

# **SHIVAJI UNIVERSITY, KOLHAPUR.**



Estd 1962  
NAAC 'A' Grade  
Syllabus For  
**Bachelor of Commerce**  
**B.Com. Part-I**  
CBCS Pattern  
**Business Mathematics**  
**Sem-I & Sem-II**

Introduced from June 2018 and Onwards

(Subject to the modifications will be made from time to time)

**B.Com. Part- I**  
**Semester – I (CBCS Pattern)**  
**Business Mathematics Paper-I**  
 (Algebra And Commercial Arithmetic)  
**Generic Elective Course**  
**To be implemented from June - 2018**

<b>Unit No.</b>	<b>Title of the unit</b>	<b>No. of Lectures</b>
<b>1</b>	<b>Progression</b>	<b>15</b>
	1.1 Introduction. 1.2 Definition: Sequence, Arithmetic Progression (A.P.). 1.3 General term ( $n^{\text{th}}$ term ) of an A.P., Sum of the first ' n ' terms of an A. P. and simple examples. 1.3.1 Examples based on the application of Arithmetic Progression to Business. 1.4 Definition : Geometric Progression (G.P.). 1.5 General term ( $n^{\text{th}}$ term ) of an G.P., Sum of the first ' n ' terms of an G. P. and simple examples. 1.5.1 Examples based on the application of Geometric Progression to Business.	
<b>2</b>	<b>Matrices and Determinants</b>	<b>15</b>
	2.1 Introduction. 2.2 Definition of Matrix 2.3 Types of matrices : Rectangular matrix, Row matrix, Column matrix, Square matrix, Diagonal	

	<p>matrix, Scalar matrix, Unit matrix(Identity matrix), Upper triangular matrix, Lower triangular matrix, Null matrix (Zero matrix).</p> <p>2.4 Algebra of matrices : Equality of matrices, Addition and Subtraction of matrices. Scalar multiplication of a matrix, Multiplication of matrices Transpose of a matrix and examples.</p> <p>2.5 Minor, cofactor, Adjoint, Inverse of a square matrix. Finding inverse of a matrix by using adjoint method.</p> <p>2.6 Determinants of second and third order. Determinant of a square matrix, Singular and non – singular matrix. Properties of determinants (without proof), Examples.</p> <p>2.6.1 Cramer's rule, Solution of system of linear equations by cramer's rule.</p>	
<b>3</b>	<b>Ratio, Proportion, Percentage and Interest</b>	<b>15</b>
	<p>3.1 Introduction.</p> <p>3.2 Ratio and Proportion.</p> <p>3.2.1 Simple and compound proportion.</p> <p>3.2.2 Simple examples on ratio and proportion.</p> <p>3.3 Percentage, simple examples.</p> <p>3.4 Interest: Simple Interest, Compound Interest</p> <p>3.4.1 Simple examples based on simple and compound interest.</p>	

	3.5 Annuity : Types of annuity, Present value of an annuity, Future value of an annuity. Examples	
<b>4</b>	<b>Linear Programming Problems (L. P. P.)</b>	<b>15</b>
	<p>4.1 Introduction.</p> <p>4.2 Definition: Linear Programming, Objective function, Decision variables, Constraints.</p> <p>4.3 Formulation of L.P.P (Two variables only)</p> <p>4.4 Definition: Solution to L.P.P., Feasible solution, optimal solution.</p> <p>4.5 Solution of L.P.P. by graphical method. ( cases having no solution, multiple solutions, unbounded solution) Examples.</p>	

\*\*\* (1) Non – programmable calculator is allowed.

#### **Reference Books**

- 1) **Comprehensive Business Mathematics**, Venna G. R. , New Age International (P) Limited Publishers, New Delhi.
- 2) **Text Book of Matrices**, Shantinarayan.
- 3) **Business Mathematics**, . Kumbhojkar G. V.
- 4) **Business Mathematics**, Soni R. S.
- 5) **Business Mathematics**, Kapoor V. K., Sancheti D. C.
- 6) **Operation Research**, J. K. Sharma.
- 7) **Business Mathematics**, B.Com. Part - I Published by Shivaji University, Kolhapur.

**B.Com. Part- I**  
**Semester – II (CBCS Pattern)**  
**Business Mathematics Paper-II**  
 (Calculus)  
**Generic Elective Course**

Unit No.	Title of the unit	No. of Lectures
<b>1</b>	<b>Functions Of Real Variables</b>	<b>15</b>
	<p>1.1 Introduction.</p> <p>1.2 Linear, Quadratic, Exponential (<math>y = a^x</math>), Inverse functions and their graphs. Illustrative examples.</p> <p>1.3 Limit of Function.</p> <p style="padding-left: 40px;">1.3.1 Definition of Limit, Standard limits.</p> <p style="padding-left: 40px;">1.3.2 Algebra of limits: If <math>f(x)</math> and <math>g(x)</math> are two functions of <math>x</math> and <math>k</math> is any scalar, then</p> <p style="padding-left: 80px;">(i) <math>\lim_{x \rightarrow a} [f(x) \pm g(x)] = \lim_{x \rightarrow a} f(x) \pm \lim_{x \rightarrow a} g(x)</math>.</p> <p style="padding-left: 80px;">(ii) <math>\lim_{x \rightarrow a} k f(x) = k \cdot \lim_{x \rightarrow a} f(x)</math>.</p> <p style="padding-left: 80px;">(iii) <math>\lim_{x \rightarrow a} [f(x) \cdot g(x)] = \lim_{x \rightarrow a} f(x) \cdot \lim_{x \rightarrow a} g(x)</math>.</p> <p style="padding-left: 80px;">(iv) <math>\lim_{x \rightarrow a} \frac{f(x)}{g(x)} = \frac{\lim_{x \rightarrow a} f(x)}{\lim_{x \rightarrow a} g(x)}</math>, provided <math>\lim_{x \rightarrow a} g(x) \neq 0</math>.</p> <p>0. (without proof)</p> <p>1.4 Simple examples.</p>	
<b>2</b>	<b>Differentiation</b>	<b>15</b>
	<p>2.1 Definition : Derivative of a function.</p> <p>2.2 Derivative of some standard functions from first</p>	

	<p>principle ( <math>y = x^n</math>, <math>y = e^x</math>, <math>y = a^x</math>. <math>y = c</math>, where <math>c</math> is a constant function.</p> <p>2.3 Rules of Differentiation : Sum, Difference, Product and Quotient of two functions.</p> <p>2.3.1 Simple examples.</p> <p>2.4 Second order derivative and examples.</p>	
<b>3</b>	<b>Integration</b>	<b>15</b>
	<p>3.1 Integration - An antiderivative process.</p> <p>3.2 Standard Integrals.</p> <p>3.3 Algebra of integrals : If <math>f(x)</math> and <math>g(x)</math> are two integrable functions and <math>k</math> is any constant, then</p> <p>(i) <math>\int k \cdot f(x) dx = k \cdot \int f(x) dx</math>.</p> <p>(ii) <math>\int [f(x) \pm g(x)] dx = \int f(x) dx \pm \int g(x) dx</math>.</p> <p>3.3 Methods of integration : (i) Substitution method (ii) Integration by parts.</p> <p>3.3.1 Examples.</p> <p>3.4 Definite integrals and their properties, examples.</p>	
<b>4</b>	<b>Application of Calculus in Business</b>	<b>15</b>
	<p>4.1 Maxima and minima, Case of one variable involving second order derivative.</p> <p>4.2 Cost function, Average cost, Marginal cost, Revenue function, Profit function , Elasticity of demand.</p> <p>4.3 Consumer's surplus and producer's surplus.</p>	

	4.4 Examples based on (4.1), (4.2) and (4.3)	
--	--	--

- \*\*\* (1) Non – programmable calculator is allowed.  
(2) For limit, derivative and integration – trigonometric functions should be omitted.

### **Reference Books**

- 1) **Business Mathematics**, Venna G. R. , New Age International (P) Limited Publishers, New Delhi.
- 2) **Elements of Calculus**, Bhagvat and Pawate.
- 3) **Business Mathematics**, . Kumbhojkar G. V.
- 4) **Business Mathematics**, Soni R. S.
- 5) **Business Mathematics**, Kapoor V. K., Sancheti D. C.
- 6) **Differential Calculus** - Shantinakaran
- 7) **Integral Calculus** – Shantinakaran
- 8) **Business Mathematics** – Agarwal B. M.
- 9) **Business Mathematics**, B.Com. Part - I Published by Shivaji University, Kolhapur.

Equivalence in accordance with titles and contents of paper  
(For CBCS pattern – Revised Syllabus)

Sr. No.	Title of old paper	Title of New paper
1.	Business Mathematics Paper- I (Sem I)	Business Mathematics Paper- I (Sem I) (Algebra And Commercial Arithmetic)
2.	Business Mathematics Paper- II (Sem II)	Business Mathematics Paper- II (Sem II) (Calculus)