## Course: B.B.A. (Hons.)

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| **SEMESTER** | I |
| **TITLE OF THE SUBJECT** | MATHEMATICS FOR BUSINESS |
| **COURSE CODE** | 04BB0106 |
| **DURATION** | 48 HOURS |

**OBJECTIVES**

- To improve logic and reasoning ability, problem structuring and analytical skills
- To enable students to gain understanding of mathematical applications in business
- To understand calculation and applications of Interest, annuity and loan amortization
- To understand the applications of matrices and functions in business
- To understand the use of derivatives in business

**PRE-REQUISITES**

- Should have knowledge of basic algebra and calculations

**Course Duration:**

The course duration is of 48 sessions of 60 minutes each.

**Course Contents:**

| Unit No | Unit / Sub Unit | Sessions |
|---|---|---|
| Unit I | **MATHEMATICS OF FINANCE**<br>Introduction, Simple Interest and Compound Interest –<br>Concept and problem solution<br>Future Value (FV) - Annuity: Amount of ordinary annuity,<br>Amount of annuity due<br>Present Value (PV) -ordinary annuity and annuity due<br>Loan Amortization and Equated Monthly Installments (EMIs) -<br>Reducing balance and flat rate of interest<br>**Use of MS Excel** | 10 |
| Unit II | **FUNCTIONS**<br>Introduction, Constants, Variables, Types of functions–<br>Linear function and Polynomial functions<br>Functions in Business: Cost function, Revenue function and Profit function, | 10 |

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| | construction of cost functions, Profit function and Break Even Point (BEP) | |
| Unit III | **DIFFERENTIATION AND APPLICATIONS OF DERIVATIVES**<br>Limit of a function, important results, differentiation of algebraic functions – formulae (no derivation)<br>Derivative of function of one variable, derivative of sum, difference, product and quotient of two functions (no derivation), chain rule, differentiation of implicit function, price elasticity of demand,<br>second order derivative<br>Application of derivatives – Marginal cost, Marginal revenue,<br>Marginal Profit, Maxima and Minima | 12 |
| Unit IV | **DETERMINANTS**<br>Determinant of second order and of third order, Minor of an element<br>Expansion of determinant, Properties of determinant,<br>Use of determinants in solving simultaneous linear equations –<br>Cramer's Rule for two and three linear equations<br>**Use of MS Excel to calculate determinant** | 06 |
| Unit V | **MATRICES AND APPLICATIONS**<br>Introduction, Definition, Types of matrices, Algebra of matrices (Addition and Subtraction), Additive Inverse of a matrix, Structure problems in matrix form, Multiplication of matrices (Max 3X3)<br>Minor, cofactor, adjoint and Inverse of Matrix, Solution of system of linear equations using inverse of coefficient matrix (Max 3)<br>**Use of MS Excel to calculate inverse of matrix** | 10 |

**Learning Outcomes**

**After studying this course, student should be able to:**

- Calculate simple and compound interest on investments
- Understand repayments of loan using EMIs
- Structure and solve problems using matrices
- Understand and establish relationship between variables using functions to determine equilibrium
- Determine minimum and maximum (optimum) value of cost and profit

**Evaluation:**

**The students will be evaluated on a continuous basis and broadly follow the scheme given below:**

| | | Weight age |
|---|---|---|
| A | Continuous Evaluation Component<br>(Assignments/Class Participation& Attendance) | 20% (C.E.C.) |
| B | Internal Assessment | 30% (I.A.) |
| C | End-Semester Examination | 50% (ExternalAssessment) |

**Text Books:**

| Sr.No | Author/s | Name of the Book | Publisher | Edition & Year of Publication |
|---|---|---|---|---|
| **T-01** | A. Dikshit and J. Jain | Business mathematics | Himalaya Publishing House | Latest |
| **T-02** | P. Hazarika | Business Mathematics | S. Chand and Sons | Latest |
| **T-03** | P. Mariappan | Business Mathematics | Pearson Education | Latest |

**Reference Books:**

| Sr.No | Author/s | Name of the Book | Publisher | Edition & Year of Publication |
|---|---|---|---|---|
| **R-01** | D C Sancheti and V K Kapoor | Business Mathematics | Sultan Chand and Sons | Latest |
| **R-02** | Zamarudeen and Qazi | Business Mathematics | Vikas Publishing | Latest |

**Session Plan:**

| Sessions | Topic |
|---|---|
| 1 – 2 | **Unit – 1:- Mathematics of Finance**<br>Simple Interest – concept, problem solution |
| 3 – 4 | Compound Interest – Concept, Problem solution<br>(constant and changing rate of interest) |
| 5 – 8 | PV and FV – Ordinary annuity and annuity Due |
| 9 – 10 | Loan Amortization and Equated Monthly Installments (EMIs)<br>**Use of MS Excel** |
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| 11 – 12 | **Unit – 2:-Functions**<br>Introduction, Constants, Variables, Types of functions –<br>Linear function and Polynomial functions |
| 13 – 16 | Functions in Business: Cost function, Revenue function and Profit function |
| 17 – 20 | Construction of cost functions, Profit function and Break Even Point (BEP) |
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| 21 – 23 | **Unit – 3:- Differentiation And Applications Of Derivative**<br>Limit of a function, important results, differentiation of algebraic functions – formulae (no derivation) |
| 24 – 26 | Derivative of function of one variable, derivative of sum, difference, product and quotient of two functions (no derivation) |
| 27 – 29 | chain rule, differentiation of implicit function, price elasticity of demand, second order derivative |
| 30 – 32 | Application of derivatives – Marginal cost, Marginal revenue,<br>Marginal Profit, Maxima and Minima |
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| 33 – 35 | **Unit – 4:-Determinants**<br>Determinant of second order and of third order, Minor of an element<br>Expansion of determinant, Properties of determinant |
| 36 – 38 | Use of determinants in solving simultaneous linear equations –<br>Cramer's Rule for two and three linear equations<br>**Use of MS Excel to calculate determinant** |
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| 39 – 40 | **Unit – 5:-Matrices and Applications**<br>Introduction, Definition, Types of matrices, Algebra of matrices (Addition and Subtraction), Additive Inverse of a matrix |
| 41 – 42 | Multiplication of matrices (Max 3X3) |
| 43 – 45 | Minor, cofactor, adjoint and Inverse of Matrix |
| 46 – 48 | Solution of system of linear equations using inverse of coefficient matrix (Max 3)<br>**Use of MS Excel to calculate inverse of matrix** |
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**BBA (H)**

**Session Plan:**

| | **Sessions** | **Topic** |
|---|---|---|
| 28TH, 31ST , +1ST | 1 – 2 | **Unit – 1:- Mathematics of Finance**<br>Simple Interest – concept, problem solution |
| 2ND , 4TH, + 8/9 | 3 – 4 | Compound Interest – Concept, Problem solution (constant and changing rate of interest) |
| 16,18,21,23,25 | 5 – 8 | PV and FV – Ordinary annuity and annuity Due |
| 28,29 | 9 – 10 | Loan Amortization and Equated Monthly Installments (EMIs)<br>**Use of MS Excel** |
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| 25,26 | 11 – 12 | **Unit – 2:-Functions**<br>Introduction, Constants, Variables, Types of functions – Linear function and Polynomial functions |
| 27,29,3Oct,4 | 13 – 16 | Functions in Business: Cost function, Revenue function and Profit function |
| 6,9,10,11 | 17 – 20 | Construction of cost functions, Profit function and Break Even Point (BEP) |
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| 23,24,25 | 21 – 23 | **Unit – 3:- Differentiation And Applications Of Derivative**<br>Limit of a function, important results, differentiation of algebraic functions – formulae (no derivation) |
| 27,30, 31 | 24 – 26 | Derivative of function of one variable, derivative of sum, difference, product and quotient of two functions (no derivation) |
| 1Nov ,3,6 | 27 – 29 | chain rule, differentiation of implicit function, price elasticity of demand, |

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| | | second order derivative |
| 7,8,10 | 30 – 32 | Application of derivatives – Marginal cost, Marginal revenue,<br>Marginal Profit, Maxima and Minima |
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| 31, 01Sept | 33 – 35 | **Unit – 4:-Determinants**<br>Determinant of second order and of third order, Minor of an element, Expansion of determinant, Properties of determinant |
| 04,05 | 36 – 38 | Use of determinants in solving simultaneous linear equations –Cramer's Rule for two and three linear equations **Use of MS Excel to calculate determinant** |
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| 6,8 | 39 – 40 | **Unit – 5:-Matrices and Applications**<br>Introduction, Definition, Types of matrices, Algebra of matrices (Addition and Subtraction), Additive Inverse of a matrix |
| 11,12 | 41 – 42 | Multiplication of matrices (Max 3X3) |
| 13,15,18 | 43 – 45 | Minor, cofactor, adjoint and Inverse of Matrix |
| 19,20,22Sept | 46 – 48 | Solution of system of linear equations using inverse of coefficient matrix (Max 3)<br>**Use of MS Excel to calculate inverse of matrix** |
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