



UNSW Course Outline

MNGT5520 Quantitative Business Modelling for Managers (Full-time, Session 3, Kensington) - 2024

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General Course Information

Course Code : MNGT5520

Year : 2024

Term : Term 3

Teaching Period : T3

Is a multi-term course? : No

Faculty : UNSW Business School

Academic Unit : AGSM MBA Programs

Delivery Mode : In Person

Delivery Format : Standard

Delivery Location : Kensington

Campus : Sydney

Study Level : Postgraduate

Units of Credit : 6

Useful Links

[Handbook Class Timetable](#)

Course Details & Outcomes

Course Description

This course provides students with the skills required to model, analyse and solve complex

business problems that have financial (revenue and cost) implications for a firm and its profitability. The course also aims to enable students to effectively present data for effective communication to a business audience.

Course Learning Outcomes

Course Learning Outcomes	Program learning outcomes
CL01 : Identify core variables of interest within quantitative business problems and understand how best to numerically analyse those problems.	• PL01 : Business Knowledge
CL02 : Identify and apply appropriate business optimisation modelling theories and techniques to general management and business decisions within diverse situations.	• PL01 : Business Knowledge • PL02 : Problem Solving
CL03 : Demonstrate an understanding of the limits in precision and the risks associated with business models.	• PL02 : Problem Solving
CL04 : Research and analyse complex issues and problems in business and develop appropriate models to augment the choice of optimum solutions.	• PL02 : Problem Solving
CL05 : Make effective practical assumptions relating to the analysis of quantitative business data.	• PL02 : Problem Solving
CL06 : Design, build and manipulate (including via the conduct of scenario and sensitivity analysis) complex numerical models relating to forecasting, optimisation and simulation; and understand and relay the limitations of each of those models.	• PL02 : Problem Solving • PL03 : Business Communication
CL07 : Produce written documents and oral presentations that communicate effectively information for the intended audience and purpose.	• PL03 : Business Communication
CL08 : Participate collaboratively, effectively and responsibly in a team to achieve specified outcomes.	• PL04 : Teamwork

Course Learning Outcomes	Assessment Item
CLO1 : Identify core variables of interest within quantitative business problems and understand how best to numerically analyse those problems.	<ul style="list-style-type: none"> • Class Participation • Individual Assignment • Group Project
CLO2 : Identify and apply appropriate business optimisation modelling theories and techniques to general management and business decisions within diverse situations.	<ul style="list-style-type: none"> • Class Participation • Individual Assignment • Group Project
CLO3 : Demonstrate an understanding of the limits in precision and the risks associated with business models.	<ul style="list-style-type: none"> • Business Presentation • Class Participation • Individual Assignment • Group Project
CLO4 : Research and analyse complex issues and problems in business and develop appropriate models to augment the choice of optimum solutions.	<ul style="list-style-type: none"> • Business Presentation • Class Participation • Individual Assignment • Group Project
CLO5 : Make effective practical assumptions relating to the analysis of quantitative business data.	<ul style="list-style-type: none"> • Business Presentation • Class Participation • Individual Assignment • Group Project
CLO6 : Design, build and manipulate (including via the conduct of scenario and sensitivity analysis) complex numerical models relating to forecasting, optimisation and simulation; and understand and relay the limitations of each of those models.	<ul style="list-style-type: none"> • Business Presentation • Class Participation • Individual Assignment • Group Project
CLO7 : Produce written documents and oral presentations that communicate effectively information for the intended audience and purpose.	<ul style="list-style-type: none"> • Business Presentation • Class Participation • Individual Assignment • Group Project
CLO8 : Participate collaboratively, effectively and responsibly in a team to achieve specified outcomes.	<ul style="list-style-type: none"> • Business Presentation • Class Participation • Group Project

Learning and Teaching Technologies

Moodle - Learning Management System

Learning and Teaching in this course

This course uses an adult-learning approach that stresses proactive and interactive teaching and learning. Direct student contribution, including critical and lateral discussion that reflects students' readings and experiences, is expected and encouraged. Students must be proactive and self-driven with regard to mastering the content of this course.

This course is weighted towards practical application through design, build and open discussion of many quantitative models. Face-to-face sessions will encompass both lecture and workshop components - because the course content must be first learned, then practised and performed in order to be perfected. The workshops will involve students jointly attempting a variety of practical learning exercises; therefore, students will be required to have access to a laptop during all class sessions.

The lectures by the Facilitator will build student understanding of the main concepts and techniques. The workshops will then provide an interactive environment through which to enhance learning via collaboration. By actively and conscientiously engaging in the workshop activities, students will learn from each other and increase their confidence/competence across all the areas of course content.

Students are required to undertake self-driven research and study outside of the face-to-face sessions. This will involve, among other things: (i) reviewing course notes before each session; (ii) identifying practical business applications for the theory being learned; (iii) proactively researching appropriate spreadsheet functions where a student might lack a full understanding of the same; and (iv) reviewing previous workshop activities to ensure that the techniques being developed via those activities have been mastered.

Students should note that the course utilises Microsoft Excel and is designed for Windows operating systems. Some Excel functionality/commands may differ, or be unavailable, on computers with Apple Macintosh operating systems.

Additional Course Information

Every business uses numerical data and must rely on the visual representation of data to communicate to its managers, shareholders and interested parties. Moreover, all businesses strive to optimise their finances - whether through profit maximisation or cost minimisation - and they necessarily rely on numerical techniques to determine appropriate strategies to meet that aim. Quantitative modelling is, therefore, of importance to all managers. The content of this course can also be applied over the full spectrum of business disciplines (whether quantitative or qualitative) and it offers students valuable skills that will complement and enhance any manager's toolbox.

Course Structure

This course teaches students the skills, quantitative processes and techniques required to

model, analyse and solve complex business problems that can directly affect a firm's bottom line (i.e. revenues and costs) and its profitability. The course further teaches techniques for the effective presentation of data to senior business audiences.

The course comprises four distinct modules:

- **Module 1: General Modelling** (e.g. model mapping, spreadsheeting skills, determining variables of interest, assumption making, scenario and sensitivity analysis, data cleansing and visual presentation of data for business audiences, etc.).
- **Module 2: Forecasting Models** (e.g. random data forecasting, random walks, autocorrelations, linear/simple/multiple regressions, numerical and categorical business data, dummy variables and seasonality, exponential smoothing, etc.).
- **Module 3: Optimisation Models** (e.g. linear, integer, binary, dynamic and non-linear quantitative optimisation models for business applications).
- **Module 4: Simulation Models** (e.g. simulation and analysis of business decisions under uncertainties by using Monte Carlo techniques via VBA Macros).

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates	Program learning outcomes
Class Participation Assessment Format: Individual	15%	Due Date: Ongoing throughout the course	<ul style="list-style-type: none"> • PL01 : Business Knowledge • PL02 : Problem Solving • PL03 : Business Communication • PL04 : Teamwork
Individual Assignment Assessment Format: Individual	55%	Due Date: Friday of Week 7 by 9am Sydney time	<ul style="list-style-type: none"> • PL01 : Business Knowledge • PL02 : Problem Solving • PL03 : Business Communication
Group Project Assessment Format: Group	25%	Due Date: Friday of Week 10 by 9am Sydney time	<ul style="list-style-type: none"> • PL01 : Business Knowledge • PL02 : Problem Solving • PL03 : Business Communication • PL04 : Teamwork
Business Presentation Assessment Format: Group	5%	Due Date: Friday of Week 10 in class	<ul style="list-style-type: none"> • PL02 : Problem Solving • PL03 : Business Communication • PL04 : Teamwork

Assessment Details

Class Participation

Course Learning Outcomes

- CL01 : Identify core variables of interest within quantitative business problems and understand how best to numerically analyse those problems.
- CL02 : Identify and apply appropriate business optimisation modelling theories and techniques to general management and business decisions within diverse situations.
- CL03 : Demonstrate an understanding of the limits in precision and the risks associated with business models.
- CL04 : Research and analyse complex issues and problems in business and develop appropriate models to augment the choice of optimum solutions.
- CL05 : Make effective practical assumptions relating to the analysis of quantitative business data.
- CL06 : Design, build and manipulate (including via the conduct of scenario and sensitivity analysis) complex numerical models relating to forecasting, optimisation and simulation; and understand and relay the limitations of each of those models.
- CL07 : Produce written documents and oral presentations that communicate effectively information for the intended audience and purpose.
- CL08 : Participate collaboratively, effectively and responsibly in a team to achieve specified outcomes.

Assessment Length

N/A

Generative AI Permission Level

Not Applicable

Generative AI is not considered to be of assistance to you in completing this assessment. If you do use generative AI in completing this assessment, you should attribute its use.

For more information on Generative AI and permitted use please see [here](#).

Individual Assignment

Course Learning Outcomes

- CL01 : Identify core variables of interest within quantitative business problems and understand how best to numerically analyse those problems.
- CL02 : Identify and apply appropriate business optimisation modelling theories and techniques to general management and business decisions within diverse situations.
- CL03 : Demonstrate an understanding of the limits in precision and the risks associated with business models.
- CL04 : Research and analyse complex issues and problems in business and develop

appropriate models to augment the choice of optimum solutions.

- CL05 : Make effective practical assumptions relating to the analysis of quantitative business data.
- CL06 : Design, build and manipulate (including via the conduct of scenario and sensitivity analysis) complex numerical models relating to forecasting, optimisation and simulation; and understand and relay the limitations of each of those models.
- CL07 : Produce written documents and oral presentations that communicate effectively information for the intended audience and purpose.

Assessment Length

1,000-word written report plus a spreadsheet

Generative AI Permission Level

Planning/Design Assistance

You are permitted to use generative AI tools, software or services to generate initial ideas, structures, or outlines. However, you must develop or edit those ideas to such a significant extent that what is submitted is your own work, i.e., what is generated by the tool, software or service should not be a part of your final submission. You should keep copies of your iterations to show your Course Authority if there is any uncertainty about the originality of your work.

If your Convenor has concerns that your answer contains passages of AI-generated text or media that have not been sufficiently modified you may be asked to explain your work, but we recognise that you are permitted to use AI generated text and media as a starting point and some traces may remain. If you are unable to satisfactorily demonstrate your understanding of your submission you may be referred to UNSW Conduct & Integrity Office for investigation for academic misconduct and possible penalties.

For more information on Generative AI and permitted use please see [here](#).

Group Project

Course Learning Outcomes

- CL01 : Identify core variables of interest within quantitative business problems and understand how best to numerically analyse those problems.
- CL02 : Identify and apply appropriate business optimisation modelling theories and techniques to general management and business decisions within diverse situations.
- CL03 : Demonstrate an understanding of the limits in precision and the risks associated with business models.
- CL04 : Research and analyse complex issues and problems in business and develop appropriate models to augment the choice of optimum solutions.
- CL05 : Make effective practical assumptions relating to the analysis of quantitative business data.

- CLO6 : Design, build and manipulate (including via the conduct of scenario and sensitivity analysis) complex numerical models relating to forecasting, optimisation and simulation; and understand and relay the limitations of each of those models.
- CLO7 : Produce written documents and oral presentations that communicate effectively information for the intended audience and purpose.
- CLO8 : Participate collaboratively, effectively and responsibly in a team to achieve specified outcomes.

Assessment Length

2,000-word written report plus a spreadsheet

Generative AI Permission Level

Planning/Design Assistance

You are permitted to use generative AI tools, software or services to generate initial ideas, structures, or outlines. However, you must develop or edit those ideas to such a significant extent that what is submitted is your own work, i.e., what is generated by the tool, software or service should not be a part of your final submission. You should keep copies of your iterations to show your Course Authority if there is any uncertainty about the originality of your work.

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For more information on Generative AI and permitted use please see [here](#).

Business Presentation

Course Learning Outcomes

- CLO3 : Demonstrate an understanding of the limits in precision and the risks associated with business models.
- CLO4 : Research and analyse complex issues and problems in business and develop appropriate models to augment the choice of optimum solutions.
- CLO5 : Make effective practical assumptions relating to the analysis of quantitative business data.
- CLO6 : Design, build and manipulate (including via the conduct of scenario and sensitivity analysis) complex numerical models relating to forecasting, optimisation and simulation; and understand and relay the limitations of each of those models.
- CLO7 : Produce written documents and oral presentations that communicate effectively information for the intended audience and purpose.

- CLO8 : Participate collaboratively, effectively and responsibly in a team to achieve specified outcomes.

Assessment Length

30 minutes

Generative AI Permission Level

Simple Editing Assistance

In completing this assessment, you are permitted to use standard editing and referencing functions in the software you use to complete your assessment. These functions are described below. You must not use any functions that generate or paraphrase passages of text or other media, whether based on your own work or not.

If your Convenor has concerns that your submission contains passages of AI-generated text or media, you may be asked to account for your work. If you are unable to satisfactorily demonstrate your understanding of your submission you may be referred to UNSW Conduct & Integrity Office for investigation for academic misconduct and possible penalties.

For more information on Generative AI and permitted use please see [here](#).

General Assessment Information

Grading Basis

Standard

Requirements to pass course

Students are expected to attempt all assessment requirements, and must achieve a composite mark of at least 50 out of 100 to pass the course.

Students are also expected to actively engage in course learning activities. Failure to engage in assessment tasks that are integrated into learning activities (e.g. class discussion, presentations) will be reflected in the marks for these assessable activities.

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 9 September - 15 September	Topic	Class 1 and Class 2 - General modelling concepts (model mapping, spreadsheeting essentials, variables of interest, assumption making, scenario and sensitivity analysis, data cleansing and visual presentation of data for business audiences)
	Assessment	Assessment 1: Class participation
Week 2 : 16 September - 22 September	Topic	Class 3 and Class 4 - Forecasting models (random data, random walks, autocorrelations, linear/simple/multiple regressions, numerical and categorical business data, dummy variables and seasonality, exponential smoothing)
	Assessment	Assessment 1: Class participation
Week 3 : 23 September - 29 September	Topic	Class 5 and Class 6 - Optimisation models (linear, integer, binary, dynamic and non-linear optimisation models for business applications)
	Assessment	Assessment 1: Class participation
Week 4 : 30 September - 6 October	Other	No class
Week 5 : 7 October - 13 October	Other	No class
Week 6 : 14 October - 20 October	Other	Global Network Week/Independent Study Week
Week 7 : 21 October - 27 October	Other	No class
	Assessment	Assessment 2: Individual assignment due on Friday by 9am Sydney time
Week 8 : 28 October - 3 November	Topic	Class 7 and Class 8 - Simulation models (including VBA essentials)
	Assessment	Assessment 1: Class participation
Week 9 : 4 November - 10 November	Topic	No class
Week 10 : 11 November - 17 November	Topic	Class 9 and Class 10 - Revision and group presentations
	Assessment	Assessment 1: Class participation Assessment 3: Group project due on Friday by 9am Sydney time Assessment 4: Business presentation due in class

Attendance Requirements

Students must attend the scheduled in-person three-hour facilitated class discussions.

Course Resources

Prescribed Resources

The course Moodle site will be used for the dissemination of all course material. Self-contained course notes will be provided for each module (including examples and practice activities, with appropriate data sets, answers, and base-level spreadsheets for some of the in-class activities). There is no prescribed text, but students may find additional reference books useful. Several appropriate books may be found in the UNSW Library.

Students should note that QBM is not intended to be a course that teaches students how to use Excel. Rather, Excel is the tool by which QBM teaches the higher-level application of the principles of quantitative business modelling. That said, each student enters QBM with a different level of knowledge, ability and skill in relation to the functionality that is available within

the Excel application. To attempt to level this playing field, two parts of the course have been devoted to teaching/reviewing Excel functionality. The first occurs in Module 1 - where we cover the Excel functions that are most commonly encountered in business models. The second occurs in Module 4 - where we introduce Microsoft's Visual Basic for Applications (VBA) code writing. Even with the introduction of these additional Excel sessions, some students may still need to do some further personal research/practice to fully master the Excel functionality required in QBM. Many students will, however, already have attained that level of Excel proficiency.

Other general resources include:

BusinessThink is UNSW's free, online business publication. It is a platform for business research, analysis and opinion. If you would like to subscribe to BusinessThink, and receive the free monthly e-newsletter with the latest in research, opinion and business, go to the [BusinessThink website](#).

UNSW Library provides an extensive collection of books and journals that can aid your research and learning. You can also use their online database to access periodicals. For more information, visit the [UNSW Library website](#).

Course Evaluation and Development

- Additional examples and case studies have been added to the course.
- There has been a recent growth in the number of software tools that promise to offer elements of quantitative business modelling (for example, Microsoft Power BI). In the vast majority of cases these tools are general in nature and can efficiently process data as programmed to do so by a user in order to analyse/solve a business problem, but they cannot yet determine the optimum way to process that data by themselves - this still requires human input, logic, oversight and reasoning. It is those latter skills and attributes that QBM seeks to develop.

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Facilitator in charge	Scott Muller					No	Yes

Other Useful Information

Academic Information

COURSE POLICIES AND SUPPORT

The Business School expects that you are familiar with the contents of this course outline and the UNSW and Business School learning expectations, rules, policies and support services as listed below:

- Program Learning Outcomes
- Academic Integrity and Plagiarism
- Student Responsibilities and Conduct
- Special Consideration
- Protocol for Viewing Final Exam Scripts
- Student Learning Support Services

Further information is provided on the [key policies and support](#) page.

Students may not circulate or post online any course materials such as handouts, exams, syllabi or similar resources from their courses without the written permission of their instructor.

STUDENT LEARNING OUTCOMES

The Course Learning Outcomes (CLOs) – under the Outcomes tab – are what you should be able to demonstrate by the end of this course, if you participate fully in learning activities and successfully complete the assessment items.

CLOs also contribute to your achievement of the Program Learning Outcomes (PLOs), which are developed across the duration of a program. PLOs are, in turn, directly linked to [UNSW graduate capabilities](#). More information on Coursework PLOs is available on the [key policies and support](#) page. For PG Research PLOs, including MPDBS, please refer to [UNSW HDR learning outcomes](#).

Academic Honesty and Plagiarism

As a student at UNSW you are expected to display [academic integrity](#) in your work and interactions. Where a student breaches the [UNSW Code of Conduct](#) with respect to academic integrity, the University may take disciplinary action. To assure academic integrity, you may be required to demonstrate reasoning, research and the process of constructing work submitted for

assessment.

To assist you in understanding what academic integrity means, and how to ensure that you do comply with the UNSW Code of Conduct, it is strongly recommended that you complete the [Working with Academic Integrity](#) module before submitting your first assessment task. It is a free, online self-paced Moodle module that should take about one hour to complete.

Submission of Assessment Tasks

SHORT EXTENSIONS

Short Extension is a new process that allows you to apply for an extended deadline on your assessment without the need to provide supporting documentation, offering immediate approval during brief, life-disrupting events. Requests are automatically approved once submitted.

Short extensions are ONLY available for some assessments. Check your course outline or Moodle to see if this is offered for your assessments. Where a short extension exists, all students enrolled in that course in that term are eligible to apply. Further details are available the UNSW [Current Students](#) page.

SPECIAL CONSIDERATION

You can apply for special consideration when illness or other circumstances beyond your control interfere with your performance in a specific assessment task or tasks, including online exams. Special consideration is primarily intended to provide you with an extra opportunity to demonstrate the level of performance of which you are capable.

Applications can only be made online and will NOT be accepted by teaching staff. Applications will be assessed centrally by the Case Review Team, who will update the online application with the outcome and add any relevant comments. The change to the status of the application immediately sends an email to the student and to the assessor with the outcome of the application. The majority of applications will be processed within 3-5 working days.

For further information, and to apply, see Special Consideration on the UNSW [Current Students](#) page.

LATE SUBMISSION PENALTIES

LATE SUBMISSION PENALTIES

For assessments other than examinations, late submission will incur a penalty of 5% per day or part thereof (including weekends) from the due date and time. An assessment will not be accepted after 5 days (120 hours) of the original deadline unless special consideration has been approved. In the case of an approved Equitable Learning Plan (ELP) provision, special consideration or short extension, the late penalty applies from the date of approved time extension. After five days from the extended deadline, the assessment cannot be submitted.

An assessment is considered late if the requested format, such as hard copy or electronic copy, has not been submitted on time or where the 'wrong' assessment has been submitted.

For assessments which account for 10% or less of the overall course grade, and where answers are immediately discussed or debriefed, the LIC may stipulate a different penalty. Details of such late penalties will be available on the course Moodle page.

FEEDBACK ON YOUR ASSESSMENT TASK PERFORMANCE

Feedback on student performance from formative and summative assessment tasks will be provided to students in a timely manner. Assessment tasks completed within the teaching period of a course, other than a final assessment, will be assessed and students provided with feedback, with or without a provisional result, within 10 working days of submission, under normal circumstances. Feedback on continuous assessment tasks (e.g. laboratory and studio-based, workplace-based, weekly quizzes) will be provided prior to the midpoint of the course.

Faculty-specific Information

PROTOCOL FOR VIEWING FINAL EXAM SCRIPTS

UNSW students have the right to view their final exam scripts, subject to a small number of very specific exemptions. The UNSW Business School has set a [protocol](#) under which students may view their final exam script. Individual schools within the Faculty may also set up additional local processes for viewing final exam scripts, so it is important that you check with your School.

If you are completing courses from the following schools, please note the additional school-specific information:

- Students in the **School of Accounting, Auditing & Taxation** who wish to view their final examination script should also refer to [this page](#).
- Students in the **School of Banking & Finance** should also refer to [this page](#).
- Students in the **School of Information Systems & Technology Management** should also refer

to [this page](#).

COURSE EVALUATION AND DEVELOPMENT

Feedback is regularly sought from students and continual improvements are made based on this feedback. At the end of this course, you will be asked to complete the [myExperience survey](#), which provides a key source of student evaluative feedback. Your input into this quality enhancement process is extremely valuable in assisting us to meet the needs of our students and provide an effective and enriching learning experience. The results of all surveys are carefully considered and do lead to action towards enhancing educational quality.

QUALITY ASSURANCE

The Business School is actively monitoring student learning and quality of the student experience in all its programs. A random selection of completed assessment tasks may be used for quality assurance, such as to determine the extent to which program learning goals are being achieved. The information is required for accreditation purposes, and aggregated findings will be used to inform changes aimed at improving the quality of Business School programs. All material used for such processes will be treated as confidential.

TEACHING TIMES AND LOCATIONS

Please note that teaching times and locations are subject to change. Students are strongly advised to refer to the [Class Timetable website](#) for the most up-to-date teaching times and locations.