

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's
New Arts, Commerce, and Science College, Ahmednagar
(Autonomous)
(Affiliated to Savitribai Phule Pune University, Pune)



National Education Policy (NEP)
Choice Based Credit System (CBCS)

Programme Skeleton and Syllabus of
Open Elective (OE)

Mathematical Science
(Mathematics and Statistics)

Implemented from
Academic Year 2023-24

Credit Distribution: UG Programme

	Type of Courses	III Yr	IV Yrs (Honours)	IV Yrs Research
Major Statistics	Discipline-Specific Courses (DSC)	46	74	66
	Discipline Specific Elective (DSE)	08	16	16
	Skill Enhancement Courses (SEC)	06	06	06
	Vocational Skill Courses (VSC)	08	08	08
	On-Job Training (OJT)	04	08	04
	Field Project (FP)	04	04	04
	Community Engagement and Service (CEP)	02	02	02
	Research project	00	00	12
	Research Methodology	00	04	04
	Indian Knowledge System	02	02	02
	Total (I, II and III Year)	80	124	124
Minor	Minor	20	20	20
Other Courses	Open Elective (OE)/ Multidisciplinary Courses	12	12	12
	Co-Curricular Courses	08	08	08
	Ability Enhancement Courses	08	08	08
	Value Education Courses	04	04	04
	Total	132	176	176

Bucket list of Open Elective Courses (OE) offered by the college

Sr. No.	School/Department	Department	Credits/Course	Courses	Total Credits
1.	Marathi	Marathi	03	04	12
2.	Hindi	Hindi	03	04	12
3.	English	English	03	04	12
4.	Economics	Economics	03	04	12
5.	Social Sciences	History, Political Science Sociology, Defense Studies	03	04	12
6.	Mental and Moral Sciences	Philosophy Psychology	03	04	12
7.	Music	Music	03	04	12
8.	Commerce	Commerce	03	04	12
9.	Management	BBA and BBA (CA)	03	04	12
10.	Chemical Science	Chemistry	03	04	12
11.	Life Sciences	Botany, Zoology, Microbiology, and Biotechnology	03	04	12
12.	Physical Sciences	Physics and Electronics	03	04	12
13.	Mathematical Science	Mathematics and Statistics	03	04	12
14.	Computational Science	CASAS	03	04	12
15.	Media Studies	Communication Studies and Animation	03	04	12
16.	Earth and Environmental Science	Geography and Environmental Science	03	04	12

List of OE under the Faculty of Science
Open for Commerce and Humanities(Arts)

Sr. No.	Offering Departments	OE-01	OE-02	OE-03	OE-04
	Credits	03	03	03	03
1.	Chemical Science	ABC	ABC	ABC	ABC
2.	Life Sciences	ABC	ABC	ABC	ABC
3.	Physical Sciences	ABC	ABC	ABC	ABC
4.	Mathematical Science	ABC	ABC	ABC	ABC
5.	Computational Science	ABC	ABC	ABC	ABC
6.	Media Studies	ABC	ABC	ABC	ABC
7.	Earth and Environmental Science	ABC	ABC	ABC	ABC

Programme Framework (Courses and Credits): Open Elective (OE) in Mathematical Sciences

Sr. No.	Year	Semester	Level	Course Type	Course Code	Title	Credits
1.	I	I	4.5	OE-01	OE-01	Bussiness Mathematics-I	03
2.	I	II	4.5	OE-02	OE-02	Bussiness Statistics	03
3.	I	III	5.0	OE-03	OE-03	Bussiness Mathematics-II	03
4.	I	IV	5.0	OE-04	OE-04	Operation Research	03
							12

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's
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Syllabus
Open Elective (OE)

Title of the Course: Business Mathematics-I								
Year: I				Semester: I				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
OE-1	OE-1	03	00	03	45	30	70	100

Learning Objectives:

1. Apply the knowledge of Mathematics (Algebra, Matrices, Calculus, Optimization) in solving business problems.
2. Demonstrate mathematical skills required in mathematically intensive areas in Commerce such as Finance and Economics.
3. Understand the important role Mathematics plays in all facets of the business world.
4. Understand the use of equations, formulae, and mathematical expressions and relationships in a variety of contexts.
5. Demonstrate critical thinking, modelling, and problem-solving skills in a variety of contexts.

Course Outcomes (Cos):

1. Translate the real word problems through appropriate mathematical modelling.
2. Explain the concepts and use equations, formulae and mathematical expressions and relationships in a variety of contexts.
3. Finding the extreme values of functions.
4. Analyze and demonstrate the mathematical skill require in mathematically intensive areas in economics and business.

Detailed Syllabus:

Unit - I		Algebra	9
		Set theory and simple applications of Venn Diagram. Relations, functions, indices. Logarithms. Permutations and combinations.	
Unit – II		Matrices	12
		Definition of a matrix, types of matrices. Algebra of matrices. Properties of determinants. Calculations of values of determinants up to third order. Adjoint of a matrix, elementary row and column operations.	
Unit - III		Percentage and Ratios	12
		Percentages: Definition, Calculation of percentage	

		Ratios- Types of Ratios Duplicate, Triplicate and Sub-Duplicate of ratio Examples.	
Unit - IV		Proportions	12
		Definitions and properties Cross product property Reciprocal property United proportions Continued proportions and Compound proportions.	

Suggested Readings/Material:

1. Basic Mathematics, Allen R.G.D, Macmillan, New Delhi, 1962.
2. Mathematics for Economics, Dowling, E.T., Schaum's Series, McGrawHill, London, 2020.
3. Quantitative Techniques in Management, Vohra, N.D., Tata McGraw Hill, New Delhi, 2006.
4. Business Mathematics, Soni R.S., Pitamber Publishing House, Delhi, 1996.

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Syllabus
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Title of the Course: Bussiness Statistics								
Year: I				Semester: I				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
OE-1	OE-1	03	00	03	45	30	70	100

Learning Objectives:

1. To study different scaling methods for variable and attribute.
2. To learn different tools to visualize data.
3. To study the different techniques of descriptive Statistics.
4. To study the concepts of chacterstic properties bivariante relation. \
5. To study appropriate index number for various commodities.

Course Outcomes (COs):

1. Understand role and importance of statistics in various business situations .
2. To develop skills related with basic statistical techniques.
3. Develop right understanding regarding regression, correlation and data interpretation.

Detailed Syllabus:

Unit - I		Exploratory Data Analysis Methods	10
		Types of data: Scaling methods: i)Attributes: Nominal scale, ordinal scale, Likert's scale ii)Variables: Interval scale, ratio scale, Discrete and continuous variables, difference between linear scale and circular scale, Review of Types of data such as Primary data, Secondary data, Cross-sectional data, time series data, directional data, panel data.	
		Review of graphical and diagrammatic techniques such as Graphs & Diagram- Histogram, frequency polygon and frequency curve, Ogive curve, Pie chart , Bar Diagram, Multiple bar Diagram, Sub-divided bar diagram	
Unit – II		Measures of Central Tendency and Dispersion	10
		Review of Types of Measure of Central Tendency: Arithmetic Mean, Median, Mode for discrete and Continuous frequency distribution, Combined Mean, trimmed arithmetic mean, partition values.	

		Review of Types of Measure of Dispersion- Absolute & Relative Measure dispersion Range, Semi-interquartile range (Quartile deviation), Mean deviation(about mean, mode and median), Variance and standard deviation, coefficient of range, coefficient of quartile deviation and coefficient of mean deviation, coefficient of variation(C.V.)	
Unit - III		Correlation and Regression	15
		Correlation: Bivariate data, Scatter diagram and interpretation. Concept of correlation between two variables, positive correlation, negative correlation, no correlation. Covariance between two variables, Karl Pearson's coefficient of correlation (r): Definition, computation for ungrouped data and interpretation, Properties. Spearman's rank correlation coefficient (with and without ties)	
		Linear Regression: Concept of dependent and independent variables, Identification of response and predictor variables and relation between them, Meaning of regression, difference between correlation and regression, Connection between correlation and regression, regression line of Y on X and X on Y, regression coefficient, Explained and unexplained variation, coefficient of determination, adjusted R ²	
Unit - IV		Index Number	10
		Introduction and scope of Index Numbers. Various types of Index Numbers like Human Development Index, Happiness Index BSE sensitivity Index, Definition and Meaning, Problems/considerations in the construction of index numbers, Simple and weighted price index numbers based on price relatives, Simple and weighted price index numbers based on aggregates.	
		Laspeyre's, Paasche's and Fisher's Index numbers, Consumer price index number: Considerations in its construction. Methods of construction of consumer price index number - (i) family budget method (ii) aggregate expenditure method	

Suggested Readings/Material:

1. Strategic Management: The Indian Context, R. Srivivasan
2. Concepts in Strategic Management and Business Policy, By Thomas L. Wheelen, J. David Hunger, Alan Hoffman, Charles E. Bamford
3. Strategic Management, Fred R. David, Forest R. David
4. Probability and Statistics, R Walpole, S Myers and K Ye Pearson Education International London.
5. Fundamentals of Mathematical Statistics, S.C. Gupta and V.K. Kapoor, Sultan Chand & Sons New Delhi.
6. Fundamentals of Applied Statistics, S.C. Gupta, Sultan Chand & Sons New Delhi.
7. Quantitative Techniques for Business, Dr. A.B. Rao, Jaico Publishing House Mumbai.
8. Fundamentals of Statistics, D.N. Elhance, Kitab Mahal Kanpur.