonstrates the ability to invert a process to form a plan and clearly articulates the group's decision making process; identifies alternatives that reflect an in-depth understanding of the situation
		Evaluation: Scant <u>1 2 3 4 5 6 7 8 9 10</u> Substantially Developed	
Assess feasibility (Group)	25%	Scant Does not examine how the approach affects the relevant stakeholders from a quality, efficiency and value standpoint and not able to identify areas of risk and possible side effects.	Substantially Developed Clearly assess how well the approach affects the relevant stakeholders from a quality, efficiency and value standpoint, considers areas of risk and provides insights in addressing possible side effects.
		Evaluation: Scant <u>1 2 3 4 5 6 7 8 9 10</u> Substantially Developed	
Evaluate Outcomes (Group)	25%	Scant Review results superficially in terms of the problem defined with no consideration of need for further work	Substantially Developed Reviews results relative to the problem defined with through, specific considerations of need for further rework.
		Evaluation: Scant <u>1 2 3 4 5 6 7 8 9 10</u> Substantially Developed	

Appendix D: Confidential Peer Evaluation

Teamwork & Interpersonal Skills (Peer Evaluation) Rubric

Learning Objective: The ability to work effectively with others in a group setting.

Traits	Performance	
<p><u>1. Roles and Responsibility (RR)</u> Behaves professionally by upholding responsibility and assuming accountability for self and others in progressing towards the team’s goal.</p>	<p>Scant Unclear about his/her own role; refuses to take a role in the group; insists to work individually and has limited coordination or communication with others.</p>	<p>Substantially Developed Always fulfills responsibilities; performs his/her role within the group with enthusiasm and demonstrates willingness to work collaboratively.</p>
	<p>Evaluation: Scant <u>1 2 3 4 5 6 7 8 9 10</u> Substantially Developed</p>	
<p><u>2. Communication (CM)</u> Identifies appropriate mechanisms to coordinate and correspond with team members.</p>	<p>Scant Modes of communication are not appropriate, causing confusion and miscommunication among team members.</p>	<p>Substantially Developed Modes of communication are appropriate, and maintaining timely communication and correspondence with team members.</p>
	<p>Evaluation: Scant <u>1 2 3 4 5 6 7 8 9 10</u> Substantially Developed</p>	
<p><u>3. Conflict Resolution (CR)</u> Resolves conflicts using a variety of approaches.</p>	<p>Scant Does not recognize conflicts or is unwilling to resolve conflicts.</p>	<p>Substantially Developed Consistently resolves conflicts through facilitating open discussion and compromise.</p>
	<p>Evaluation: Scant <u>1 2 3 4 5 6 7 8 9 10</u> Substantially Developed</p>	
<p><u>4. Contributions (CT)</u> Contributes positive input for the team; effectively utilizes one’s knowledge and expertise.</p>	<p>Scant Largely disinterested in working in a group and refuses to participate; observes passively or is unwilling to share information with other team members.</p>	<p>Substantially Developed <u>Actively attends and participates in all activities and provides meaningful contribution in articulating ideas and opinions.</u></p>
	<p>Evaluation: Scant <u>1 2 3 4 5 6 7 8 9 10</u> Substantially Developed</p>	
<p><u>5. Relationship (RS)</u> Maintains cooperative interaction with other team members regardless of individual /cultural differences and respects diverse perspectives.</p>	<p>Scant Rarely listens to others and does not acknowledge the opinions that differ from his/her own.</p>	<p>Substantially Developed Engages in respectful relationships with all other members in the team. Embraces and accepts diverse points of view without prejudice.</p>
	<p>Evaluation: Scant <u>1 2 3 4 5 6 7 8 9 10</u> Substantially Developed</p>	

References: *Teamwork Value Rubric - Association of American Colleges and Universities.* Retrieved from <http://www.aacu.org/value/rubrics/pdf/teamwork.pdf>