



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Department of Mathematics (GE for UG Students)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
MAUGGE01	GE	Calculus	60	20	20	0	0	3	0	0	3

Course Objective

To introduce the students with the Fundamentals of the Calculus.

Course Outcomes

After the successful completion of this course students will be able to:

- 1. solve the problems of the limit, continuity, and differentiation*
- 2. apply the techniques of differentiations*
- 3. analyse the nature of continuous and differentiable functions*
- 4. illustrate the maxima and minima of quantities in form of differentiable functions*
- 5. create the infinite series for functions.*

Course Content:

UNIT – I

Limit of a function, Algebra of limits, L- hospital rule.

UNIT – II

Continuity of a function at a point and interval and differentiability. Derivative of function, Differentiation by first principal, application of theorem involving sum, product, division. Differentiation of higher order, Differentiation of trigonometric function, exponential function, inverse function, logarithmic function, implicit function.

UNIT – III


Roll's theorem, Lagrange's Mean Value theorem.


UNIT – IV

Tangent and Normal, Maxima and minima (one variable)., Exact differentiation.


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MAUGGE01	GE	Calculus	60	20	20	0	0	3	0	0	3

UNIT – V

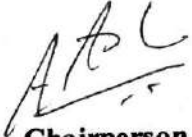
Taylor's theorem, Maclurins Theorem.

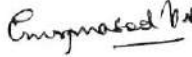
References:


1. Differential & Integral Calculus (Vol. I & II) – Courant & John.
2. T. M. Apostol: Mathematical Analysis, Addison-Wesley Publishing Co. 1957
3. Advanced Calculus – David Widder (Prentice Hall)
4. Differential & Integral Calculus (Vol. I) – N. Piskunov (CBS Publishers & Distributors)
5. Advanced Calculus – David V. Widder (Prentice Hall)
6. Mathematical Analysis – Shanti Narayan (S. Chand & Co.).
7. Differential Calculus – Shantinayakan.

Texts:

1. Basic Real & Abstract Analysis – Randolph J. P. (Academic Press).
2. A First Course in Real Analysis – M. H. Protter & G. B. Morrey (Springer Verlag, NBHM).
3. A Course of Analysis – Phillips.
4. Problems in Mathematical Analysis – B. P. Demidovich (Mir).
5. Problems in Mathematical Analysis – Berman (Mir).


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MAUGGE02	GE	Subsidiary Mathematics	60	20	20	0	0	3	0	0	3

Course Objective

This course aims at equipping student with a broad-based knowledge of mathematics with emphasis on business applications.

Course Outcomes

After the successful completion of this course students will be able to:

- 1. understand and apply the basics ratio and percentage*
- 2. understand the real-life applications of Mathematics.*
- 3. analyse the profit and loss situations*
- 4. illustrate the mathematical treatment of Stock and Shares*
- 5. learn the basics of Matrix and Determinants.*

Course Content:

UNIT – I

Ratio, Proportion and Percentage

Ratio- Definition, Continued Ratio, Inverse Ratio, Proportion, Continued Proportion, Direct Proportion, Inverse Proportion, Variation, Inverse Variation, Joint Variation, Percentage - Meaning and Computations of Percentages.

UNIT – II

Profit and Loss


Terms and Formulae, Trade discount, Cash discount, Problems involving cost price, Selling Price, Trade discount and Cash Discount. Introduction to Commission and brokerage, Problems on Commission and brokerage, concepts and treatment of depreciation.


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MAUGGE02	GE	Subsidiary Mathematics	60	20	20	0	0	3	0	0	3

UNIT – III

Interest

Simple Interest, Compound interest (reducing balance & Flat Interest rate of interest), Equated Monthly Instalments (EMI), Principles of Hire-Purchase.

UNIT – IV

Shares and Dividends

Concept & Examples of Shares, Stock exchange, Face Value, Market Value, Dividend, Equity Shares, Preferential Shares, Bonus Shares, delete examples.

UNIT – V

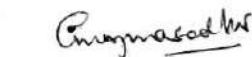
Matrices and Determinants

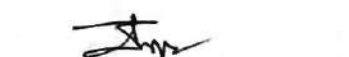
Multivariable data, Definition of a Matrix, Types of Matrices, Algebra of Matrices, Determinants, Adjoint of a Matrix, Inverse of a Matrix via adjoint Matrix.

Reference Books:

1. Business Mathematics by Dr. Amarnath Dikshit & Dr. J. K. Jain.
2. Business Mathematics by V. K. Kapoor - Sultan Chand & Sons, Delhi.
3. Business Mathematics by Bari - New Literature Publishing Company, Mumbai.


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MAUGGE03	GE	Probability Theory	60	20	20	0	0	3	0	0	3

Course Objective

To introduce the students with the Fundamentals of the Probability Theory

Course Outcomes

After the successful completion of this course students will be able to:

- 1. understand the probabilistic approach and applications of probability*
- 2. analyse and differentiate the events*
- 3. evaluate the probability of simple and complex events*
- 4. apply the Bayes' theorem to find the conditional probability.*

Course Content:

UNIT – I

Introduction to probability, basic terminology: random experiment, outcome, trial and event, exhaustive events, favorable events, mutually exclusive events, equally likely events, independent events.

UNIT – II


Definition of probability: Mathematical (or Classical or 'A Priori') probability, statistical probability, Axiomatic probability, application of the probability.

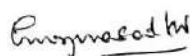
UNIT – III

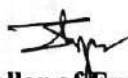
Addition theorem on probability and related examples.

UNIT – IV

Conditional probability, multiplication theorem for independent and dependent events, related examples.


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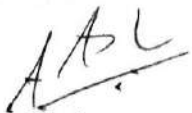
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			END SEM	MST	Q/A	END SEM	Q/A				
MAUGGE03	GE	Probablility Theory	60	20	20	0	0	3	0	0	3


UNIT – V


Bayes' theorem, related examples.

Reference Books:

1. Fundamentals of mathematical statistics, S.C. Gupta and V.K.Kapoor, sultan chand & sons
2. Fundamental of statistics, Goon, Gupta and Dasgupta.
3. Statistical Methods: An Introductory Text, J. Medhi.


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MAUGGE04	GE	Descriptive Statistics	60	20	20	0	0	3	0	0	3

Course Objective

To introduce the students with the Fundamentals of the Correlation and Regression.

Course Outcomes

After the successful completion of this course students will be able to:

- 1. understand the correlation and regression between two data sets*
- 2. apply the concept of correlation and regression in real life problems*
- 3. analyse the data sets for possible similarities*
- 4. construct the line of best fit for a data*
- 5. criticize the data based on correlations and regression.*

Course Content:

UNIT – I

Correlation: Meaning of correlation, scatter plot, Karl Pearson coefficient of correlation and related examples.

UNIT – II


Rank Correlation: Spearman rank correlation coefficient, Tied ranks (repeated ranks) and untied ranks (non-repeated ranks) and related examples.

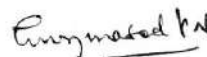
UNIT – III


Linear regression, regression coefficient, lines of regression and related examples.

UNIT – IV

Method of least square for fitting of a straight line.


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MAUGGE04	GE	Descriptive Statistics	60	20	20	0	0	3	0	0	3

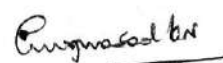
UNIT – V

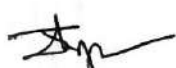
Curvilinear regression: parabola and exponential curve.

References:

1. Fundamentals of mathematical statistics, S.C. Gupta and V.K.Kapoor, sultan chand & sons.
2. Fundamental of statistics, Goon, Gupta and Dasgupta.
3. Statistical Methods: An Introductory Text, J. Medhi.


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			END SEM	MST	Q/A	END SEM	Q/A				
MAUGGE05	GE	Testing Hypothesis of	60	20	20	0	0	3	0	0	3

Course Objective

To introduce the students with the Fundamentals of the Hypothesis Theory.

Course Outcomes

After the successful completion of this course students will be able to:

- 1. apply the testing of hypothesis in real life situations*
- 2. analyse the hypothesis, errors in decision and confidence level*
- 3. compare two populations*
- 4. identify the independence of attributes.*

Course Content:

UNIT – I

Introduction: null and alternative hypothesis, critical region and acceptance region, Type I and Type II error, level of significance, p-value, power of the test, confidence interval.

UNIT – II

Small sample test: t-test for single mean, t-test for difference of means, paired t-test, critical value table of t-test, confidence limits.

UNIT – III

F-test for equality of two population variances, critical value table of F-test, confidence limits.

UNIT – IV

Exact sample test: Chi-square test for 'Goodness of fit'.

UNIT – V

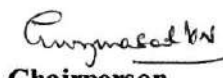
Test of independence of attributes.

References:

1. Fundamentals of mathematical statistics, S.C. Gupta and V.K. Kapoor, sultan chand & sons.
2. Fundamental of statistics, Goon, Gupta and Dasgupta.
3. Statistical Methods: An Introductory Text, J. Medhi.


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MAUGGE06	GE	Fundamentals of Statistics	60	20	20	0	0	3	0	0	3

Course Objective

To introduce the students with the Fundamentals of the Descriptive Statistics.

Course Outcomes

After the successful completion of this course students will be able to:

- 1. understand and apply the basics of Statistics*
- 2. identify statistical distributions and their graphical representation*
- 3. know the measure of central tendency*
- 4. analyse the nature of statistical data.*

Course Content:

UNIT – I

Introduction, Frequency distribution, Graphical presentation of the frequency distribution.

UNIT – II

Measures of central tendencies: arithmetic mean, median, mode.

UNIT – III

Measures of dispersion: range, quartile deviation, mean deviation, standard deviation, variance.

UNIT – IV


Skewness: Karl-Pearson coefficient of Skewness, Bowley's coefficient of Skewness.

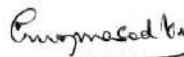
UNIT – V


Moments and Kurtosis, related examples.

References:

1. Fundamentals of mathematical statistics, S.C. Gupta and V.K.Kapoor, sultan chand & sons
2. Fundamental of statistics, Goon, Gupta and Dasgupta.
3. Statistical Methods: An Introductory Text, J. Medhi.


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MAUGGE07	GE	Numerical Methods	60	20	20	0	0	3	0	0	3

Course Objective

To introduce the Students with the Numerical Methods for PDE and basics of the Finite Difference methods.

Course Outcomes

After the successful completion of this course students will be able to:

- 1. classify the PDE's*
- 2. apply the numerical techniques to find the solution of partial differential equations*
- 3. apply the basics of the finite difference methods*
- 4. analyse and solve the wave and heat equations*
- 5. to create solutions of one dimensional PDE by FEM.*

Course Content:

UNIT – I

Classification of Partial Differential Equations, Finite Difference approximations to partial derivatives.

UNIT – II


Elliptic equations, Numerical solution of Laplace's Equation, Solution of Poisson Equation.


UNIT – III

Parabolic Equations, Numerical solution of Heat Equation.

UNIT – IV

Hyperbolic Equations, Numerical solution of Wave Equation.


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MAUGGE07	GE	Numerical Methods	60	20	20	0	0	3	0	0	3

UNIT – V


Concepts of Finite Element Method. Numerical solution of one dimensional PDE.

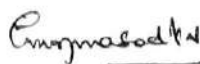
Texts:


1. Higher Engineering Mathematics, B. S. Grewal.

References:

1. A First Course in the Numerical Analysis of Differential Equations. Cambridge Texts in Applied Mathematics, Series Number 44, Arieh Iserles.
2. Numerical Solutions of Partial Differential Equations" by G D Smith
3. Finite Difference Methods for Ordinary and Partial Differential Equations by Randall J. LeVeque.


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MAUGGE08	DC	Mathematical Modelling	60	20	20	0	0	3	0	0	3

Course Objective

To introduce the students with the concept of Mathematical Modelling.

Course Outcomes

After the successful completion of this course students will be able to:

1. understand and apply the basics of the Mathematical Modelling
2. construct the mathematical model on real-life situations
3. analyse the limits of Mathematical Models
4. identify the role of Eigenvalues in Mathematical Modelling
5. create and examine the solutions of Mathematical Models based on Single-Species and Epidemiology.

Course Content:

UNIT – I

Introduction to mathematical modelling, what is mathematical modelling, steps involved in mathematical modelling, why mathematical modelling, principles of mathematical modelling, limitations of mathematical modelling.

UNIT – II

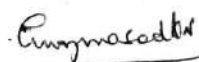
Mathematical modelling: techniques, classifications, characteristics, through geometry, through algebra, through trigonometry, through calculus, and simple illustrations.

UNIT – III

Stability Analysis, Role of Eigen Values, Nature of Critical Points.


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MAUGGE08	DC	Mathematical Modelling	60	20	20	0	0	3	0	0	3

UNIT – IV

Single-Species models: Exponential Growth Model - Formation of the Model, Solution and Interpretation, Logistic Growth Model - Formation of the Model, Solution and Interpretation.

UNIT – V

Mathematical Models in Epidemiology: SI Model - Formation of the Model, Solution and Interpretation, SIS Model with constant coefficient - Formation of the Model, Solution and Interpretation.

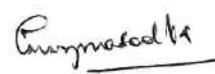
Texts:


1. Mathematical Modelling by J.N. Kapur, New Age International Publishers
2. M.M. Gibbons: A concrete approach to Mathematical modeling, John Wiley and sons, 1995.
3. Linear Models in Biology by M.R. Cullen, Ellis Horwood Ltd.

References:

1. Mathematical Models in Biology and Medicines by J.N. Kapur, EWP
2. Introduction to Mathematical Biology by S.I. Rubinow, John Wiley & Sons. 1975.
3. Mathematical Biology (Biomathematics, Volume 19) by J.D. Murray, Springer Verlag.


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