SARDAR PATEL UNIVERSITY , VALLABH VIDYANAGAR
SYLLABUS FOR B.Sc.(APPLIED MATHEMATICS) SEMESTER - 3
PAPER-I(T) (NUMERICAL METHODS) US03CAMT01
THREE HOURS PER WEEK (3 CREDIT)
Effective from June 2018
Marks:-100 (30 Internal + 70 External)

UNIT-1

Errors and Their Computations,A General Error Formula,Errors in a series approximation,Solutions of Algebraic and Transcendental Equations : Bisection Method , Iteration Method, Aitken's Δ^2 Process , Method of False Position , Newton-Raphson Method , Ramanujan's Method .

UNIT-2

Interpolation : Finite Differences, Forward ,Backward and Central Differences , Symbolic Relations of Operators , Detection of Errors by Use of Difference Tables , Differences of a Polynomial , Newton's Forward and Backward Formulae , Gauss Forward and Backward Formulae , Stirling's ,Bessel's and Everett's Formulae .

UNIT-3

Interpolation with Unequally Spaced Points , Lagrange's Interpolation Formula (Without proof) , Divided Difference and Their Properties , Newton's General Interpolation Formula , Interpolation by Iteration , Inverse Interpolation , Method of Successive Approximations , Numerical Differentiation:- Newton's Forward and Backward, Gauss's Method , Maximum and Minimum Values of a Tabulated Function .

UNIT-4

Numerical Integration :- Trapezoidal Rule , Simpson's $(\frac{1}{3})^{rd}$ and $(\frac{3}{8})^{th}$ Rules , Romberg Integration , Numerical Solution of Ordinary Differential Equation by Taylor's Series , Picards' Method , Euler's Method , Modified Euler's Method , Range-Kutta Method .

NOTE : Use of non- programmable Scientific Calculator is Allowed .

Recommended Texts :

(1) S.S.Sastry, Introductory methods of Numerical analysis,4th Ed., Prentice hall of India,2010. Chapter : 1(1.3,1.4,1.5), 2(2.1 to 2.6,),3(3.3.1,3.32,3.3.3,3.6,3.7,3.9.1,3.10,3.11), 5(5.1,5.2,5.3,5.4.1,5.4.2,5.4.3,5.4.6),7(7.1 to 7.5)

Reference Texts:

(1) Brain Bradie, A Friendly Introduction to Numerical analysis, Pearson Education,India,2007.
(2) M.K.Jain, S.R.K.Iyengar and R.K.Jain , Numerical Methods for Scientific and Engineering Computation, 6th Ed.,New Age International Publisher,India 2007 .
(3) C.F.Gerald,P.O.Wheatly, Applied Numerical Analysis,Pearson Education,India,2008.
(4) G. Sankar rao , Numerical analysis.
(5) B.S.Grawal , Numerical analysis , Khanna pub.

SARDAR PATEL UNIVERSITY , VALLABH VIDYANAGAR
PROPOSED SYLLABUS FOR B.Sc.(APPLIED MATHEMATICS) SEMESTER - 3
PAPER-2(T)(MULTIVARIATE CALCULUS) U S03 CAMT02
THREE HOURS PER WEEK (3 CREDIT)
Effective from June 2018
Marks:-100 (30 Internal + 70 External)

UNIT-1

Beta and Gamma Functions and Their Properties, Relation Between Beta and Gamma functions and Examples , Vector Calculus :Gradient of scalar field , Directional derivatives ,Tangent Plane and Normal Vector to a Surface , The Divergence and Curl of a Vector Field.

UNIT-2

Line integral , Evaluation of Line Integrals , Double Integral , Change of Variables in Double Integral , Application of Double integral ,Change of Order of Integration in Cartesian Form

UNIT-3

Line Integral Independent of Path , Green's Theorem and its Application with Examples ,Area of Plane Region , Vector Form of Green's Theorem ,Surfaces , Tangent Plane and Normal Line to the Surface , First Fundamental Form , Area of a Surface , Surface Integrals , Moment of Inertia of Surface

UNIT-4

Triple Integrals , Divergence Theorem of Gauss and its Applications With Examples ,First and Second Form of Green's Theorem , Application of Triple Integral (Total Mass ,Moment of Inertia , Volume) , Stoke's Theorem and its Applications with Examples .

Recommended Texts :

(1) E.Kreyszing , Advanced Engineering Mathematics , Fifth edition , New Age International (P) Ltd., New Delhi , 1997.
Chapter : 9

(2) Shanti Narayan , A course of Mathematical Analysis ,S.Chand & Company Ltd.
Chapter :Appendix I (A.4,A.5,A.6)

Reference texts:

(1) Maurice D.Weir, Joel Hass,Frank R.Giordano , Thomas'Calculus ,Pearson Education,India.

(2) Dr.Dinesh Karia,M.L.Patel,N.Y.Patel,B.P.Patel,A Textbook of Calculus with an Introduction to Differential Equations.

(3) B.S.Grewal, Higher Engineering Mathematics, Thirty-fifth edition,Khanna Publ.

(4) Dr.K.R.Kachot, Higher Engineering Mathematics Vol- 1 ,Mahajan Pub. House , Ahmedabad

SARDAR PATEL UNIVERSITY , VALLABH VIDYANAGAR
SYLLABUS FOR B.Sc.(APPLIED MATHEMATICS) SEMESTER - 3
PAPER-3(P)(MATHEMATICS PRACTICAL) U503CAMT03
SIX HOURS PER WEEK (3 CREDIT)
Effective from June 2018
Marks:-100 (30 Internal + 70 External)

(1) Inherent Errors and truncated errors ; Errors in a series approximation.

(2) Interpolation :- Newton's forward and backward, Gauss's forward and Backward, Sterling's, Bessel's, Everett's, Lagrange's , Newton's General and Lagrange's general formulae , Method of successive approximations ,
Numerical differentiation and integration :- differentiation of Newton's
forward and backward , Stirling's , Bessel's , Newton's General and
Lagrange's formulae ; Trapezoidal, Simpson's $(\frac{1}{3})^{rd}$ and $(\frac{3}{8})^{th}$ rules, Romberg method.

(3) Solution of algebraic and transcendental equations : Bisection method, Iteration method, Aitken's Δ^2 process, method of false position, Newton
Raphson's method ; Numerical solution of ordinary differential equations :-
Solution by Taylor's series, Picard's method, Euler's Method,Modified Euler's method ; Runge-kutta method (fourth order only).

(4) Boolean algebra and Switching circuits.

Recommended Texts :

(1) S.S.Sastry, Introductory methods of Numerical analysis, Prentice Hall Of India, 1990.
(2) Scarborough, Numerical Mathematical Analysis
(3) Bajpai, calus and farly, Numerical Analysis for scientists and Engineers, John Wiely.
(4) J.E.Whitesitt , Boolean Algebra .

Notes :
(1) Use of the standard texts books may be permitted at the time of Practical Examination.
(2) The candidate shall have to produce at the time practical Examination the record of their prescribed Laboratory work, certified by the Head of the Department.

SARDAR PATEL UNIVERSITY , VALLABH VIDYANAGAR
B.Sc.(MATHEMATICS) SEMESTER - III
US03EMTH01 (Calculus)
TWO HOURS PER WEEK (2 CREDIT)
Effective from June 2011
Marks:-100(30 internal+70 external)

UNIT-1. Definition of improper integrals of both types ; Convergence of improper integrals ; Comparison tests for convergence .

UNIT-2. Beta and Gamma functions and their properties; Relation between Beta and Gamma functions and Examples.

UNIT-3. Gradient of scalar field ; Directional derivatives ; The divergence of a vector field ; The curl of a vector field .

UNIT-4. Periodic functions ; Fourier series and its applications ; Euler formulae ; Even and odd functions ; Half range expansions.

Reference texts:

(1) Shanti Narayan, Integral Calculus ,S.C.Chand and Co.
(2) Dr.Dinesh Karia,M.L.Patel,N.Y.Patel,B.P.Patel,A Textbook of Calculus with an Introduction to Differential Equations.
(3) E.Kreyszing ,Advanced Engineering Mathematics,Fifth edition,New Age International (p) Ltd.,New Delhi,1997.
(4) B.S.Grewal,Higher Engineering Mathematics.
(5) K.R.Kachot,Higher Engineering Mathematics.

SARDAR PATEL UNIVERSITY ,VALLABH VIDYANAGAR
B.Sc.(MATHEMATICS) SEMESTER - III
US03EMTH02 (Mathematical Methods - 1)
TWO HOURS PER WEEK (2 CREDIT)
Effective from June 2011
Marks:-100(30 internal+70 external)

UNIT-1. Differential Equations of First Order ; Methods of solution of Equations of the First Order and First Degree Differential Equations : Variable Separable,Homogeneous equations,Linear equations.

UNIT-2. Application of Differential Equations of First Order : Physical Applications , Simple Electric Circuit , Newton's Law Of Cooling .

UNIT-3. Application of Differential Equations of First Order : Heat Flow , Rate of Decay of Radio-Active Materials , Chemical Reactions and Solutions.

UNIT-4. Application of Linear Differential Equations of First Order : Simple harmonic motion , Oscillations , Simple Pendulum , Oscllatory electrical circuits , Deflection of Beams .

Reference texts:

(1) B.S.Grewal,Higher Engineering Mathematics,Khanna Publishers,Delhi.
(2) E.Kreyszing ,Advanced Engineering Mathematics,Fifth edition,New Age International (p) Ltd.,New Delhi,1997.
(3) K.R.Kachot,Higher Engineering Mathematics.

SARDAR PATEL UNIVERSITY , VALLABH VIDYANAGAR
B.Sc.(MATHEMATICS) SEMESTER - IV
US03EMTH03 (Financial Mathematics - 1)
TWO HOURS PER WEEK (2 CREDIT)
Effective from June 2011
Marks:-100(30 internal+70 external)

Unit - 1 . Simple interest ; Compound interest ; Doubling rule ; Continuously compound interest .

Unit - 2 . Present Value Analysis : Present value of pay off ; Examples ; Rate of return for discrete as well as continuously varying interest rates.

Unit - 3 . Options Pricing ; Examples ; Arbitrage and its meaning ; Law of one price .

Unit - 4 . Examples of Pricing via Arbitrage ; Forward and future contracts ; Law of one price .

Reference texts:

(1) Sheldon M. Ross, An Elementary Introduction to Mathematical Finance(Second Edition).
(2) John C. Hull, Options , Futures and other derivatives(Seventh Edition).

SARDAR PATEL UNIVERSITY , VALLABH VIDYANAGAR
B.Sc.(MATHEMATICS) SEMESTER - III
US03EMTH04 (Operations Research)
TWO HOURS PER WEEK (2 CREDIT)
Effective from June 2011
Marks:-100(30 internal+70 external)

Unit - 1 . Introduction to Linear Programming ; LP model ; Graphical solution and sensitivity analysis .

Unit - 2 . Simplex method ; Need of Simplex method ; Basic solutions .

Unit - 3 . Transportation models ; Various methods and applications

Unit - 4 . Assignment Problems ; Various cases and methods ; applications

Recommended Texts :

(1) Hamdy and Tahia , Operations Research , An introduction, Prentice - Hall, 1997 .
(2) V.K.Kapoor , Operations Research , S.Chand and sons , New Delhi ,2007 .

SARDAR PATEL UNIVERSITY , VALLABH VIDYANAGAR
B.Sc.(MATHEMATICS) SEMESTER - III
US03EMTH05 (Calculus and Algebra - 1)
TWO HOURS PER WEEK (2 CREDIT)
(For the students who were in Biology group in semester I and II)
Effective from June 2011
Marks:-100(30 internal+70 external)

Unit - 1 . Indeterminate forms ; L'Hospital's rule and examples.

Unit - 2 . Partial derivatives ; Euler's theorem on homogeneous functions of two and three Variables its application and examples; .

Unit - 3 . Different types of matrices associated with a given matrix - transpose Conjugate and Toe conjugate transpose of a matrix ; Some special Types of Matrices-square, row, column, diagonal , scalar , unit , Zero,Triangular , symmetric, skew-symmetric, Hermitian and skew- Hermitian matrices ; Sub matrices of a matrix .

Unit - 4 . Determinant and Minors of a matrix ; Reversal law for the transpose of a product ; Associative law for matrix multiplication ; Distributive law; Characteristic matrix and characteristic equation of a matrix ; Cayley-Hamilton theorem.

Recommended Texts :

(1) Shanti Narayan, Differential Calculus ,Ninth edition,S.C.Chand and Co.
(2) Shanti Narayan and Mittal , A text book of Matrices ,S.C.Chand and Co.
(3) D. J. Karia, N. Y. Patel, B. P. Patel, M. L. Patel, Introduction to calculus and differential equations.
(4) B.S.Grewal, Higher Engineering Mathematics.

SARDAR PATEL UNIVERSITY , VALLABH VIDYANAGAR
B.Sc.(INFORMATION TECHNOLOGY) SEMESTER - III
US03EMTH06 (Operations Research-I)
TWO HOURS PER WEEK (2 CREDIT)
Effective from July 2015
Marks:-100(30 internal+70 external)

Unit-I History, meaning and applications of OR. Introduction to LPP, General and Standard Formulation of LPP, Problems of formulation of LPP, Solution of LPP using Graphical method

Unit-II Solution of LPP using Simplex method and Big M method, Duality in LPP(Concept only)

Unit-III Transportation Problems: Introduction, Mathematical formulation of Transportation problem, Methods of finding initial basic feasible solution

- North West Corner Method (N-W Corner Method)
- Row Minima Method
- Column Minima method
- Matrix Minima Method (Least Cost Entry Method)
- Vogel's Approximation method (VAM)

Unit-IV Modified distribution(MODI) method for finding optimum solution of Transportation Problem, Unbalanced TP, Degenerate TP

Text Book: Operations Research by S. D. Sharma, publisher: Kedar Nath Ram Nath(15th edi.)

Chapter 1	1.1, 1.2, 1.3
Chapter 3	3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.10, 3.11
Chapter 5	5.1, 5.2, 5.3, 5.4, 5.5.4, 5.8.1, 5.8.2, 5.8.3
Chapter 7	7.1 to 7.3 (theorems without proof)
Chapter 11	11.1, 11.2, 11.3, 11.4, 11.8, 11.9, 11.10, 11.11, 11.12

References:

(i) Operations Research by J.K.Sharma
(ii) Operations Research: An Introduction by Hamdy A.Taha
(iii) Operations Research by Kanti Swarup and Man Mohan Gupta