



BUSINESS SCHOOL
Te Kura Pakihi

FINC102 - Business Mathematics COURSE OUTLINE

Semester 1, 2021

This course outline contains information specific to this paper.

Paper Description and Aims

FINC102- Business Mathematics is an 18 points paper with 0.15 EFTS. This course focuses on an integrated treatment of mathematics and covers five major topics such as algebra, matrices and simultaneous equations, differential calculus, multivariate functions, Integral calculus, and modelling techniques with an emphasis on application in commerce. This paper is a pre-requisite for some higher level finance papers. This course assumes a minimal background in mathematics and aims to give the students an introduction to each topic. This paper is based on four weekly lectures and additional drop in sessions to help the students with weekly assignments and lecture notes.

Assessment includes ten weekly assignments (20%), one mid-term test (20%), and a final examination (60%).

In order to pass this paper, you need to score at least 50% overall AND at least 50% in the final exam.

Disclaimer: While this course outline aims to be as accurate as possible, changes may occur during the semester due to a variety of circumstances. **Any changes will be formally communicated by your lecturer via Blackboard and/or in class.**

Learning Outcomes

Upon successful completion of this paper, you should be able to:

- (i) Understand and use equations, formulae, and mathematical expressions and relationships in a variety of contexts
- (ii) Apply the knowledge in mathematics (algebra, matrices, calculus, and optimization) in solving business problems
- (iii) Demonstrate mathematical skills required in mathematically intensive areas in commerce such as Finance and Economics
- (iv) Demonstrate critical thinking, modelling, and problem solving skills in a variety of contexts

This course also focuses on achieving the following generic and specific attributes of the graduate profile of the program:

- (i) Critical thinking (ii) in-depth knowledge (iii) self-motivation and (iv) lifelong learning

Teaching Staff

Lecturer and Course Coordinator

Dr Anindya Sen

Office: OBS 3.18

Email: anindya.sen@otago.ac.nz

Office Hours: To be announced on Blackboard

Tutorial Coordinator

Tim Baxter

Email: baxti370@student.otago.ac.nz

Tutors and Contact

Tim Baxter: baxti370@student.otago.ac.nz

Basri Khan: abda832@student.otago.ac.nz

Seu Wand Tee: teewa743@student.otago.ac.nz

Lecture Times and Rooms

Lectures and Timings:

There will be 3 lectures each week, starting on the week of March 1.

The week starting April 5 is the Mid-Semester Break.

Lectures are scheduled for:

Monday (11 am – 11:50 am) – AUDIT

Tuesday (9 am – 9:50 am) – QUAD 2

Wednesday (11 am – 12:50 pm) – BURN 1

The second half of the Wednesday lecture will focus on solving problems based on previously taught material. This is extremely important for solidifying the concepts you learn through practice.

Tutorials:

A number of tutorials are scheduled for each week – please refer to the Timetable document posted on Blackboard (Page 46).

Tutorials are optional and **are not streamed** - you may attend any tutorial at your convenience.

Course Delivery

All lectures are compulsory for all students – any student missing a lecture is solely responsible for making up the material they missed.

Lectures present the key conceptual material of the course in a large classroom environment.

The course will primarily cover the five different areas of mathematics below and connect them to business applications

- [1] Algebra
- [2] Matrices and simultaneous equations
- [3] Differential calculus
- [4] Multivariate functions, and
- [5] Integral calculus

I aim to make the lectures as self contained as possible.

However, there is an optional course textbook for students looking for supporting material.

In addition to the above, I will also post notes from the course which were used in previous years – some students might find these helpful as well.

Please note – My lectures will not be “following” either the textbook or the previous years’ course notes. These are strictly *supplementary* for students looking for additional material.

Tutorials (optional):

Tutorials are interactive, collaborative sessions in which the students attempt to cement the concepts learned from lectures with their peers in a supportive environment.

They also provide an opportunity for the students to look through solutions of the previous week’s assignment in an interactive setting and clarify doubts about current material.

Tutorials start on the week of March 8.

The detailed schedule will be posted on Blackboard.

Tutorials are not streamed and students may attend as per convenience

Textbook (not compulsory but strongly recommended):

Essential Mathematics for Economics and Business: Teresa Bradley and Paul and Patton – 4th edition

This book is available in the bookshop.

You may also buy a second hand copy (the edition is not very important but page numbers may not match).

Please note that this textbook does not cover all the topics taught in the lectures.

Therefore, it is very important that you attend all the lectures.

Assessment and Pass Requirements

All material presented in the course is examinable unless explicitly stated otherwise.

Assessment includes ten weekly assignments (20%), one mid-term test (20%), and a final examination (60%).

In order to pass this paper, you need to score at least 50% overall AND at least 50% in the final exam.

Assignments:

- There will be **10 assignments** counting for a **total of 20% towards your course grade.**
- **Assignments must be handwritten and pages stapled together with the student's name and the ID number written on the front page of the assignment.**
- Assignments must be submitted in the appropriate FINC102 dropbox - according to your surname - **before or at 2:00 pm on the due date** (see Table below). The dropboxes are situated **on level three of the commerce building (next to room 3.36).**
- **Marked assignments may be collected only at the Friday tutorials.** Students are allowed to collect **only the two most recent assignments** at any time and all the previous unclaimed assignments will be destroyed.
- The solutions for each assignment will be posted on Blackboard on the following week and therefore
- **No late submissions of assignments are allowed under any circumstances.**
- The marks of the assignments will be posted on Blackboard and **it is the responsibility of the student to check for the accuracy of his/her mark entered.**

Mid-Term Exam:

- **Wednesday April 21, 11:00 am to 12:45 pm.** You will be informed about the venue on Blackboard
- **Midterm will be worth 20%** of course
- This will be a **closed book exam**
- The midterm will be **based on all material covered till the end of the previous week**
- Please bring a calculator. **Only approved calculators from the list below are permitted**

Final examination:

- **Final exam will be worth 60%** of the course
- **You must score at least 50% in the final – 30 out of 60 – to pass the paper**
- **Final exam will be based on ALL the material covered in the paper**
- **Date, Venue and Duration will be announced in class**
- Please bring a calculator. **Only approved calculators from the list below are permitted**

Calculators allowed in the mid-term test and the final examination:

You are only permitted to use calculators in List A of calculators approved by the University of Otago.

Please see Blackboard for details since this list is updated on a regular basis.

Due dates and marks for each component of assessment are listed in the table below.

Assessment details:

Assessment	Due date	Time	% of final grade	Requirements to pass this paper
Assignment - 1	12 th March	2:00 pm	2 %	
Assignment - 2	19 th March	2:00 pm	2 %	
Assignment - 3	26 th March	2:00 pm	2 %	
Assignment - 4	1 st April	2:00 pm	2 %	
Assignment - 5	16 th April	2:00 pm	2 %	
Midterm exam	21st April	11:00-12:45 pm	20%	
Assignment - 6	30 th April	2:00 pm	2 %	
Assignment - 7	7 th May	2:00 pm	2 %	
Assignment - 8	14 th May	2:00 pm	2 %	
Assignment - 9	21 st May	2:00 pm	2 %	
Assignment - 10	28 th May	2:00 pm	2 %	
Final examination	TBA		60 %	Must pass

Expectations and Workload

The expected workload for this 18 point paper is 180 hours. This time includes both formal contact hours, completion of assignments and self-study and examination preparation.

Lectures	50 hours
Assignments	40 hours
Examination and Quiz preparation	30 hours
Self-study of notes and text	60 hours
Total	180 hours

Blackboard

All official communication regarding the course will happen via Blackboard and all course materials, assignments, solutions etc will be uploaded there.

Please make sure you can access Blackboard at <https://blackboard.otago.ac.nz/>

All announcements on Blackboard will also be emailed to your linked student email account (see below)

Student Webmail

We will use your student email account to email you information relevant to your programme. To forward your university email address to an email address that you use regularly:

1. Log into your StudentMail account (<http://www.otago.ac.nz/smlanding/>) using your student username and password.
2. Click the **Cog** button (top right corner)
3. Click on **Mail** under **Your App Settings**.
4. Under **Accounts** on left hand side, select **Forwarding**
5. Under the Forwarding heading, type in the email address you want your email to be forwarded to. You can also choose to have a copy of these emails kept on your StudentMail account, so please check the box if you would like this.
6. Click the **Save** button

Learning outcomes / Quality Assurance

The following assessment grid is used for this purpose in this course.

Learning Outcome	Ten Assignments	Mid-term	Final Examination	Total
Understand and use equations, formulate and use mathematical expressions, apply mathematical knowledge in solving business problems, demonstrate critical thinking, modelling and problem solving skills	20 %			20 %
Understand and use equations, formulate and use mathematical expressions, apply mathematical knowledge in solving business problems, demonstrate critical thinking, modelling and problem solving skills		20 %		20%
Understand and use equations, formulate and use mathematical expressions, apply mathematical knowledge in solving business problems, demonstrate critical thinking, modelling and problem solving skills			60 %	60 %
Total				100%

Grading System

The grading system used in this course is:

A+	90-100	C+	60-64
A	85-89	C	55-59
A-	80-84	C-	50-54
B+	75-79	D	40-49
B	70-74	E	<40
B-	65-69		

Class Representatives

We encourage your feedback. This can be in the form of contacting staff, participating in course evaluation surveys and communicating with class representatives. Continual improvements will be made to this course based in part on student feedback.

The class representative system is an avenue for encouraging communication and consultation between staff and students involved in a particular paper or course of study at the University of Otago. It provides students with a vehicle for communicating their views on matters associated with the teaching and delivery of their paper or course of study. It provides staff with the opportunity to communicate information to and gain constructive feedback from students. It contributes to the development of a sense of community within a Department/School/Faculty and it adds a further dimension to the range of support services that the University of Otago offers to its students. The School of Business fully supports the class representative system.

Volunteers to act as class representatives for this paper will be called early in the semester. The OUSA then invites all class representatives to a training session, conducted by OUSA, about what it means to be a class representative and some of the possible procedures for dealing with issues that arise. They also provide information on the services that OUSA offers and the role OUSA can play in solving problems that may occur. The OUSA also provides ongoing support to class representatives during the semester. The staff of the department of Accountancy and Finance will also meet with the class representatives for this paper during the semester to discuss general issues or matters they wish to have considered.

Course Calendar

The course calendar in Table-2 details semester dates, lecture topics, and the date of each lecture. **Note that this calendar may change as the course proceeds.** Any changes will be announced at lectures and detailed on Blackboard.

The topics covered in each lecture and the reading for each lecture from the the textbook are given.

Please note that some of the topics in the lectures may not be covered in the textbook.

Calendar

	<u>Topics covered</u>	<u>pages in the Textbook</u>
<u>WEEK -1: STARTING 1ST MARCH</u>		
Mon – Mar 1	Preliminary Lecture	
Tue – Mar 2	Set Theory	not covered in the textbook
Wed – Mar 3	Functions, inverse Functions, composite functions	p 6, 336, 438, 378, 362

WEEK- 2: STARTING 8TH MARCH

Mon – Mar 8	Factorizing, solving Quadratic equalities And inequalities, exponents	p 148, 171, 184, 206
Tue – Mar 9	Polynomial functions, Roots of polynomial functions	p 168, 148, 156
Wed – Mar 10	Sequences and series, Arithmetic and geometric series	p 210

Problem Solving Class – 1 (get a printout from the Blackboard)

ASSIGNMENT – 1 DUE ON FRIDAY 12TH MARCH, 2:00 PM

WEEK – 3: STARTING 15TH MARCH

Mon – Mar 15	Financial mathematics, Simple interest, compound interest, NPV	p 219, 230, 232
Tue – Mar 16	Annuities, sinking fund, Future and present values	p 238, 241
Wed – Mar 17	Simultaneous equations, Graphical solution	p 102

Problem Solving Class – 2 (get a printout from the Blackboard)

ASSIGNMENT – 2 DUE ON FRIDAY 19TH MARCH, 2:00 PM

WEEK – 4: STARTING 22ND MARCH

Mon – Mar 22	matrices, multiplication, Transpose matrix	p 488
--------------	---	-------

Tue – Mar 23 Determinant of a matrix, p 504, 507
 Cramer's rule

Wed – Mar 24 Inverse matrix, p 518
 Singular matrix, laws of matrix manipulation

Problem Solving Class – 3 (get a printout from the Blackboard)

ASSIGNMENT – 3 DUE ON FRIDAY 26TH MARCH, 2:00 PM

WEEK – 5: STARTING 29TH MARCH

Mon – Mar 29 matrix equations, not covered in the textbook
 Quadratic function of a matrix, minors

Tue – Mar 30 eigenvalues, eigenvectors, not covered in the textbook
 Definiteness of a matrix

Wed – Mar 31 limits of a function not covered in the textbook

Problem Solving Class – 4 (get a printout from the Blackboard)

ASSIGNMENT -4 DUE ON THURSDAY 1ST APRIL, 2:00 PM

MID SEMESTER BREAK: 5TH APRIL – 9TH APRIL

WEEK – 6: STARTING 12TH APRIL

Mon – Apr 12 rate of change, p p270, 457
 Gradient of a curve

Tue – Apr 13 differential calculus, p 259
 Rules of differentiation

Wed – Apr 14 rules for differentiation p 259

Problem Solving Class – 5 (get a printout from the Blackboard)

ASSIGNMENT - 5 DUE ON FRIDAY 16TH APRIL, 2:00 PM

WEEK – 7: STARTING 19TH APRIL

Mon – Apr 19 Implicit differentiation, not covered in the textbook
 Analysis of errors

Tue – Apr 20 elasticity, p 83
 Marginal rate of return,
 growth

MIDTERM EXAM - ON WEDNESDAY, 21ST APRIL, 11:00 – 12:45 PM

WEEK -8: STARTING 26TH APRIL (26 APR ANZAC DAY)

Tue – Apr 27 higher order derivatives, p 334

Increasing and
Decreasing functions

Wed – Apr 28 curve sketching, p 259
Maxima, minima, points of inflection

Problem Solving Class – 6 (get a printout from the Blackboard)

ASSIGNMENT-6 DUE ON FRIDAY 30TH APRIL, 2:00 PM

WEEK – 9: STARTING 3RD MAY

Mon – May 3 Taylor’s theorem not covered in the textbook

Tue – May 4 Binomial theorem, not covered in the textbook
Newton-Raphson algorithm

Wed – May 5 Functions of 2 variables, p 361
Partial derivatives

Problem solving class – 7 (get a printout from the Blackboard)

ASSIGNMENT-7 DUE ON FRIDAY 7TH MAY, 2:00 PM

WEEK – 10: STARTING 10TH MAY

Mon – May 10 total differentiation, p 361
Total derivative,
Partial elasticity

Tue – May 11 chain rule of partial p 361
Of partial differentiation, homogeneity, Euler’s theorem

Wed – May 12 Unconstrained optimization p 400

Problem Solving Class – 8 (get a printout from the Blackboard)

ASSIGNMENT – 8 DUE ON FRIDAY 14TH MAY, 2:00 PM

WEEK – 11: STARTING 17TH MAY

Mon – May 17 Constrained optimization, p 410
Lagrange multipliers

Tue – May 18 Interpretation of Lambda p 410

Wed – May 19 Integration of functions p 427
 Rules of integration

Problem Solving class – 9 (get a printout from the Blackboard)

ASSIGNMENT – 9 DUE ON FRIDAY 21ST MAY, 2:00 PM

WEEK – 12: STARTING 24TH MAY

Mon – May 24 Definite integral, p 427
 Integrating by parts

Tue – May 25 Area between curves p 427

Wed – May 26 Differential equations p 456

PROBLEM SOLVING CLASS – 10 (GET A PRINTOUT FROM THE BLACKBOARD)

ASSIGNMENT – 10 DUE ON FRIDAY 28TH MAY, 2:00 PM

WEEK – 13: STARTING 31ST MAY

Mon – May 31 Revision

Tue – Jun 1 Revision

Wed – Jun 2 Revision