BUSINESS SCHOOL
Te Kura Pakihi

FINC102 - Business Mathematics
COURSE OUTLINE

Semester 1, 2018

Contents

This course outline contains information specific to this paper. For more general information common to your paper, please refer to the COMMERCE_UG_2018: Commerce Undergraduate Students site on Blackboard.

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 major topics such as algebra, matrices, calculus, optimization, 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 nine weekly assignments (15 %), one mid-term Quiz (15 %), and a final examination (70 %).

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 paper Coordinator

Name: Professor I.M. Premachandra (Prema)
Office: Room 3.48, commerce building
Email: i.premachandra@otago.ac.nz
Office Hours: Mon 9:30-10:30, Wed 2-4:00

Tutorial/help sessions coordinator

Name: Gan (Jill) Liu
Office: NA
Email: liuga174@student.otago.ac.nz
Office Hours: to be announced in the class

You should contact the paper coordinator Premachandra with any administrative enquiries about the paper, e.g. requests for late submission of assignments or failure to attend exams/quizzes due to illness. Regarding drop in sessions and assignment marks please contact the tutorial/help session coordinator.

Tutors

Gan Liu, Liuga174@student.otago.ac.nz
Ben Hurley, hurbe537@student.otago.ac.nz
Olivia Finer, finol840@student.otago.ac.nz

Lecture Times and Rooms

Lectures, Day/Time: Mon 11-11:50 (CAST2), Tue 9-9:50(CAST 1), Wed 11-12:50 (AUDIT). The second hour of the Wednesday's lecture is a problem solving class (PSC).

Drop in sessions, Day/Time: Several drop in sessions are available from Tuesday to Friday (see Table 1) every week and please refer to the Blackboard announcements for any changes in room allocations and times. **Drop in sessions are optional**.

Course Delivery

Lectures: It is very important that you attend all the lectures. Lectures present the key conceptual material of the course in a large classroom environment. All the lecture slides are available on the Blackboard in five different folders namely Algebra, Matrices, Differential calculus, Multivariate calculus, and Integral calculus. The students are advised to print the lecture notes from the Blackboard on their own and bring them to the lectures. The lectures are also supported by a textbook and an example booklet with solutions. Wednesday's lecture is a two hours one where the first half is a lecture and the second half is a problem solving class. *Students are expected to read the lecture slides in advance and attend all classes to gain full benefit from this course. Students who are unable to attend a lecture are expected to catch up on missed material and annotated lecture notes will be posted on the Blackboard for this purpose. It is to be noted that the lectures will not be audio/video recorded and made publicly available. Unless stated otherwise, all aspects of the course are examinable.*

Problem solving classes (PSC): The second hour of Wednesday's lecture is devoted for a problem solving class where problems similar to assignments and examination questions will be solved. **The problem solving class is a very important component of the course and I strongly advise the students not to miss this class**. **In the lectures you mainly learn mathematical techniques and in the problem solving class you learn how to apply those techniques in solving problems**. These

problems are based on the lectures and the students are advised to have the lecture notes with them when they attend these classes. The problem sheets for these classes will be posted on the Blackboard and it is the responsibility of the students to print the problem sheet on their own and bring them to the class. The problem solving classes begin in the second week of the semester. Solutions to the problems discussed in the problem solving classes will not be posted on Blackboard.

Drop in sessions (optional): Drop in sessions 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 solve the assignment problems on their own with the support of the tutors. There will be several drop in sessions that run from Tuesday to Friday every week and the **students may attend any of the drop in sessions at their convenience**. It is to be noted that the drop in sessions on Tuesdays and Wednesdays are less crowded compared to the one on Thursday as the assignments are due on Fridays. Therefore the students are encouraged to attend the sessions on Tuesday and Wednesday as much as possible if they need more time with the tutors. Please refer to the FINC102 Blackboard announcements for any changes of the room and time allocations of drop in sessions. Depending on the attendance for each drop in session, we may change the rooms and the times of these sessions as the course proceeds and it is the responsibility of the students to read Blackboard announcements regularly for these changes. The Table-1 below lists the times and the rooms currently allocated for the drop in sessions.

Drop in sessions begin in 10th week of the semester (i.e., starting from 5th March).

Table – 1:

Day	Time	Room Number
Tuesday	12:00 – 12:50	OBS223
Wednesday	9:00 – 9:50	OBS222 (week 9-13, 15-16, 18-22 OBSLG05 (week 23-24)
Wednesday	10:00 – 10:50	OBS222 (week 9-13, 15-16, 18-22) OBSLG05 (week 23-24)
Wednesday	3:00 – 3:50	OBS221 (week 9-13, 15-16, 18-22)
Thursday	9:00 – 9:50	OBS 222 (week 9-13, 15-22) OBSLG05 (week 23-24)
Thursday	10:00 – 10:50	OBS222 (week 9-13, 15-22) OBSLG05 (week 23-24)
Thursday	1:00 – 1:50	OBS223 (week 9-13, 15-22)
Thursday	3:00 – 3:50	OBS222 (week 9-13, 15-22)
Friday	11:00 – 11:50	OBS 222 (week 9-12, 15-22, only for collecting marked assignments)
Friday	12:00 – 12:50	OBS 223 (week 9-12, 15-22, only for collecting marked assignments)

Course calendar: The course calendar in Table-2 details semester dates, lecture topics, and the date of each lecture. The due dates of assignments, quizzes and examination are illustrated in Table-3 later in this course outline. 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 Essential Mathematics for Economics and Business (textbook) are given in the following table.

Table – 2	**Topics covered**	**2nd edition**	**3rd Edition**
WEEK – 9: BEGINNING ON 26TH FEBRUARY			
Lecture - 0	Preliminary Lecture		
Lecture – 1	Fractions	p 4 – 7	p 5 – 8
Lecture – 2	Quadratic	p 132 – 146	p 147 – 154
	Logarithms	p 165 – 177	p 184 – 196
	Equations	p 7 – 14	p 8 – 15
	Inequalities	p 14 – 17	p 15 – 18
WEEK – 10: BEGINNING ON 5TH MARCH			
Lecture – 3	Linear functions	p 29 – 47, 66-71	p 37 – 55, 76-81
Lecture – 4	Arithmetic and		
	Geometric series	p 189 – 195	p 208 – 215
Lecture – 5	simple and compound		
	Interest	p 195 – 201	p 216 – 225
	Annual % rate (APR)	p 202 – 205	p 225 – 226
	Continuous compounding	p 202	p 223
	NPV / IRR	p 207 – 213	p 228 – 234
Problem Solving Class – 1			
ASSIGNMENT – 1 DUE ON FRIDAY 9TH MARCH, 12:00 PM			
WEEK – 11: BEGINNING ON 12TH MARCH			
Lecture – 6	Annuities / sinking funds	p 213 – 226	p 234 – 246
Lecture – 7	Simultaneous equations	Chapter 3	Chapter 3
Lecture – 8	Matrices	p 452 – 462	p 486 – 496
Problem Solving Class – 2			
ASSIGNMENT – 2 DUE ON FRIDAY 16TH MARCH, 12:00 PM			
WEEK – 12: BEGINNING ON 19TH MARCH			
Lecture – 9	Determinants	p 468	p 502 – 503
	Cramer's rule	p 469 – 475	p 503 – 508, 511
	3x3 Determinants	p 476 – 480	p 511

Lecture – 10	Inverse Matrix	p 483 – 487	p 512 – 522
	3x3 cofactor method		
	Inverse of 2x2	p 484	p 519
	Solving a system of equations using		
	Matrix method	p 487 – 488	p 522 – 523

Lecture – 11 Matrix equations and quadratic form – textbook has no reading

Problem Solving Class – 3

ASSIGNMENT – 3 DUE ON FRIDAY 23RD MARCH, 12:00 PM

WEEK – 13: BEGINNING ON 26TH MARCH

Lecture – 12	Eigenvalues and vectors - textbook has no readings		
Lecture – 13	methods for calculating limits - textbook has no reading		
Lecture – 14	derived function as a limit	p 236 – 238	p 258 – 260
	Power rule for		
	Differentiation	p 238 – 241	p 261 – 265

Problem Solving Class – 4

ASSIGNMENT -4 DUE ON FRIDAY 29TH MARCH, 12:00 PM

[Week-14: 2nd April – 6th April Mid-Semester Break]

WEEK – 15: BEGINNING ON 9TH APRIL

Lecture – 15	rate of change, gradient, Chord and tangent, measuring gradient		
	Of a curve, instantaneous rate of change,		
	The derivative	p 235 – 238	p 258 – 261
Lecture – 16	chain rule	p 308 – 310, 328	p 333 – 334
	Product rule	p 311 – 313, 328	p 335 – 339
	Quotient Rule,		
	L'Hopital's rule	p 313 – 315, 328	p 337 – 338, 358

Lecture – 17 Differentiation of implicit functions – textbook has no readings

Problem Solving Class – 5

ASSIGNMENT -5 DUE ON FRIDAY 13TH APRIL, 12:00 PM

WEEK – 16: BEGINNING ON 16TH APRIL

Lecture – 18	Elasticity	p 319 – 327, 329	p 344 – 352
Lecture – 19	curve sketching	p 263 – 306	p 297 – 300
Lecture – 20	Taylor's theorem	textbook has no readings	

Problem Solving Class – 6

ASSIGNMENT- 6 DUE ON FRIDAY 20TH APRIL, 12:00 PM

WEEK -17: BEGINNING ON 23RD APRIL

Lecture – 21	Binomial theorem	textbook has no readings	
Lecture – 22	first order partial derivatives	p 332 – 340	p 360 – 368

ASSIGNMENT-7 DUE ON FRIDAY 27TH APRIL, 12:00 PM

WEEK – 18: BEGINNING ON 30TH APRIL

Lecture – 23	total differentiation	p 344 – 349	p 372 – 378
	Partial elasticity	p 364 – 369	p 393 – 397
Lecture – 24	higher order partial		
	Derivatives	p 340 – 344	p 368 – 372
	Returns to scale	p 357 – 359	p 386 – 387

QUIZ-1, 2ND MAY (WEDNESDAY), 11:00 – 12:50 PM

WEEK – 19: BEGINNING OF 7TH MAY

Lecture – 25	Unconstrained optimization	p 369 – 390	p 398 – 408
Lecture – 26	constrained optimization		
	And Lagrange multipliers	p 378 – 390	p 408 – 420
Lecture – 27	Interpretation of Lambda	p 384 – 385	p p414 – 415

Problem Solving Class – 7

ASSIGNMENT – 8 DUE ON FRIDAY 11TH MAY, 12:00 PM

WEEK – 20: BEGINNING 14TH MAY

Lecture – 28	Integration	p 294 – 407	p 426 – 439
Lecture – 29	Definite integral	p 407 – 414	p 439 – 446
Lecture – 30	Area between curves	p 420 – 421	p p 453

Problem Solving class - 8

ASSIGNMENT – 9 DUE ON FRIDAY 18TH MAY, 12:00 PM

WEEK – 21: BEGINNING 21ST MAY

Lecture – 31	Differential Equations	p 422 – 438	p 454 – 473
Lecture – 32	Problem solving class – 9		
Revision Class	Wed 23rd May, 11:00 – 12:50		

ASSIGNMENT – 10 (NON-HAND IN)

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**

Students are expected to study all the lecture slides and go through all the assignment and quiz problems as a preparation for the final examination.

Course Learning Resources

Textbook: Essential Mathematics for Economics and Business, Teresa Bradley and Paul and Patton, 3rd or 2nd edition (highly recommended). This book is available in the bookshop. You may also buy a second hand copy (the edition is not very important).
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.

Booklet of examples: A bound booklet of examples, related to weekly lectures, will be available from the reception, department of Accountancy and Finance, at a reasonable price. Bound copies of the booklet are available at the reception of the Dept. of Accountancy and Finance for $10 per bound copy. Please bring exact change.

In addition, the university library provides online resources for students. These include subject guides, and other resources, and citation styles. Check it out at:
http://www.library.otago.ac.nz/services/undergrad.html if applicable.

Blackboard

https://blackboard.otago.ac.nz/ provide you with access to course materials, class notes, and resources. Blackboard is used to email the whole class so it is important that you check your student email and Blackboard regularly.

Further information about student support, learning support and information, academic integrity and other university resources for students is available on the COMMERCE_UG_2017: Commerce Undergraduate Students site on Blackboard.

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

Assessment

All material presented is examinable (except where stated otherwise) by assignments, quizzes, and the final examination. All-important assessment information such as due dates and times, content, guidelines and so on will be discussed at lectures and, where appropriate, detailed on Blackboard. ***Students are responsible for ensuring that they are aware of this information, keeping track of their own progress, and catching up on any missed classes.***
The items included in the overall assessment of the course are as follows.

Weekly Assignments: The nine weekly assignments test the writing and analytical skills of the students and **they carry 15 % towards the final mark of the course**. Weekly assignments will be posted on Blackboard and the students need to print them on their own. 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 posted into the appropriate FINC102 boxes according to their surnames **before 12:00 pm on Fridays** of the week the assignment is due (see Table 2 and 3 for due dates of the assignments). The posting boxes are situated **on level three of the commerce building**. Marked assignments may be collected only on Fridays drop in sessions (see Table 1). Any changes to the venue and the times where your marked assignment can be collected will be posted on Blackboard. 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 in this course. 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 Quiz: There will be one closed book quiz on **2nd of May from 11:00 to 12:50** (also see Table 2) **worth of 15% of the final mark** of the course. **You must bring your ID to the examination hall and you will not be allowed to enter the examination hall without your ID.** All the questions in the quiz are multiple choice ones and are based on the lectures. It is the responsibility of the students to make themselves available on the quiz date. You are allowed to use a calculator that does not have any communication devices or graphics capability in the quiz and in the final exam. Please see the Blackboard for the approved models of calculators. The date, time, and venue of the quiz are also illustrated in Table 3. If you fail to attend the quiz due to a legitimate reason such as illness, you need to provide the course coordinator with documentary evidence such as a medical certificate from a certified medical practitioner. Failure to do so might result in a zero mark for the quiz. The quiz will provide the students with an opportunity to practice questions that are similar to the questions that appear in the final examination.

Final examination: There will be a three hour multiple choice closed book examination **worth 70 % of the final mark** for the course.

The type calculators allowed to use in Quiz and final examination:

You are not allowed to use calculators with graphics or communication facilities in the Quiz and in the final examination. See the Blackboard for the types of calculators allowed in the Quiz and the final examination.

The due dates and the marks allocated for each component of assessment

- **are illustrated in the following table.**

Table – 3:

Assessment	Due date	Time	% of final grade	Requirements to pass this paper
Assignment - 1	9th March	12:00 pm	1.6 %	
Assignment - 2	16th March	12:00 pm	1.6 %	
Assignment - 3	23rd March	12:00 pm	1.6 %	
Assignment - 4	29th March	12:00 pm	1.7 %	
Assignment - 5	13th April	12:00 pm	1.7 %	
Assignment - 6	20th April	12:00 pm	1.7 %	

Assignment - 7	27th April	12:00 pm	1.7 %	
QUIZ - 1	2nd May	11:00 – 12:50	15 %	
Assignment - 8	11th May	12:00 pm	1.7 %	
Assignment - 9	18th May	12:00 pm	1.7 %	
Assignment - 10	Non-hand in			
Final examination	**TBA**		**70 %**	**Must pass**

Course Requirements

[1] **In order to pass the FINC102 paper you must: (i) pass the final examination (ii) overall mark for the course should be 50% or above. If you fail the final examination your overall mark will be returned as F (failed) regardless of your internal assessment marks (i.e., marks for assignments and the Quiz). The assignment-mark contribution towards the final course mark is 15% of the average mark of the nine assignments.**

[2] Students who are unable to sit for the quiz due to illness or other special circumstances must provide the course coordinator with documentary evidence (such as a medical certificate) along with the special consideration form for appropriate actions to be taken. Failing to do so may result in a zero mark for the quiz. Please see the Blackboard for the departmental policy on the special consideration for internal assessments.

[3] There will be a mid-term test (QUIZ) on 2nd of May (Wednesday) from 11:00 to 12:50. The quiz will be held in two rooms (according to the alphabetical order of the surnames of the students) and please see Blackboard for details such as the room allocation. It is important that you bring your ID and a calculator for the Quiz. **You will not be allowed to enter the examination hall without your ID**. You are not allowed to use calculators with graphics and communication devices. See the Blackboard for allowable calculators. A formula sheet will be given in the QUIZ and in the final examination (see the Blackboard for the formula sheet).

[4] If you have to repeat the course, you need to hand in all the assignments and sit for the quiz and the final examination again. Assignment or quiz marks in any previous attempts will not be carried forward.

[5] As we post the solutions to each assignment on Blackboard the following week, no late assignments will be accepted or penalties be given in this course.

[6] Assignments must be hand written and pages stapled together with the student's ID number and the name written on the front page of the assignment. Assignments must be posted into the appropriate (according to surname) FINC102 boxes situated at level three (next to room Com 3.36), before, 12.00 pm on Fridays of the week the assignment is due. The due dates of each assignment are given in Table 3 and will also be printed on the assignment. Solutions for each assignment will be posted on Blackboard in the following week.

[7] Marked assignments may be collected only at Friday drop in sessions (11:00 – 12:50) at the designated room (please see Table 1 and also the Blackboard for any changes of the room and the time). You can collect only the two most recent assignments at any time and all the previous unclaimed marked assignments will be destroyed.

Learning outcomes / Quality Assurance

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

Learning Outcome	Nine Assignments	Quiz	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	15 %			15 %
Understand and use equations, formulate and use mathematical expressions, apply mathematical knowledge in solving business problems, demonstrate critical thinking, modelling and problem solving skills		15 %		15 %
Understand and use equations, formulate and use mathematical expressions, apply mathematical knowledge in solving business problems, demonstrate critical thinking, modelling and problem solving skills			70 %	70 %
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.

Concerns about the course

We hope you will feel comfortable coming to talk to us if you have a concern about the course. The course coordinator will be happy to discuss directly any concerns you may have about the course. Alternatively, you can report your concerns to the class representatives who will follow up with the department at the class rep meetings. If, after making approaches via these channels, you do not feel that your concerns have been addressed adequately, there are university channels that may aid resolution. For further advice or more information on the course, contact the departmental administrator or head of department.

Disclaimer

While every effort is made to ensure that the information contained in this document is accurate, it is subject to change. Changes will be notified in class and via Blackboard. Students are encouraged to check Blackboard regularly. It is the student's responsibility to be informed.

I.M. Premachandra
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University of Otago
17th February 2018