NANYANG TECHNOLOGICAL UNIVERSITY
NANYANG BUSINESS SCHOOL
BR3212
COMPUTING SOLUTIONS FOR RISK MANAGEMENT & INSURANCE

Academic Year	: 2023-2024	**Semester**	: 2
Course Coordinator	: Yap Jen Ming		
Pre-requisites	: AB1201 and AB1202		
No. of AUs	: 3		
Contact Hours	: 3 hours per week		

A) Course Aims

This course is specially designed for the students who are interested in learning the software tools frequently used by the practitioners in the financial industry such as Excel, VBA, SQL and R and understanding how to communicate model and model results to the target audiences. The course uses various real-life examples for demonstration in order to give the students firsthand experience of how the practitioners using the software tools in solving the problems faced by them in their day-to-day works.

B) Intended Learning Outcomes (ILO)/Objectives

By the end of this course, you should be able to:

- ILO1: Discover and assess the various functionalities of software such as Excel, VBA, SQL and R;
- ILO2: Analyze and solve various insurance and risk management related issues with the use of software such as Excel, VBA, SQL and R; and
- ILO3: Communicate the model and model results to the audiences in an effective manner.

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The course covers the following key topics:

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   First, this chapter provides the details of the key Excel features and functions used by the practitioners in developing the Excel model. Second, it demonstrates how to create proper graphs with Excel. Last, it shows the best practices in maintaining an Excel spreadsheet and plotting a graph.

2. Insurance and Financial Risk Management Application: Excel

   This chapter shows the theoretical concepts on Value-at-Risk (VaR) analysis. In particular, it demonstrates how Excel can be used to carry out the analysis. This chapter has two parts:

   a. Monte Carlo Simulation & Curve Fitting

      The first part shows how to fit a curve on a specific risk via a curve fitting exercise.

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      The second part shows the concepts and pros and cons of the VaR methods – Parametric, Historical and Monte-Carlo. In addition, it explains and compares the results derived from the VaR methods.

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   First, this chapter demonstrates the basic rules in VBA macro. Second, it illustrates the common VBA commands used by the practitioners when they develop the program.

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      This part illustrates how VBA could be used to automate a (calculation) process.

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      This part explains the theoretical concepts on both options and forwards. In addition, it shows how to create a customized function to determine the value of options and forwards.

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Component	ILO Tested	NBS Learning Goal (Refer to Appendix 1)	Weightage	Team/ Individual	Assessment Rubrics (Refer to Appendix 2)

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ANNEX B: ASSESSMENT CRITERIA

Annex B1: Assessment Rubric for Mid-term Test

(Learning Goal: Acquisition of Knowledge, Problem Solving & Decision Making, Written Communication)

1. **To assess the student's understanding of the application of different software tools in particular to Excel and VBA Programming on insurance related issues**
2. **To assess the student's ability to document the model process and communicate the model results to the audiences**

No	Learning Objective	Performance	
1	Discover and assess the various functionalities of Excel	**Not yet** Fail to understand the application of various Excel functions	**Substantially developed** Have good understandings of various Excel functions
		Evaluation: Scant 1 2 3 4 5 6 7 8 9 10 Substantially developed	
2	Analyze and solve various insurance and financial risk management related issues with the use of Excel	**Not yet** Show a poor ability of using Excel to solve most of the insurance and financial risk management problems	**Substantially developed** Have a good ability of using Excel to solve most of the insurance and financial risk management problems
		Evaluation: Scant 1 2 3 4 5 6 7 8 9 10 Substantially developed	
3	Discover and assess the various functionalities of VBA	**Not yet** Fail to understand the application of various VBA Programming	**Substantially developed** Have good understandings of various VBA Programming
		Evaluation: Scant 1 2 3 4 5 6 7 8 9 10 Substantially developed	
4	Analyze and solve various insurance and financial risk management related issues with the use of VBA	**Not yet** Show a poor ability of using VBA to solve most of the insurance and financial risk management problems	**Substantially developed** Have a good ability of using VBA to solve most of the insurance and financial risk management problems
		Evaluation: Scant 1 2 3 4 5 6 7 8 9 10 Substantially developed	
5	Prepare the model and present results to the audiences in an effective manner (Written Communication)	**Not yet** Fail to create an audit trail for a model	**Substantially developed** Able to produce a professional audit trail for a model
		Evaluation: Scant 1 2 3 4 5 6 7 8 9 10 Substantially developed	
		Not yet Fail to make appropriate comments on the model results	**Substantially developed** Able to make constructive comments on the model results
		Evaluation: Scant 1 2 3 4 5 6 7 8 9 10 Substantially developed	

Annex B2: Assessment Rubric for Individual Presentation (Learning Goal: Oral Communication)

To assess the student's ability of communicating the model and model results in a clear manner.

<table>
<tr><th>No</th><th>Learning Objective</th><th colspan="2">Performance</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">Summarise the model and model results (using PowerPoint slides).</td><td>Not yet
Struggles to summarise the model and its results in a clear manner using PowerPoint slides.
Superfluous visuals, no visuals, visuals containing inaccuracies or visuals that are so poorly constructed that they detract from the presentation; the font is too small to be easily seen.</td><td>Substantially developed
Adeptly summarises the model and its results in a clear and visually engaging manner using PowerPoint slides.
Visual aids are designed to maximise audience understanding; the use of media is varied and appropriate with media not being added simply for the sake of use.</td></tr>
<tr><td colspan="2">Evaluation: Not yet 1 2 3 4 5 6 7 8 9 10 Substantially developed</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">Present the model and model results to the audiences (oral communications)</td><td>Not yet
Struggles to present the model and its results in a clear and engaging manner.
Does not appear to understand the question and does not make any attempts to clarify the question.
Responses are incorrect, unable to respond to questions; superficially responds to questions or only provides answers to rudimentary questions.</td><td>Substantially developed
Proficiently presents the model and its results to the audience clearly and engagingly.
Calm and composed when faced with questions. Listens to the entire question and asks questions when clarification of a question is needed.
Confidently, spontaneously, and accurately responds to all questions with persuasive explanations and elaboration.</td></tr>
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</table>

Annex B3: Assessment Rubric for Class Participation (Learning Goal: Oral Communication)

To assess the student's contribution to the class discussion.

Criterion	Performance		
	1 – Beginning	2 – Learning	3 – Competent
Being respectful in participation	Raises points by frequently interrupting the speaker	Raises points by interrupting the speaker on occasions	Raises points politely and without interrupting the speaker.
Demonstrates good preparation for class	Unprepared for class contribution.	Draws on course and reading content for the lesson	Draws on course and reading content for the lesson, connects to previous content, and brings in new content.
Contributes to learning	Seldom moves the conversation/discussion to new insights.	Moves the conversation/discussion to new insights by questioning in constructive way.	Moves the conversation/discussion to new insights by questioning in constructive way; expands on suggestions/ideas by others; offers counter opinion.

ANNEX C: CURRENT COURSE OUTLINE

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Course Code	BR3209		
Course Title	Computing for Risk Management and Insurance Practices		
Pre-requisites	AB1201 and AB1202		
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Proposal Date	07 December 2021		

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13	Insurance & Financial Application: R ✓ *Monte Carlo Simulation & Value-at-Risk Analysis* ✓ *Simple Regression Analysis*	ILO2	Handout
14	Revision	ILO1 – ILO3	Handout

ANNEX D: NOTES AND SAMPLES

A NOTE ON TEAMWORK ASSESSMENT & PEER EVALUATION

** For course coordinator/instructor's note & not to be included in the course outline*

A student's ability to work in, and lead, a team is an important skill for his/her future career progression and development. As such, courses are encouraged to incorporate team activities as part of the course continuous assessment.

Consistent with the outcome-based teaching and learning pedagogy, course instructors that plan to incorporate teamwork will need to think through the learning objectives that they want to achieve through the team activities including behaviors that students should exhibit during teamwork.

To motivate and assess students' learning in teamwork, assessment should be aligned with the planned learning objectives and meaningful feedback should be provided to the students. As instructors may not be able to directly observe, assess and provide feedback to students in terms of their performance in teams, peer evaluation is likely the best alternate form of assessment and feedback to help students develop their teamwork skills. Courses are strongly encouraged to conduct peer evaluation or put in place other means for students to learn and receive feedback from their team members.

In aligning teamwork assessment with peer evaluation, different assessment methods are likely to have their own pros and cons. As such, instructors should discuss and agree on the teamwork assessment method to be used in a course. In deciding on a teamwork assessment method, considerations should be given to circumstances under which and how a member's teamwork mark may be increased, unchanged and/or decreased in light of student peer evaluations and free-riding concerns (including the availability of evidence and opportunities provided to affected members to voice their side of the story). Where peer evaluation is not compulsory, instructors are encouraged to request a positive confirmation from all members that every member has contributed significantly to the team assignment (as opposed to a negative confirmation where students inform instructors only of free-riding issues in their teams). The adopted assessment method for team assignments should be clearly conveyed to all students upfront and stated in the course outline together with the other course assessment components. In addition, changes in assessment criteria and methods (including team assignments) midway in the course should be avoided unless all students are informed and agreeable.

For illustration purposes, attached is a sample of peer evaluation method used in an undergraduate course where members' marks are reduced if their average peer rating is found to be on the low side (<4 on a scale of 1 to 7).

Instructors are strongly recommended to use the online Teamwork & Interpersonal Skills Rubric available in eUreka.

Sample Peer Evaluation Used in an Undergraduate Course

Peer Evaluation Instructions

All members are required to complete a peer evaluation for each member of the team (i.e., including a self-assessment). The completed peer evaluation form must be submitted individually to the instructor immediately after the team project has been submitted for grading. Identity of appraisers will be kept **confidential** and will not be revealed to other team members.

We will use a member's ratings (on a scale ranging from 1 to 7) to award marks for the team project to other members by computing the average rating that a member receives from other members (i.e., excluding each member's self-rating). Each member will be informed of his/her average rating. A member's mark for the team project will be computed as follows:

1. If a member's average rating is ≥ 4, the member will receive **100%** of the overall mark awarded to the team project.

2. If a member's average rating is < 4 but ≥ 3, the member will receive **80%** of the overall mark awarded to the team project.

3. If a member's average rating is < 3 but ≥ 2, the member will receive **50%** of the overall mark awarded to the team project.

4. If a member's average rating is < 2, the member will receive **30%** of the overall mark awarded to the team project.

A member who has concerns with the ratings given by other team members and/or his/her average rating should immediately consult his/her instructor upon receiving his/her peer evaluation feedback.

CONFIDENTIAL PEER EVALUATION FORM FOR TEAM PROJECT

Member's name: _____

Seminar group and team number: _____

Please use the attached Peer Evaluation Rubric to evaluate yourself and your team members on each of the 5 stated attributes (on a scale of 1 to 7). State your ratings for yourself and each of your team members in the table below. For your self-assessment, insert "(Self)" after your name in the table below.

Index #	**Name of team members**	**1 - RR**	**2 - CM**	**3 - CR**	**4 - CT**	**5 - RS**	**Average Rating**
1							
2							
3							
4							
5							
6							

If any of your ratings above is **< 4**, please provide a brief explanation to justify the ratings.

Index #	Brief explanation to justify a rating of **< 4**

You may attach supporting documents (like emails and screen shots), if any, to support your explanations above.

Teamwork & Interpersonal Skills (Peer Evaluation) Rubric
Learning Objective: The ability to work effectively with others in a group setting.

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

References:

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

SAMPLE OF ASSESSMENT COMPONENT

a. Team Case Research Study Presentation (30 min)

i. Pick an Asia-based company (e.g. Shopee, BreadTalk, Osim) that are currently regional/international but with the potential to be more global in their business (therefore, no SIA, Keppel, Sembawang and others that are already fairly well established globally). Give a brief description of its business.

ii. Outline in what ways this company can become more global (i.e. what should its strategy be to become a global player). In doing so, also highlight its comparative advantages, its unique business propositions, its key success factors, the challenges it will face, etc. Use all research means, including interviewing the company (if need be) to complete the study.

b. Individual Research Essay (10 to 15 pages, double-spacing):

You are to write an essay on one of the suggested topics (below). The following are some suggested topics. Students can opt to write on any global marketing-related topics so long as permission is obtained from your instructor.

1. Can politics ever be detached from business? Why and why not? Cite examples, including those from various industries, to support your arguments. How then can companies overcome the influence of politics in developing global business strategies?

2. What's the roles of creativity and innovation in the development of global business strategies and markets? What practical ways/steps can companies (especially those from Asia) take to ensure that they can improve in these areas? What roles can governments and tertiary institutions play in these areas?

3. High technology, digitalization and artificial intelligence have arrived in the world in the most impressive and massive ways. How would they affect the ways businesses will be conducted globally?

4. In global business competition, is there scope for smaller players? How can smaller players grow in this highly competitive world (Note: All global companies started as small, e.g. Dell, Microsoft, Kentucky Fried Chicken, etc.)

5. What is your assessment of the current US-China trade frictions? Will it get better or worse in the future, and who will win? How would such frictions affect the relationships of these two countries in other areas?

6. Any other topic approved by your instructor. You need to speak to your instructor by Week 05.

ANNEX E: LIST OF NBS LEARNING GOALS

LEARNING GOAL	LEARNING OBJECTIVE	CHECK
TASK SKILLS		
Acquisition of Knowledge	*Instructors, please define.*	
Ethical Reasoning	The ability to recognize and understand ethical issues, and apply sound ethical reasoning.	
Critical Thinking & Creative Thinking	The ability to define, examine, evaluate, analyze and synthesize various arguments and knowledge to form independent judgment.	
	The ability to provide insight in an innovative way characterized by high degree of adaptiveness.	
Problem Solving & Decision Making	The ability to identify problem, generate a plan to solve problem, implement and evaluate the plan and make sound business decision.	
Planning & Execution	The ability to set clear priorities and plans of action for the task and define task objectives to fulfill goals within a planned schedule for execution.	
PEOPLE SKILLS		
Oral Communication & Written Communication	The ability to communicate well with others verbally so that it clearly expresses the intended message and is understandable and useful to the receiving party.	
	The ability to communicate well with others in writing so that it clearly expresses the intended message and is understandable and useful to the receiving party.	
Negotiation	The ability to systematically plan and prepare for negotiation and apply negotiation skills in personal and professional practice.	
Cultural Intelligence	The ability to function effectively in situations characterized by cultural diversity.	
Teamwork & Interpersonal Skills	The ability to work effectively with others in a group setting.	
Motivation & Development of Self & Others	The ability to develop a better understanding of one's strengths and weaknesses, and learn to view others and mistakes positively as sources of personal and professional development.	

Please write to NBS Accreditation office (nbsaccro@ntu.edu.sg) for sample rubrics.

ANNEX F: RESOURCES

BLOOM'S TAXONOMY FOR LEARNING OUTCOMES/OBJECTIVES

Action Words for Bloom's Taxonomy					
Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Create**
define	explain	solve	analyze	reframe	design
identify	describe	apply	compare	criticize	compose
describe	interpret	illustrate	classify	evaluate	create
label	paraphrase	modify	contrast	order	plan
list	summarize	use	distinguish	appraise	combine
name	classify	calculate	infer	judge	formulate
state	compare	change	separate	support	invent
match	differentiate	choose	explain	compare	hypothesize
recognize	discuss	demonstrate	select	decide	substitute
select	distinguish	discover	categorize	discriminate	write
examine	extend	experiment	connect	recommend	compile
locate	predict	relate	differentiate	summarize	construct
memorize	associate	show	discriminate	assess	develop
quote	contrast	sketch	divide	choose	generalize
recall	convert	complete	order	convince	integrate
reproduce	demonstrate	construct	point out	defend	modify
tabulate	estimate	dramatize	prioritize	estimate	organize
tell	express	interpret	subdivide	find errors	prepare
copy	identify	manipulate	survey	grade	produce
discover	indicate	paint	advertise	measure	rearrange
duplicate	infer	prepare	appraise	predict	rewrite
enumerate	relate	produce	break down	rank	role-play
listen	restate	report	calculate	score	adapt
observe	select	teach	conclude	select	anticipate
omit	translate	act	correlate	test	arrange
read	ask	administer	criticize	argue	assemble
recite	cite	articulate	deduce	conclude	choose
record	discover	chart	devise	consider	collaborate
repeat	generalize	collect	diagram	critique	collect
retell	give examples	compute	dissect	debate	devise
visualize	group	determine	estimate	distinguish	express
	illustrate	develop	evaluate	editorialize	facilitate
	judge	employ	experiment	justify	imagine
	observe	establish	focus	persuade	infer
	order	examine	illustrate	rate	intervene
	report	explain	organize	weigh	justify
	represent	interview	outline		make
	research	judge	plan		manage
	review	list	question		negotiate
	rewrite	operate	test		originate
	show	practice			propose
	trace	predict			reorganize
	transform	record			report
		schedule			revise
		simulate			schematize
		transfer			simulate
		write			solve
					speculate
					structure
					support
					test
					validate