**QM-110 Business Mathematics**

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| Resource Person: |  |
| Email: |  |
| Contact Hours: |  |
| Office Address: |  |
| Programme: | BBA |
| Section: |  |
| Semester: |  |
| Course Pre-requisites: | Students attending this course should have basic knowledge about Arithmetic and Algebra. |
| Credit Hours: | 03 |
| Course Type: |  |
| Venue/Day/Time: |  |
| Course URL (if any): |  |

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| **Course Description:** |
| Today, quantitative methods and its applications are an integral part of our lives. In such diverse settings as politics, medicine, education, and business, human activities are both measured and guided by quantitative methods. More and more decisions made in the business world now rely on soundness of mathematical and statistical information, and on appropriateness of the use of analytical tools. It is, therefore, imperative for a business manager to be aware of the multifaceted role of quantitative methods as a descriptor of information, a tool for analysis, a means of reaching conclusions, and an aid to decision making.  This course is aimed to provide a review of basic mathematical concepts and tools, along with a more detailed discussion on their applications in Business & Economics. This course will also provide necessary quantitative background for advance courses in the areas of Business, Finance, Operations, and Economics. |

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| **Course Teaching Methodology:** |
| On campus |

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| **Programme Educational Objectives (POs):** | |
| PO-1 | To equip students with knowledge, skills and insight in Mathematics and related fields. |
| PO-2 | To enable students to work as a mathematical professional, or to employ as a scientific researcher. |
| PO-3 | To develop the ability to utilize the mathematical problem solving methods such as analysis, modeling, programming and mathematical software applications in addressing the practical issues. |
| PO-4 |  |

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| **Programme Learning Outcomes (PLOs):**  **After completing this degree programme, students shall be able to:** | | |
|  | | **Mapping the PLOs with POs** |
| PLO-1 | To inculcate business knowledge and analytical skills in graduates to think decisively in order to develop innovative solutions to problems in a business environment. |  |
| PLO-2 | To provide a progressive and structured framework to graduates that enables them in developing and applying knowledge set of critical and ethical evaluation. |  |
| PLO-3 | To craft graduates’ expertise in order to increase their resourcefulness. |  |
| PLO-4 | To develop critical thinking skills for the purpose of evaluating information, solving problems, and making sound decisions. |  |

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| **Course Objectives (COs)** | |
| CO-1 | To prepare the students, not majoring in mathematics, with the essential tools of algebra to apply the concepts and the techniques in their respective disciplines. |
| CO-2 | Define basic terms in the areas of business calculus and financial mathematics |
| CO-3 | Discuss precisely the mathematical concepts in solving business and management problems. |
| CO-4 | Solve accurately business mathematics problems using the various basic equation and formula algebraically or graphically. |

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| **Course Learning Outcomes (CLOs):**  **After completing this course, students shall be able to:** | | |
|  | | **Mapping the CLOs with PLOs** |
| CLO-1 | Discuss and review basic mathematical concepts and tools. |  |
| CLO-2 | Describe how different mathematical and quantitative methods relate to decision making in areas of Business & Economics.  Describe how different mathematical and quantitative methods relate to decision making in areas of Business & Economics. |  |
| CLO-3 | Guide how the graduates in Business & Economics will likely be using these methods extensively in their careers. |  |
| CLO-4 | To make students capable of selecting and using appropriate software and make best use of it to achieve their business goals. |  |

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| **Assurance of Learning and Assessment Items:**  *Specify Assessment Items that will assure student learning through application and achieve objectives of specific PLOs / COs / CLOs* | |
| **Assessment Item** | **Application/ Objectives**  **PLO / CO / CLO** |
| Quizzes | All |
| Assignments | All |
| Mid-term exam | All |
| Project/Presentation | All |
| Final exam | All |

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| **Assessment Structure and Grading Policy\*:** | | |
| **Assessment Item** | **Weight (%)** | **Execution Plan** |
| Quizzes | 15 | 4 to 6-time assessment |
| Assignments | 10 | 4 to 6-time assessment |
| Mid-term exam | 25 | One-time assessment |
| Project/Presentation | 10 | One-time assessment |
| Final exam | 40 | One-time assessment |
| **Total** | **100** |  |
| **Notes – Norms and Important Class Policies:**  *(such as submission guidelines, academic honesty, make-up policy, code of conduct)*  **Classroom Behavior:**  Positive and constructive class participation will be monitored for each class. Particular emphasis will be given during the presentation sessions. The manner in which the question is asked or answered will also be noted. Your behaviour, as business executive will contribute to the class participation marks.  **Participant Responsibilities:**  The learning process is based on independent work with texts, textbook, and cases supported by lectures and assignments/cases - see schedule. Participants are supposed to have read the text chapters under discussion in advance. Questions answered to these text chapters, will contribute to the class participation marks.  **Use of Unfair Means**  Participants are expected to do their own work in their assignments, quizzes and exams. They are always encouraged to discuss with each other but the assignments, quizzes and exams should be their own work reflecting their own effort and intellect. The School of Business & Economics is VERY STRICT against any action of plagiarism, copying and cheating. So don’t put yourself in any embarrassing position that may mar your career. In summary, any or all of these actions may be taken against you in case of cheating.   * Zero Point for the assignment/quiz/exam * Case would be sent to UMC Committee   **Use of Mobile Phones and Other Electronic Devices**   * Use of mobile phones and similar devices is prohibited during the class * Your phone should not be heard or visible during the class * All mobile phones should be turned-off (or at least in the “silent” mode) and secured in pockets or bags during the class time, and may not be used for ANY purpose, including  calculations, time-keeping, etc. In case you are anticipating an emergency call, you need to discuss this matter with the resource person BEFORE the start of the class   **Entering and Leaving the Classroom**   * You are requested to seek permission from the resource person while entering or leaving the classroom during the session   **Tests and Grading:**   * According to new grading policy participants are supposed to obtain 50% marks in 70% evaluation and 50% marks in their final exam. Passing marks are 50% of total assessment.   **Quizzes/Class Participation:**   * Quizzes will be taken according to calendar of activities. The quizzes are aimed at evaluating the participants’ understanding and clarity of different concepts. Some corrective action will be taken if necessary, to fill the gap between desired and actual.   **Required Material for QM-110:**  Participants are required to bring the following in every class they come to attend:   1. Textbook 2. Calculator 3. Ring file (for notes) 4. Lead pencil (and accessories) (optional)   **NOTE:**  Failure to bring any of the first three things or being absent or late in a class, may result in a loss of marks in your class participation, and may adversely affect your final grade. | | |

*\*Rubrics for all assessments (including mid and final exams) will be provided separately to the students.*

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| **Weekly Sessions Plan:** | | | |
| **Week** | **Topics / Contents** | **Activity** | **Application/Objectives**  **PLO / CO / CLO** |
| 1 | Preliminaries:  * Algebra and Real Numbers * Operations on polynomials * Factoring polynomials * Operation on Rational Expressions * Integer Exponents and * Scientific Notation | **Assignment # 1** | All |
| 2 | Ratios, Proportions:  * Rate and Ratio * Defining Proportion * Proportional Parts and their use * Indirect Proportion * Compound Proportion | **Quiz # 1** | All |
| 3 | **Percentages:**   * Defining Percentage * Difference between Percentage and Proportion * Percentage Gain and its Business Use * Percentage Loss and its Business Use |  | All |
| 4 | **Sequence and Series:**   * Sequence * Series and Summation Notation * Arithmetic Sequence * Geometric Sequence | **Assignment # 2** | All |
| 5 | **Mathematics of Finance:**   * Simple Interest and Return on Investments * Compound Interest and Continue Compound Interest * Computing Growth Rate and Annual Percentage Yield | **Quiz # 2** | All |
| 6 | **Mathematics of Finance:**   * Annuity, types of annuity, Ordinary Annuity and Annuity Due * Future Value of an Annuity; Sinking Funds * Present Value of an Annuity; Amortization and Amortization Schedules | **Assignment # 3** | All |
| 7 | **Linear Equations and Graphs:**   * Linear Equations and its Graphs * Purchase Price and Consumer Price Index * Graphs and Lines | **Quiz # 3** | All |
| 8 | **Linear Equations and Graphs:**   * Cartesian Coordinate System * Applications related to Production, Cost, and Supply & Demand Situations |  | All |
| 9 | **Mid Term** | **Review Session** | All |
| 10 | **Mathematical Functions:**   * Quadratic Function * Exponential Function * Logarithmic Function | **Assignment # 4** | All |
| 11 | **Mathematical Functions:**   * Quadratic Function * Exponential Function * Logarithmic Function | **Quiz # 4** | All |
| 12 | **System of linear Equations; Matrices:**   * System of Linear Equations in Two Variables * System of Linear Equations and Augmented Matrices * Gauss-Jordan Elimination | **Assignment # 5** | All |
| 13 | **System of linear Equations; Matrices:**   * Matrices: Basic Operations * Inverse of a Square Matrix * Matrix Equations and Systems of linear Equations | **Quiz # 5** | All |
| 14 | **Use of Differential Calculus**   * The Derivative * Basic differentiation properties | **Assignment # 6**  **Quiz # 6** | All |
| 15 | **Use of Differential Calculus**   * Differentials * Marginal Analysis in Business and Economics * Derivatives of Products and Quotients |  | All |
| 16 | Final Term Examination |  | All |

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| **Primary Text Book (s):** |
| * **Essential of College Mathematics(For Business & Economics)** (11th Edition) By: Raymond A. Barnett, Michael R. Zeigler |

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| **Reference / Supplementary Reading (s):** |
| * **Applied Mathematics for Business, Economics, and the social sciences**   By: Frank |

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| **Useful Online / Web Resources:** |
| * Moodle.umt.edu.pk |