NATIONAL UNIVERSITY OF SINGAPORE

BPM1701: Calculus and Statistics

Semester 2, 2024/2025

Instructor: **Assoc Prof LEE Hon Sing**
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Consultation Hrs: By appointment through email

Course Objective

This is a short course that prepares the fresh undergraduates for the Mathematics that they will encounter in their first year of Business courses. In particular it focuses on the area of Calculus and Statistics.

Motivation

Fresh Business undergraduates have different Mathematics mastery and preparedness when they come to the Business school. Some need revision due to their lack of contact with Mathematics during their National Service. Some did not come from Junior Colleges and missed taking the equivalent of "O" level Additional Mathematics. This different level of Mathematics mastery among students caused difficulties in the pedagogy of the first-year Business courses. This subject aims to bridge the gap in students' Mathematics mastery.

Learning Outcome

By the end of the course, students would get a basic revision on the following topics:
1) Indices and logarithms
2) Functions
3) Roots of equations
4) Inequalities
5) Simultaneous equations
6) Coordinate geometry
7) Differentiation
8) Integration
9) Sequences and series
10) Basic probability
11) Basic statistics

Mode of Teaching

Students will go through this course as e-learning. They would watch e-learning videos posted on Canvas, try out the exercises posted there, and finally take the Final Assessment on their own time during the semester. Based solely on the Final Assessment, all students will be given a pass or fail grade.

Reference Text

Any "O" level Additional Mathematics textbook.

Final Assessment

All students must individually do an open book online 1-hour quiz consisting of 15 questions through the Canvas website. Students are allowed unlimited attempts. They need to earn a passing grade (i.e. score 9 out of 15 marks) in one of the attempts, else they would be awarded a fail grade for this course. All students must pass this course before their graduation. Deadline: **Friday 21 Feb 2025 2359 hrs**.

Academic Honesty & Plagiarism

Academic integrity and honesty are essential for the pursuit and acquisition of knowledge. The University and School expect every student to uphold academic integrity & honesty at all times. Academic dishonesty is any misrepresentation with the intent to deceive, failure to acknowledge the source, falsification of information, inaccuracy of statements, cheating at examinations/tests, or inappropriate use of resources.

Plagiarism is 'the practice of taking someone else's work or ideas and passing them off as one's own' (The New Oxford Dictionary of English). The University and School will not condone plagiarism. Students should adopt this rule - You have the obligation to make clear to the assessor which is your own work, and which is the work of others. Otherwise, your assessor is entitled to assume that everything being presented for assessment is being presented as entirely your own work. This is a minimum standard. In case of any doubts, you should consult your instructor.

Additional guidance is available at:
https://www.nus.edu.sg/registrar/administrative-policies-procedures/undergraduate/acceptance-record#NUSCodeofStudentConduct
Online Information on Plagiarism:
https://libguides.nus.edu.sg/copyright_essentials_teaching_learning_research/plagiarism

Syllabus:

Topic	Online Coverage
0	• Course Introduction Intro to the Course (3:30 mins)
1	• Indices and Logarithms 1: Indices and Logarithms (16:32 mins)

2	• Functions
	  2a: Graphs of Functions (6:40 mins)
	  2b: Composite Functions (7:25 mins)
	  2c: Inverse Functions (3:25 mins)

3	• Roots of Equations
	  3a: Factor Theorem (5:13 mins)
	  3b: Polynomial Division (7:33 mins)
	  3c: Solving Quadratic Equations (6:36 mins)
	  3d: Solving Higher Degree Polynomials (6:16 mins)

4	• Inequalities
	  4a: Basic Inequality Rules (9:28 mins)
	  4b: Polynomial Inequalities (8:12 mins)

5	• Simultaneous Equations
	  5a: By Elimination (4:49 mins)
	  5b: By Substitution (5:35 mins)
	  5c: Higher Degree Equations (6:44 mins)

6	• Coordinate Geometry
	  6a: Equation of a Straight Line (9:19 mins)
	  6b: Mid-points (4:40 mins)

7	• Differentiation
	  7a: Basic differentials: polynomial, exponential, logarithm (15:45 mins)
	  7b: Chain Rule (3:06 mins)
	  7c: Product Rule and Quotient Rule (9:25 mins)
	  7d: Application 1: Rate of Change (7:10 mins)
	  7e: Application 2: Optimization (9:21 mins)
	  7f: Application 3: Estimation (11:29 mins)

8	• Integration
	  8a: Basic Integrals: polynomial, exponential, logarithm (12:23 mins)
	  8b: Application: Area under the graph, Cumulative Quantities (6:24 mins)

9	• Sequences and Series 9a: Arithmetic Progression (6:08 mins)

	9b: Geometric Progression (7:38 mins)

10	• Basic Probability
	    10a: Sets and Events (7:14 mins)
	    10b: Probability Definition (6:23 mins)
	    10c: Independent Events (13:18 mins)
	    10d: Conditional Probability (10:10 mins)

11	• Basic Statistics
	    11a: Mean, Mode and Median (7:52 mins)
	    11b: Variance and Standard Deviation (7:19 mins)
	    11c: Covariance (5:16 mins)
	    11d: Correlation (3:52 mins)

Final Assessment

This is an online quiz consisting of 15 questions to be completed in 1-hour, individual effort, and open book. Scientific calculators are allowed, and students should use them. Students have unlimited attempts; the score will be regarded from the best attempt. All students must pass this quiz before the end of week 6, i.e. **Friday 21 Feb 2025 2359 hrs**.

The **passing mark is 60%**. Students who fail will have to take this course again in subsequent semesters until they pass. Students cannot graduate without passing this course.