澳門理工大學
Universidade Politécnica de Macau
Macao Polytechnic University

# FACULTY OF BUSINESS

# BACHELOR OF MANAGEMENT

# LEARNING MODULE OUTLINE

| | | | |
|---|---|---|---|
| Academic Year | 2025 / 2026 | Semester | 1 |
| Module Code | MATH2100-211 | | |
| Learning Module | Business Mathematics | | |
| Pre-requisite(s) | Nil | | |
| Medium of Instruction | English | | |
| Credits | 3 | Contact Hours | 45 |
| Instructor | Natalie Pang | Email | wspang@mpu.edu.mo |
| Office | M524, Meng Tak Building | Office Phone | 85993324 |

## MODULE DESCRIPTION

This module emphasizes the mathematics required in general business processes. It is designed to prepare students for the mathematical and analytical applications most useful in subsequent business and economics courses. Topics include functions and graphs, mathematics of finance, matrix algebra, linear programming, and basic calculus.

## MODULE INTENDED LEARNING OUTCOMES (ILOS)

On completion of this learning module, students will be able to:

| | |
|---|---|
| M1. | Explain the concepts of mathematics. |
| M2. | Explain the rationales behind the mathematical formulae. |
| M3. | Apply mathematical skills to solve simple real-world problems. |
| M4. | Formulate simple real-world problems into mathematics problems. |
| M5. | Demonstrate the ability to think abstractly, critically and mathematically. |

These ILOs aims to enable students to attain the following Programme Intended Learning Outcomes (PILOs):

| **PILOs** | **M1** | **M2** | **M3** | **M4** | **M5** | **M6** | **M7** | **M8** |
|---|---|---|---|---|---|---|---|---|
| P1. Integrate contemporary Management theories and business disciplines relevant to general business practices. | | | | | | | | |
| P2. Apply critical thinking and logical analysis skills and techniques to resolve management issues. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| P3. Utilize appropriate written and spoken forms to communicate effectively and professionally with stakeholders in various cultural environments. | | | | | | | | |
| P4. Demonstrate leadership in a team and respecting the rights of others irrespective of their cultural background, race or gender in order to solve unpredictable problems in the field. | | | | | | | | |
| P5. With the help of mathematical and statistical skills, utilize the latest empirical findings and academic studies to support the recommendation of business projects or reports. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| P6. Recommend an appropriate course of action by ethically examining economic, environmental, political, legal and regulatory contexts of global business practices. | | | | | | | | |
| P7. Interpret and utilize Management information or business software for internal control, planning, performance evaluation, and coordination to improve efficiency and effectiveness in the business process. | | | | | | | | |

**MODULE SCHEDULE AND COVERAGE**

| Week | Content Coverage | Contact Hours |
|---|---|---|
| 1 | 1. Functions and Graphs<br>1.1 Functions<br>1.2 Elementary Functions: Graphs and Transformations<br>1.3 Quadratic Functions<br>1.4 Polynomial and Rational Functions<br>1.5 Exponential Functions<br>1.6 Logarithmic Functions | 3 |
| 2 | 2. Mathematics of Finance<br>2.1 Simple Interest<br>2.2 Compound and Continuous Compound Interest<br>2.3 Future Value of an Annuity; Sinking Funds<br>2.4 Present Value of an Annuity; Amortization | 6 |
| 4 | 3. Systems of Linear Equations; Matrices<br>3.1 Review: Systems of Linear Equations in Two Variables<br>3.2 Systems of Linear Equations and Augmented Matrices<br>3.3 Gauss-Jordan Elimination<br>3.4 Matrices: Basic Operations<br>3.5 Inverse of a Square Matrix<br>3.6 Matrix Equations and Systems of Linear Equations | 6 |
| 6 | 4. Linear Inequalities and Linear Programming<br>4.1 Linear Inequalities in Two Variables<br>4.2 Systems of Linear Inequalities in Two Variables<br>4.3 Linear Programming in Two Dimensions: A Geometric Approach | 3 |

| | | |
|---|---|---|
| 7 | Test | 3 |
| 8 | 8. Limits and the Derivative<br>8.1 Introduction to Limits<br>8.2 Infinite Limits and Limits at Infinity<br>8.4 The Derivative<br>8.5 Basic Differentiation Properties<br>8.7 Marginal Analysis in Business and Economics | 6 |
| 10 | 9. Additional Derivative Topics<br>9.2 Derivatives of Exponential and Logarithmic Functions<br>9.3 Derivatives of Products and Quotients<br>9.4 The Chain Rule | 3 |
| 11 | 10. Graphing and Optimization<br>10.1 First Derivative and Graphs<br>10.2 Second Derivative and Graphs<br>10.4 Curve-Sketching Techniques<br>10.5 Absolute Maxima and Minima<br>10.6 Optimization | 6 |
| 13 | 11. Integration<br>11.1 Antiderivatives and Indefinite Integrals<br>11.2 Integration by Substitution<br>11.3 Differential Equations; Growth and Decay<br>11.4 The Definite Integral<br>11.5 The Fundamental Theorem of Calculus | 6 |
| 15 | Final Exam | 3 |

## TEACHING AND LEARNING ACTIVITIES

In this learning module, students will work towards attaining the ILOs through the following teaching and learning activities:

| **Teaching and Learning Activities** | **M1** | **M2** | **M3** | **M4** | **M5** |
|---|---|---|---|---|---|
| T1. Lecture | ✓ | ✓ | ✓ | ✓ | ✓ |
| T2. Classwork exercises | ✓ | ✓ | ✓ | ✓ | ✓ |

## ATTENDANCE

Attendance requirements are governed by the Academic Regulations Governing Bachelor's Degree Programmes of the Macao Polytechnic University. Students who do not meet the attendance requirements for the learning module shall be awarded an 'F' grade.

## ASSESSMENT

In this learning module, students are required to complete the following assessment activities:

| **Assessment Activities** | **Weighting (%)** | **ILOs to be Assessed** |
|---|---|---|
| A1. Classwork exercises | 20% | M1 – M5 |
| A2. Test | 30% | M1 – M5 |
| A3. Final examination | 50% | M1 – M5 |

The assessment will be conducted following the University's Assessment Strategy (see www.mpu.edu.mo/teaching_learning/en/assessment_strategy.php). Passing this learning module indicates that students will have attained the ILOs of this learning module and thus acquired its credits.

**MARKING SCHEME**

The University Grading System:

| Letter Grade | Mark Ranges | Grade Point | Grade Definition |
|---|---|---|---|
| A<br>A- | 93-100<br>88-92 | 4.0<br>3.7 | Excellent |
| B+ | 83-87 | 3.3 | Very Good |
| B<br>B- | 78-82<br>73-77 | 3.0<br>2.7 | Good |
| C+<br>C<br>C- | 68-72<br>63-67<br>58-62 | 2.3<br>2.0<br>1.7 | Satisfactory |
| D+<br>D- | 53-57<br>50-52 | 1.3<br>1.0 | Pass |
| F | 0-49 | 0 | Fail |

**TEXTBOOK**

Barnett, R.A., Ziegler, M. R., Byleen, K. E., & Stocker, C. J. (2019). *College Mathematics for Business, Economics, Life Sciences and Social Sciences*, 14th Edition. Pearson Education.

**STUDENT FEEDBACK**

At the end of every semester, students are invited to provide feedback on the learning module and the teaching arrangement through questionnaires. Your feedback is valuable for instructors to enhance the module and its delivery for future students. The instructor and programme coordinators will consider all feedback and respond with actions formally in the annual programme review.

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| Module Code | MATH2100-214 | | |
| Learning Module | Business Mathematics | | |
| Pre-requisite(s) | Nil | | |
| Medium of Instruction | Chinese | | |
| Credits | 3 | Contact Hours | 45 |
| Instructor | Natalie Pang | Email | wspang@mpu.edu.mo |
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|---|---|---|---|---|---|---|---|---|
| P1. Integrate contemporary Management theories and business disciplines relevant to general business practices. | | | | | | | | |
| P2. Apply critical thinking and logical analysis skills and techniques to resolve management issues. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

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| P3. Utilize appropriate written and spoken forms to communicate effectively and professionally with stakeholders in various cultural environments. | | | | | | | | |
| P4. Demonstrate leadership in a team and respecting the rights of others irrespective of their cultural background, race or gender in order to solve unpredictable problems in the field. | | | | | | | | |
| P5. With the help of mathematical and statistical skills, utilize the latest empirical findings and academic studies to support the recommendation of business projects or reports. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| P6. Recommend an appropriate course of action by ethically examining economic, environmental, political, legal and regulatory contexts of global business practices. | | | | | | | | |
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| T2. Classwork exercises | ✓ | ✓ | ✓ | ✓ | ✓ |

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