# MA-100 Calculus I

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| Program | BS- CS, IT, SE, TN, EPE, AE , MA , PHY |
| Credit Hours | 3 |
| Duration |  |
| Prerequisites | Intermediate Mathematics |
| Resource Person | Ifra Noureen |
| Counseling Timing |  |
| Contact | [Ifra.noureen@umt.edu.pk](mailto:Ifra.noureen@umt.edu.pk)  Ext: 3496 |

**Chairman/Director Programme signature………………. Dean’s signature…………**

**Date………………………………….**

**Learning Objective**

Upon completion of the course, students will be able to:

* Understand the basic limit and continuity of a function and apply it upon various polynomial, root, trigonometric, logarithmic and exponential functions.
* grasp the concept of derivative of a function and applying different techniques to differentiate and optimize various functions.
* Handle indefinite integral of a given function and to be able to apply it for finding the areas between the curves and finding the volumes.

**Learning Methodology**

Lecture, interactive, participative

**Grade Evaluation Criteria**

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

**Marks Evaluation Marks in percentage**

Qizzes 15%

Assignments 5 %

Mid Term 30%

Attendance & Class Participation 5%

Presentations 5%

Final exam 40 %

Total 100%

**Recommended Text Books**

M.D. Weir, J. Hass & F.R. Giordano. *Thomas' Calculus*, Pearson

Education, latest edition.

**Reference Books**

* Swokowski, Olinick and Pence, Calculus and Analytical

Geometry, 6th edition, 1994, Brooks**/**Cole Publishers

* Howard Anton, Calculus, 7th edition, 2002, John Wiley and Sons

(WIE)

* William E. Boyce Richard C. Diprima, Calculus, John Wiley and

Sons, ISBN: 0471093335.

* Erwin Kreyzing, Advanced Engineering Mathematics, 7th edition,

1993, John Wiley and Sons

**Calendar of Course contents to be covered during semester**

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| **Week** | **Topics** | **Exercise** |
| 1 | Inequalities , Lines, Circles, and Parabolas | 1.1, 1.2 |
| 2 | Functions and Graphs , Trigonometric Functions, Calculating Limits Using the Limit Laws | 1.3, 1.6, 2.2 |
| 3 | One-Sided Limits and Limits at Infinity , Vertical Asymptotes, Continuity | 2.4, 2.5, 2.6 |
| 4 | Equation of tangent, The Derivative as a Function, Differentiation Rules | 2.7, 3.1, 3.2 |
| 5 | Derivative as a Rate of Change, Derivatives of Trigonometric Functions , The Chain Rule and Parametric Equations | 3.3, 3.4, 3.5 |
| 6 | Implicit Differentiation, Extreme Values of Functions | 3.6, 4.1 |
| 7 | The Mean Value Theorem, Monotonic Functions and The First Derivative Test , Indeterminate Forms and L’Hôpital’s Rule | 4.2, 4.3, 4.6 |
| 8 | Revision of previous topics followed by **MID TERM EXAMINATION** | |
| 9 | The Fundamental Theorem of Calculus, Indefinite Integrals and the Substitution Rule | 5.4, 5.5 |
| 10 | Basic Integration Formulas, Integration by Parts | 8.1, 8.2 |
| 11 | Integration of Rational Functions by Partial Fractions Trigonometric Integrals | 8.3, 8.4 |
| 12 | Trigonometric Substitutions, Improper Integrals | 8.5, 8.8 |
| 13 | Natural Logarithms, The Exponential Function | 7.2, 7.3 |
| 14 | *ax* andlog*ax* , Hyperbolic Functions. | 7.4, 7.8 |
| 15 | Revision of previous topics followed by **Final TERM EXAMINATION** | |