**Dr. Hasan Murad School of Management (HSM)**

**Course Title:** Mathematics

**Course Code:** UCQM-110 (QM 110)

**Resource Person:**

**Department:** Economics and Statistics

**HSM Vision**

HSM envisions its success in the sustainable contribution that it will make to the industry, academia and research in public and private sector. HSM will lead by providing professionally competent and ethically conscious human resources engaged in the global and local context to foster socio-economic growth and sustainability for the society. HSM envisages having faculty with high research potential and a deep desire for cutting edge research including collaboration with national and international partners.

**HSM Mission**

Being a research-oriented and student-centric business school, we emphasize research publications in impact factor journals as well as state-of -the-art learning methodologies.  We will prepare our students to become the future ethical business leaders and the guiding post for the society, while equipping them with the knowledge and skills required by world-class professionals.  We will be the leading choice for organizations seeking highly talented human resource. HSM will foster internationalization with key stakeholders and actively work to exchange best practices with business schools across Pakistan through collaborations, workshops, conferences and other means.

**Course Objectives**

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 mathematics background for advance courses in the areas of Business, Finance, Operations, and Economics.

**Learning Objectives**

The objectives of the course are to gain knowledge of following topics in Business Mathematics:

* Ratios, Percentages, sequence and series.
* Mathematics of Finance, Linear equations and graphs.
* System of linear equations and differential calculus.

**Learning Outcomes**

Upon successfully completing this course, the participants will be able to:

* Discuss and review basic mathematical concepts and tools.
* Describe how different mathematical and quantitative methods relate to decision making in areas of Business, Finance, Marketing and Economics.
* Guide how the graduates in Business and Economics will likely be using these methods extensively in their careers.

**Teaching Methodology (List methodologies used –examples are given below)**

Interactive Classes

**STUDENTS ARE REQUIRED TO READ AND UNDERSTAND ALL ITEMS OUTLINED IN THE PARTICIPANT HANDBOOK**

**Class Policy: -**

* Be on Time

You need to be at class at the assigned time. After 10 minutes past the assigned time, you will be marked absent.

* Mobile Policy

**TURN OFF YOUR MOBILE PHONE!** It is unprofessional to be texting or otherwise.

* Email Policy

**READ YOUR EMAILS!** You are responsible if you miss a deadline because you did not read your email.

Participants should regularly check their university emails accounts regularly and respond accordingly.

* Class Attendance Policy

A minimum of 80% attendance is required for a participant to be eligible to sit in the final examination. Being sick and going to weddings are absences and will not be counted as present. You have the opportunity to use 6 absences out of 30 classes. Participants with less than 80% of attendance in a course will be given grade ‘F’ (Fail) and will not be allowed to take end term exams. International students who will be leaving for visa during semester should not use any days off except for visa trip. Otherwise they could reach short attendance.

* Withdraw Policy

Students may withdraw from a course till the end of the 12th week of the semester. Consequently, grade W will be awarded to the student which shall have no impact on the calculation of the GPA of the student. A Student withdrawing after the 12th week shall be automatically awarded “F” grade which shall count in the GPA.

* Moodle

UMT –LMS (Moodle) is an Open Source Course Management System (CMS), also known as a learning Management System (LMS). Participants should regularly visit the course website on MOODLE Course Management system, and fully benefit from its capabilities. If you are facing any problem using moodle, visit <http://oit.umt.edu.pk/moodle>. For further query send your queries to moodle@umt.edu.pk

* Harassment Policy

Sexual or any other harassment is prohibited and is constituted as punishable offence. Sexual or any other harassment of any participant will not be tolerated. All actions categorized as sexual or any other harassment when done physically or verbally would also be considered as sexual harassment when done using electronic media such as computers, mobiles, internet, emails etc.

* Use of Unfair Means/Honesty Policy

Any participant found using unfair means or assisting another participant during a class test/quiz, assignments or examination would be liable to disciplinary action.

* Plagiarism Policy

All students are required to attach a “Turnitin” report on every assignment, big or small. Any student who attempts to bypass “Turnitin” will receive “F” grade which will count towards the CGPA. The participants submit the plagiarism report to the resource person with every assignment, report, project, thesis etc. If student attempts to cheat “Turnitin”, he/she will receive a second “F” that will count towards the CGPA. There are special rules on plagiarism for final reports etc. all outlined in your handbook.
* Communication of Results

The results of quizzes, midterms and assignments are communicated to the participants during the semester and answer books are returned to them. It is the responsibility of the course instructor to keep the participants informed about his/her progress during the semester. The course instructor will inform a participant at least one week before the final examination related to his or her performance in the course.

**Course Outline**

**Course Code:** UCQM-110 **Course Title**: Mathematics

|  |  |
| --- | --- |
| Program | Under Graduate |
| Credit Hours | 03 |
| Duration | 15-Weeks |
| Prerequisites (If any) | 12-years of education |
| Resource PersonName and Email |  |
| Counseling Timing |  |
| Contact no. | NA |
| Web Links: -(Face book, Linked In, Google Groups, Other platforms) | NA |

 **Chairman/Director Programme signature…………………………………. Date…………………….**

**Dean’s signature…………………………… …………………. Date………………………………………….**

**Grade Evaluation Criteria**

Following is the criteria for the distribution of marks to evaluate final grade in a semester.

**Marks Evaluation Marks in Percentage**

Quizzes 15%

Assignments 15%

Mid Term 20%

Class Activities 00%

Term Project & Presentations 10%

Final exam 40%

Total 100%

**Recommended Text Book:**

Essential of College Mathematics (For Business & Economics) (11th Edition) By: Raymond A. Barnett, Michael R. Zeigler

**Reference Book:**

Applied Mathematics for Business, Economics, and the social sciences by: Frank

**Course Title:** Mathematics **Course Code:** UCQM-110 **Book:** Essential of College Mathematics

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **No** | **Topics to be****covered in the course** | **Learning Objective****of this topic** | **Expected Outcomes from Students** | **Teaching Method** | **Assessment Criteria** | **Deadlines and Homework** |
| 1 | **Preliminaries:*** Algebra and Real Numbers
* Operations on polynomials
* Factoring polynomials
* Operation on Rational Expressions
* Integer Exponents and
* Scientific Notation
 | To review the basic concepts of mathematics, identifying and solving equations and inequalities and their use in business. | Students will understand some basic background of business mathematics. | Lecture | Assignment # 1 | Within a week  |
| 2 | **Ratios, Proportions:*** Rate and Ratio
* Defining Proportion
* Proportional Parts and their use
* Indirect Proportion
* Compound Proportion
 | To learn how the concept of ratios and percentages can be helpful in different business, economics and finance related situations and also the situations where proportions will serve effective purposes. | Students will learn the difference between rate, ratio and proportions. | Lecture | Quiz # 1 |  |
| 3 | **Percentages:*** Defining Percentage
* Difference between Percentage and Proportion
* Percentage Gain and its Business Use
* Percentage Loss and its Business Use
 | To be able to learn understand the concept of percentage and its use of computing percentage gain and loss in different business and economics situations. | Students will be trained the use of percentage in business. | Lecture | Quiz # 2 |  |
| 4 | **Sequence and Series:*** Sequence
* Series and Summation Notation
* Arithmetic Sequence
* Geometric Sequence
 | To learn and understand the concepts of sequence and series and their applications in terms of loan repayment and economy stimulation. | Students will recognize the difference between sequence and series and their applications. | Lecture | Assignment # 2 | Within a week |
| 5 | **Mathematics of Finance:*** Simple Interest and Return on Investments
* Compound Interest and Continue Compound Interest
* Computing Growth Rate and Annual Percentage Yield
 | To be able to understand the concepts of simple, compound interests and Annual Percentage Yield.  | Students will become skilled at the use of different types of interest on investment. | Lecture | Assignment # 3 | Within a week |
| 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
 | To be able to understand annuities, sinking funds, amortization, and amortization schedules, to develop formulas and compute their values under different business, economics and finance situations. | Students will become skilled at the use of Annuity, Sinking Funds and Amortization. | Lecture | Quiz # 3 |  |
| 7 | **Linear Equations and Graphs:*** Linear Equations and its Graphs
* Purchase Price and Consumer Price Index
 | To discuss some algebraic methods for solving equations  | Students will understand linear equations and their graphs. | Lecture | Assignment # 4 | Within a week |
| 8 | **Linear Equations and Graphs:*** Graphs and Lines
* Cartesian Coordinate System
* Applications related to Production, Cost, and Supply & Demand Situations
 | To introduce coordinate system to explore the relationship between algebra and geometry, to use this algebraic-geometric relationship to find mathematical models for describing real-world data sets. | Students will become skilled at the applications of linear equations and their graphs.  | Lecture | Quiz # 4 |  |
| 9 | **Mid Term** |  |  |  |  |  |
| 10 | **Mathematical Functions:*** Function
* Elementary Functions: Graphs and Transformations
* Quadratic Function
* Exponential Function
* Logarithmic Function
 | To develop functions and identifying their types, how to apply functions in real life, to use functions to check the linear and curved trend in data.  | Students will become skilled at the use of mathematical functions. | Lecture | Quiz # 5 |  |
| 11 | **System of Linear Equations; Matrices:*** System of Linear Equations in Two Variables
 | To review how systems of linear equations involving two variables are solved.  | Students will understand the system of linear equations.  | Lecture | Assignment # 5 | Within a week |
| 12 | **System of Linear Equations; Matrices:*** System of Linear Equations and Augmented Matrices
* Gauss-Jordan Elimination
* Matrices: Basic Operations
 | To turn to different method of solution involving the concept of an augmented matrix. | Students will become skilled at the use of Augmented Matrices  | Lecture | Quiz # 6 |  |
| 13 | **System of Linear Equations; Matrices:*** Inverse of a Square Matrix
* Matrix Equations and Systems of linear Equations
 | To study matrices and matrix operations, applications to important economics problem. | Students will become skilled at the use of Matrix Equations and Systems of linear Equations. | Lecture | Quiz # 7  |  |
| 14 | **Use of Differential Calculus*** The Derivative
* Basic differentiation properties
* Differentials
 | To introduce and understand the concept of derivatives. | Students will become skilled at the use of derivative in business.  | Lecture | Assignment # 6 | Within a week |
| 15 | **Use of Differential Calculus*** Marginal Analysis in Business and Economics
* Derivatives of Products and Quotients
 | To learn how the manufacturing companies can know in advance the increase in cost, revenue and ultimately profit by taking help from their marginal functions and can make effective decisions.  | Students will become skilled at the applications of differential calculus.  | Lecture | Quiz # 8 |  |