SARDAR PATEL UNIVERSITY ,VALLABH VIDYANAGAR
SYLLABUS FOR B.Sc. SEMESTER - 5
US05CMTH21(T) (REAL ANALYSIS)
FOUR HOURS PER WEEK (4 CREDIT)
Effective from June 2020
Marks:-100 (30 Internal + 70 External)

UNIT-1

Field Structure , Order Structure; Bounded and Unbounded Sets , Supremum and Infimum , Completeness and Order Completeness in R ,Archimedean Property of Real Numbers , Axioms of a Complete Ordered Field , Absolute Values .

UNIT-2

Neighbourhood of a Point , Interior Points , Interior of a Set , Limit Points of a Set, Bolzano-Weierstrass Theorem , Closed Sets , Closure of Set .

UNIT-3

Sequences , Bounds of a Sequence , Convergence of Sequences , Limit Point of a Sequence , Bolzano-Weierstrass Theorem , Limit Superior and Limit Inferior of a Sequence , Convergent and Divergent Sequences , Cauchy's General Principle of Convergence , Cauchy Sequences , Algebra of Sequences , Monotonic Sequences

UNIT-4

Infinite Series , A Necessary Condition for Convergence , Cauchy' General Principle of Convergence ; Some Preliminary Theorems , Positive Term Series , Comparison Tests for Positive Term Series , Cauchy' Root Test , D'Alembert Test , Integral Test, Alternating Series, Absolute Convergence .

Recommended texts:

S.C.Malik , Principles of Real Analysis , Third Edition , New Age International, New Delhi .
Chapter : 1(Except article 1.4.3,1.4.4,1.4.6,) , 2 ,3, 4 (Except article 4.6 , 4.7 , 4.9)

Reference Books:

(1) K.A.Rose , Elementary Analysis : The Theory of Calculus , Springer (SIE) , Indian reprint , 2009.
(2) R.G.Bartle,D.R.Sherbert ,Introduction to Real Analysis ,Third Edition , Wiley India Pvt.Ltd.New Delhi .
(3) Gerald G.Bilodeau , Paul R.Thie,G.E.Keough, An Introduction to Analysis, 2nd Ed. Jones and Barlett,2010.
(4) S.C.Malik and Savita Arora, Mathematical Analysis, Third revised Edition,New Age International Pvt. Ltd., New Delhi .
(5) Maurice D.Weir, Joel Hass,Frank R.Giordano , Thomas'Calculus ,Pearson Education,India.
(6) R.R.Goldberg, Principles of Mathematical analysis.

SARDAR PATEL UNIVERSITY , VALLABH VIDYANAGAR
SYLLABUS FOR B.Sc. SEMESTER - 5
US05CMTH22(T)(THEORY OF REAL FUNCTIONS)
FOUR HOURS PER WEEK (4 CREDIT)
Effective from June 2020
Marks:-100 (30 Internal + 70 External)

UNIT-1

Limits , Continuous Function , Functions Continuous on Closed and Bounded Intervals , Uniform Continuity ,Derivability of a Function , Properties of Derivable Functions .

UNIT-2

Increasing and Decreasing Functions , Darboux Theorem , Rolle's Theorem , Lagrange's and Cauchy's Mean Value Theorems , Taylor's Theorem with Lagrange's Form of Remainder and Cauchy's Form of Remainder , Maclaurin's Theorem , Generalized Mean Value Theorem , Taylor's and Maclaurin's Series Expansions of Exponential and Trigonometric Functions , ln(1 + x) and $(1 + x)^n$.

UNIT-3

Functions of Several Variables: Explicit and Implicit Functions , Continuity , Partial Derivatives , Differentiability , Partial Derivatives of higher order , Differentials of Higher Order,Functions of Function

UNIT-4

Change of Variables, Taylor's Theorem and Maclaurin's Theorem for Function of Two Variables ; Extreme Values of Functions of Two Variables.

Recommended Texts :

S.C.Malik , Principles of Real Analysis , Third Edition , New Age International, New Delhi .
Chapter : 5 , 6 , 11 (Except 11.11)

Reference Books :

(1) K.A.Rose , Elementary Analysis : The Theory of Calculus , Springer (SIE) , Indian reprint , 2009 .
(2) R.G.Bartle,D.R.Sherbert ,Introduction to Real Analysis ,Third Edition , Wiley India Pvt.Ltd.New Delhi .
(3) S.R.Ghorpade and B.V.Limaye,A Course in Calculus and Real Analysis,Springer, 2006.
(4) A.Mattuck,Introduction to Analysis, Prentice Hall,1999
(5) S.C.Malik and Savita Arora, mathematical Analysis, second Edition New Age International Pvt. Ltd., New Delhi 2000.
(6) Dipak Chatterjee , Real Analysis ,Prentice -Hall India Pvt. Ltd.New Delhi .

SARDAR PATEL UNIVERSITY , VALLABH VIDYANAGAR
SYLLABUS FOR B.Sc. SEMESTER - 5
US05CMTH23(T)(GROUP THEORY)
FOUR HOURS PER WEEK (4 CREDIT)
Effective from June 2020
Marks:-100 (30 Internal + 70 External)

UNIT-1

Binary Operations , Group , Laws of Exponents , Subgroups , Centre of Group , Cyclic Group

UNIT-2

Cosets of Subgroup , Lagrange's Theorem ,Index of Subgroup , Euler's Theorem , Fermat's Theorem , Isomorphism , Isomorphic Groups, Automorphism , Inner Automorphism

UNIT-3

Homomorphism , Kernel of Homomorphism , Normal Subgroup , Simple Group , Commutator Subgroup , Quotient Groups , First , Second and Third Isomorphism Theorem , Direct Products , External Direct Products ,

UNIT-4

Permutation Groups , Transposition , Cycle , Signature of Permutation , Even and Odd Permutation , Cayley's Theorem for Group , Conjugate Classes , Cauchy's Theorem ,Partition , Sylow Theorem

Recommended texts :

N.S.Gopalakrishnan, University Algebra, Second Edition, Wiley Eastern Ltd., New Delhi 1994. Chapter 1(Except 1.13.10 to 1.13.30 and 1.14) .

Reference Books :

(1) John B. Fraleigh , A First Course in Abstract Algebra , Pearson,
(2) M. Artin ,Abstract Algebra, Pearson,
(3) Joseph A. Gallian , Contemporary Abstract Algebra , Narosa Pub.House , New Delhi .
(4) I.N.Herstein, Topics in algebra ,Wiley Eastern Limited, India
(5) AshaRani Singal, Algebraic structures,
(6) J.Whitesitt, Principles of modern algebra.

SARDAR PATEL UNIVERSITY , VALLABH VIDYANAGAR
SYLLABUS FOR B.Sc. SEMESTER - 5
US05CMTH24(T) (TOPOLOGY)
FOUR HOURS PER WEEK (4 CREDIT)
Effective from June 2020
Marks:-100 (30 Internal + 70 External)

UNIT-1
Functions , Partitions , Equivalence Relations , Countable Sets , Uncountable Sets, Partially Ordered Sets
UNIT-2
Metric spaces , Limit in metric spaces , Continuous Functions on a Metric Space , Open Sets , Closed Sets
UNIT-3
Convergence , Completeness, Baire's Theorem , Continuous Mappings , Spaces of Continuous Functions
UNIT-4
Euclidean and Unitary Spaces ,Topological Spaces , Elementary Concepts , Open Bases , Open Subbases .

Recommended texts:

G.F.Simmons,Introduction to Topology and Modern Analysis,McGraw-Hill Book Company
Chapter : 1 (Only 5,6,7,8) , 2 , 3 (Only 16,17,18)

Reference Books :

(1) Satish Shirali and Harikishan L.Vasudeva,Matric Spaces,Springer Verlag, London,2006
(2) S.Kumaresan,Topology of Matric Spaces,Narosa Pub. House
(3) R.R.Goldberg , Methods of Real Analysis, Oxford and IBH .

SARDAR PATEL UNIVERSITY ,VALLABH VIDYANAGAR
SYLLABUS FOR B.Sc. SEMESTER - 5
US05CMTH25(P) (MATHEMATICS PRACTICAL)
TWELVE HOURS PER WEEK (6 CREDIT)
Effective from June 2020
Marks:-150 (45 Internal + 105 External)

Practical/Lab work to be performed on a computer :
For the Practicals the use of Free Open Source softwares like SAGE, MAXIMA , SCILAB, OCTAVE, Python (with Numpy, SciPy etc.) is recommended.

PART - 1 [Marks:-50 (15 Internal + 35 External)]

Introduction to Mathematical computing environment, Basic Arithmetic operations and expressions, Basic inbuilt functions for general purpose and Mathematics, Linear Algebra : Matrix Operations, solution of system of linear equations , Eigen values and vectors, Data graphs.

PART - 2 [Marks:-50 (15 Internal + 35 External)]

Plotting graphs of functions, Symbolic Variables , Functions and their operations, Integer Linear Programming, Solution of Differential Equations, Laplace Transforms.

PART - 3 [Marks:-50 (15 Internal + 35 External)]

Numerical methods : Numerical integrations, Interpolation, Basic graph Theory and its application.

NOTE :

(1) Practical session will be of Twelve hours per week and they will be conducted in batches of students of size 15 to 20 per batch.

(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
SYLLABUS FOR B.Sc.(MATHEMATICS) SEMESTER - 5
USO5DMTH26(T) (MECHANICS - 1)
TWO HOURS PER WEEK (2 CREDIT)
Effective from June 2020
Marks:-50(External)

UNIT-1

Ingredients of mechanics , Position vector , Velocity vector , Acceleration vector , Gradient vector , Fundamental laws of Newtonian mechanics , Theory of dimensions,

UNIT-2

Plane statics , Equilibrium of a particle , Equilibrium of systems of particles , Moment of force about a line , Necessary and sufficient condition for equilibrium.

UNIT-3

Couples , Work and potential energy , Principle of virtual work , Application in plane statics , Mass center and center of gravity , Gravitational potential .

UNIT-4

Flexible cables , Cable in contact with smooth and rough curve , Plane Kinematics , Kinematics of a particle , Motion of a rigid body parallel to a plane.

Recommended texts :

J.L.Synge and B.A.Griffith , Principles of Mechanics .
Chapter 1, Chapter 2(2.2,2.3,2.4), Chapter 3(3.1 , 3.4), Chapter 4(4.1,4.2)

Reference Books:

P.N.Chaterjee, Statics and Dynamics.

SARDAR PATEL UNIVERSITY , VALLABH VIDYANAGAR
SYLLABUS FOR B.Sc. SEMESTER - 5
US05DMTH27(T)(OPERATIONS RESEARCH-1)
TWO HOURS PER WEEK (2 CREDIT)
Effective from June 2020
Marks:-50(External)

UNIT-1
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-2
Solution of LPP using Simplex method and Big M method, Duality in LPP(Concept only)

UNIT-3
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),Vogels Approximation method (VAM),

UNIT-4
Modified distribution(MODI) method for finding optimum solution of Transportation Problem, Unbalanced TP, Degenerate TP .

Recommended text:

S. D. Sharma , Operations Research by
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, 5.5.6, 5.8.1, 5.8.2, 5.8.3) Chapter 7 (7.1 to 7.5 (theorems without proof), 7.7(introduction only)) Chapter 11 (11.1, 11.2, 11.3, 11.4, 11.8, 11.9, 11.10, 11.11, 11.12)

Reference texts:

(1) J.K.Sharma ,Operations Research
(2) Hamdy A.Taha ,Operations Research: An Introduction
(3) Kanti Swarup and Man Mohan Gupta , Operations Research

SARDAR PATEL UNIVERSITY , VALLABH VIDYANAGAR
SYLLABUS FOR B.Sc. SEMESTER - 5
US05DMTH28(T)(NUMBER THEORY - 1)
TWO HOURS PER WEEK (2 CREDIT)
Effective from June 2020
Marks:-50 (External)

UNIT-1

Divisibility , Fundamental theorem of divisibility ,Square number,Common divisors, Greatest common divisor (G.C.D.) : definition and examples , Properties of G.C.D.

UNIT-2

Least common multiple(L.C.M.) : definition and examples ,Properties of L.C.M , Relation between GCD and LCM, Prime numbers ,Fundamental property of prime number, Factorization in prime numbers , Unique factorization theorem.

UNIT-3

Total number of positive divisor of positive integer , Sum and product of positive divisors of positive integer,Definition of Congruences ,Definition of Euler's function, Perfect numbers : definition and examples , Mersenne numbers : definition and examples , Fermat numbers : definition and examples .

UNIT-4

Gauss function : definition and examples ,Properties of Gauss function, Mobius function : definition and examples , Properties of Mobius function ,Fibonacci numbers : definition and examples ,Properties of Fibonacci numbers .

Recommended texts :

C.Y.Hsiung, Elementary Theory of numbers, Allied publishers Ltd.(1992)

Reference Books:

(1) D.Burton , elementary Number Theory, 6th Ed , Tata McGraw-Hill Edition,Indian reprint.
(2) I.Niven And H.Zuckermar , An Introduction to the theory of Numbers, Wiley-Eastern Publication.
(3) S.Barnard and J.N.Child , Higher Algebra, Mc Millan and Co. Ltd.
(4) Neville Robinns, Beginning Number Theory , 2nd Ed.,Narosa Publishing House Pvt.Ltd. Delhi,2007

SARDAR PATEL UNIVERSITY ,VALLABH VIDYANAGAR
SYLLABUS FOR B.Sc. SEMESTER - 6
US06CMTH21(T) (COMPLEX ANALYSIS)
FOUR HOURS PER WEEK (4 CREDIT)
Effective from June 2020
Marks:-100 (30 Internal + 70 External)

UNIT-1

Functions of Complex Variable , Mappings,Mappings by the Exponential Function, Limits , Theorems on Limits , Limits Involving the Point at Infinity , Continuity, Derivatives, Differentiation formulas.

UNIT-2

Cauchy-Riemann Equations , Sufficient Conditions for Differentiability ,Polar Coordinates, Analytic and Harmonic Functions , Reflection Principle.

UNIT-3

The Logarithmic Function,Branches and Derivatives of Logarithms,Some Identities Involving Logarithm , Complex Exponents, Trigonometric functions , Hyperbolic Functions ,Inverse Trigonometric and Hyperbolic Functions .

UNIT-4

Linear Transformations , The Transformation w = 1/z , Linear Fractional Transformations ,An Implicit Form , Mappings of the Upper Half Plane , The Transformation $w = \sin z$, Mappings by z^2 and Branches of $z^{1/2}$.

Recommended Texts :

J.W.Brown,R.V.Churchill,Complex Variables and Applications , Seventh Edition, McGraw-Hill Book Co.,2003.
Chapter : 2 (except Article 26) , 3 , 8 (except Articles 91,92,93)

Reference Books :

(1) J.B.Conway, Functions of one complex variables, Narosa publ. House, New Delhi,1973.
(2) Joseph Bak and Donald j. Newman , Complex Analysis , Second Edition , Undergraduate Texts in Mathematics,Springer-Verlag New York,Inc.,New York,1997.

SARDAR PATEL UNIVERSITY ,VALLABH VIDYANAGAR
SYLLABUS FOR B.Sc. SEMESTER - 6
US06CMTH22(T) (RING THEORY)
FOUR HOURS PER WEEK (4 CREDIT)
Effective from June 2020
Marks:-100 (30 Internal + 70 External)

UNIT-1

Rings , Properties of Ring , Zero Divisor , Integrals Domains , Field , Ring Isomorphism , Ring Homomorphism , Kernel of Ring Homomorphism , Quotient Fields

UNIT-2

Ideals for Ring , Proper Ideal , Quotient Rings , First Isomorphism Theorem for Ring , Prime and Maximal Ideals , Factorization , Associates Elements , Irreducible Element , Prime Element , g.c.d.

UNIT-3

Euclidean Domain , Principal Ideal Domain , Unique Factorization Domain,Polynomial Rings

UNIT-4

Roots of Polynomials , Factorization of Polynomials , Eisenstein's Criterion , Primitive Polynomial , Gauss Lemma , Gauss Theorem , Rational Function , Field Extensions , Normal Extensions , Separable Extensions .

Recommended texts :

N.S.Gopalakrishnan, University Algebra, Second Edition, Wiley Eastern Ltd., New Delhi 1994.
Chapter 2 , 4 (Only 4.1 , 4.2 , 4.3) .

Reference Books :

(1) John B. Fraleigh , A First Course in Abstract Algebra , Pearson,
(2) M. Artin ,Abstract Algebra, Pearson,
(3) Joseph A. Gallian , Contemporary Abstract Algebra , Narosa Pub.House , New Delhi .
(4) I.N.Herstein, Topics in algebra ,Wiley Eastern Limited, India
(5) Asha Rani Singal, Algebraic structures,
(6) J.Whitesitt, Principles of modern algebra.

SARDAR PATEL UNIVERSITY , VALLABH VIDYANAGAR
SYLLABUS FOR B.Sc. SEMESTER - 6
US06CMTH23(T) (LINEAR ALGEBRA)
FOUR HOURS PER WEEK (4 CREDIT)
Effective from June 2020
Marks:-100 (30 Internal + 70 External)

UNIT-1
Vector Spaces , Subspaces , Linear Dependence and Independence , Basis and Dimension for Vector Space
UNIT-2
Linear Transformations , Modules , Structure Theorem
UNIT-3
Matrices , Matrix associated with a Linear Map , Linear Map associated With a Matrix ,Trace and Transpose , Rank
UNIT-4
Characteristic Roots , Canonical Form , Inner Product Spaces , Unitary , Hermitian and Orthogonal Matrices .

Recommended text:

N.S.Gopalakrishnan , University Algebra , Revised Second Edition , New Age International Publishers,New Delhi.
Chapter : 3 , 5 (Except 5.6,5.7,5.8,5.13)

Reference texts:

(1) I.N.Herstein, Topics in algebra ,Wiley Eastern Limited, India
(2) Joseph A. Gallian , Contemporary Abstract Algebra , Narosa Pub.House , New Delhi .
(3) John B. Fraleigh , A First Course in Abstract Algebra , Pearson,
(4) M. Artin ,Abstract Algebra, Pearson,
(5) S. Kumaresan , Linear Algebra- A Geometric Approach ,Prentice-Hall of India
(6) S.Lang ,Introduction to Linear Algebra ,Springer
(7) V.Krishnamurthy , An introduction to Linear Algebra ,
(8) P.B.Bhattachary,S.K.Jain,N.R.Nagpaul,First Course in Linear Algebra , Wiley - Eastan Ltd.
(9) Dr.Gundadhar Paria , Linear Algebra,New Central Book Agency .
(10) A Ramchandra Rao ,P.Bhima shankaram , Linear Algebra , Tata MacGraw-Hill Pub.

SARDAR PATEL UNIVERSITY , VALLABH VIDYANAGAR
SYLLABUS FOR B.Sc. SEMESTER - 6
US06CMTH24(T)
(RIEMANN INTEGRATION AND SERIES OF FUNCTIONS)
FOUR HOURS PER WEEK (4 CREDIT)
Effective from June 2020
Marks:-100 (30 Internal + 70 External)

UNIT-1
Riemann Integrals Definitions and Existence , Inequalities for Integrals , Refinement of Partitions , Darboux's Theorem for Integrals , Conditions of Integrability , Integrability of the Sum , Difference , Product , Quotient and Modulus of Functions.
UNIT-2
Integral as the Limit of Sums (Riemann Sums) , Some Integrable Functions , Integration and Differentiation , The Primitive ,The Fundamental Theorem of Integral Calculus , Mean Value Theorems of Integral , Second Mean Value Theorem .
UNIT-3
Improper Integrals , Integration of Unbounded Functions with Finite Limits of Integration, Comparison Tests for Convergence at a of $\int_a^b f\,dx$, Infinite Range of Integration , Integrand as a Product of Functions
UNIT-4
Pointwise Convergence , Uniform Convergence on an Interval ,Tests for Uniform Convergence , Properties of Uniformly Convergent Sequences and Series ,
The Weierstrass Approximation Theorem .

Recommended Text :

S.C.Malik and Savita Arora, Mathematical Analysis, Third Revised Edition New Age International Pvt. Ltd., New Delhi .
Chapter : 9 , 11 , 12 .

Reference Books :

(1) K.A.Rose , Elementary Analysis : The Theory of Calculus , Springer (SIE) , Indian reprint , 2009 .
(2) R.G.Bartle,D.R.Sherbert ,Introduction to Real Analysis ,Third Edition , Wiley India Pvt.Ltd., New Delhi .
(3) Charles G.Denlinger ,Elements of Real Analysis,Jones and Bartlett (Student Edition),2011

SARDAR PATEL UNIVERSITY , VALLABH VIDYANAGAR
SYLLABUS FOR B.Sc. SEMESTER - 6
US06CMTH25(P) (MATHEMATICS PRACTICAL)
TWELVE HOURS PER WEEK (6 CREDIT)
Effective from June 2020
Marks:-150 (45 Internal + 105 External)

Practical/Lab work to be performed on a computer :
For the Practicals the use of Free Open Source softwares like SAGE, MAXIMA , SCILAB, OCTAVE, Python (with Numpy, SciPy etc.) is recommended.

PART - 1 [Marks:-50 (15 Internal + 35 External)]

Group tables and Permutation group, Finite Fields, Applications of Primality, Polynomials, Divisibility, Factorization and roots, Limit, Differentiation and integration.

PART - 2 [Marks:-50 (15 Internal + 35 External)]

Introduction to Programming and Basic Programming Constructs, User defined functions , Sequences series and power series expansions.

PART - 3 [Marks:-50 (15 Internal + 35 External)]

Programming for finding roots of equations using Numerical methods, Primality testing, G.C.D. and L.C.M., Perfect numbers.

NOTE :

(1) Practical session will be of Twelve hours per week and they will be conducted in batches of students of size 15 to 20 per batch.
(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
SYLLABUS FOR B.Sc.(MATHEMATICS) SEMESTER - 6
USO6DMTH26(T) (MECHANICS - 2)
TWO HOURS PER WEEK (2 CREDIT)
Effective from June 2020
Marks:-50(External)

UNIT-1

Methods of plane dynamics , Motion of a particle , Motion of a system of particles.

UNIT-2

Applications in plane dynamics projectile with and without resistance , Motion under central force , Planetary orbits.

UNIT-3

Kinetic energy of rigid body , Angular momentum of rigid body , Moment of inertia of a rigid body.

UNIT-4

Rotational motion about a fixed line , Impulsive motion , General theory of plane , Collision.

Recommended texts :

J.L.Synge and B.A.Griffith , Principles of Mechanics .
Chapter 5 (5.1,5.2),Chapter 6(6.1,6.2,6.4, 6.5), Chapter 7(7.1,7.2),Chapter 8(8.1,8.2).

Reference Books:

P.N.Chaterjee, Statics and Dynamics.

SARDAR PATEL UNIVERSITY , VALLABH VIDYANAGAR
SYLLABUS FOR B.Sc. SEMESTER - 6
US06DMTH27(T)(OPERATIONS RESEARCH-2)
TWO HOURS PER WEEK (2 CREDIT)
Effective from June 2020
Marks:-50(External)

UNIT-1

Introduction to Assignment Problem, Mathematical formulation of Assignment problem, Hungarian method for finding optimum solution to AP, Unbalanced Assignment Problem, Maximal Assignment Problem

UNIT-2

Elements of Game Theory: Two person zero sum game: Concept, saddle points, Games without saddle points, mixed strategies (Results without proof). Graphical solution of $2 \times n$ and $n \times 2$ game. Dominance property.

UNIT-3

Job Sequencing: Introduction, Solution of Sequencing problem processing with n jobs Through 2 Machines and n jobs Through 3 Machines.

UNIT-4

Project Management by PERT and CPM: Introduction to PERT and CPM, Advantages and Assumptions, Rules for Network construction, Critical Path calculations, Total float, Free float.

Recommended text:

Text Book: Operations Research by S. D. Sharma
Chapter 12 (12.1, 12.2, 12.3, 12.4, 12.5, 12.6, 12.7.1) Chapter 19 (19.1, 19.2, 19.3, 19.4, 19.5, 19.6, 19.7,19.8, 19.9, 19.14, 19.15) Chapter 24 (24.1, 24.2, 24.3, 24.4, 24.5, 24.6) Chapter 25 (25.1, 25.2, 25.3, 25.4, 25.5, 25.6, 25.7, 25.8)

Reference texts:

(1) Operations Research by J.K.Sharma
(2) Operations Research: An Introduction by Hamdy A.Taha
(3) Operations Research by Kanti Swarup and Man Mohan Gupta

SARDAR PATEL UNIVERSITY , VALLABH VIDYANAGAR
SYLLABUS FOR B.Sc. SEMESTER - 6
US06DMTH28(T)(NUMBER THEORY - 2)
TWO HOURS PER WEEK (2 CREDIT)
Effective from June 2020
Marks:-50 (External)

UNIT-1

Linear indeterminate equations and its solution ,General solution of Linear indeterminate equation with three unknown , Pythagoras (Shang-gao indeterminate) equation and its solution.

UNIT-2

Congruences : Definition and examples , Properties of congruences ,Necessary and sufficient condition for a positive integer can be divided by 3,9,4,7,11 or 13 .

UNIT-3

Complete residue system(mod m) and its properties , Reduced residue system(mod m) and its properties , Euler's theorem,Fermat's theorem , Properties of Euler's function .

UNIT-4

Congruence in one unknown , Solution of Linear congruence in one unknown and two unknown, Chinese theorem ,Solution of system of congruences.

Recommended texts :

C.Y.Hsiung, Elementary Theory of numbers, Allied publishers Ltd.(1992)

Reference Books:

(1) D.Burton , elementary Number Theory, 6th Ed , Tata McGraw-Hill Edition,Indian reprint.
(2) I.Niven And H.Zuckermar , An Introduction to the theory of Numbers, Wiley-Eastern Publication.
(3) S.Barnard and J.N.Child , Higher Algebra, Mc Millan and Co. Ltd.
(4) Neville Robinns, Beginning Number Theory , 2nd Ed.,Narosa Publishing House Pvt.Ltd. Delhi,2007

SARDAR PATEL UNIVERSITY , VALLABH VIDYANAGAR
SYLLABUS FOR B.Sc. SEMESTER - 6
US06DMTH29(T)(GRAPH THEORY)
TWO HOURS PER WEEK (2 CREDIT)
Effective from June 2020
Marks:-50(External)

UNIT-1

Graph , Applications of graph , Finite and infinite graph , Incidence and Degree , Isolated vertex , Pendant vertex and null graph , Isomorphism , Sub graphs , Walks , Paths and circuits , Connected and disconnected Graphs , Components .

UNIT-2

Euler graphs , Operation on graph , More on Euler graphs , Hamiltonian paths and circuits , Trees and their properties , Pendant vertices in a tree , Distance and centers in a tree , Counting trees .

UNIT-3

Spanning Trees , Fundamental circuits , Finding all spanning trees of a graph , Cut-sets and their properties , All cut-sets in a graph , Fundamental circuits and cut sets , Connectivity and separability , Network flows .

UNIT-4

First and second isomorphisms , Planer graphs , Kuratowski's Two graphs , Different representations of a planar graphs , Detection of Planarity geometric and combinatorial dual.

Recommended texts :

Narsingh Deo, Graph theory with application to engineering and Computer science, Fourth printing, prentice Hall of India, 1987.
Chapter 1 (except 1.6), chapter 2 (except 2.3,2.10), chapter 3 (except 3.5,3.10), chapter 4 (except4.6) , chapter 5 (except 5.1,5.8,5.9).

Reference Books:

(1) J.Clark and A.D.Holton, A first look at Graph Theory, First Indian Reprint. Allied Publishers,1995.
(2) D.B.West, Introduction to graph theory, Prentice Hall of India, New Delhi, 1999.