

Krantiguru Shyamji Krishna Verma

***Kachchh University***

Mundra Road

**BHUJ : 370 001**



SYLLABUS (CBCS)

**B. Sc. Semester V**

**MATHEMATICS**

CODE: CEMT 507

With effect from June 2018

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**KSKV Kachchh University, Bhuj - Kachchh**  
**Syllabus of Mathematics for CBCS Semester V**

**Name of the Paper : Abstract Algebra I**

**Paper No. : CEMT-507**

**Unit 1**

[ 15 marks ]

Groups, Examples of groups, Elementary properties of a Group, Order of a group, Subgroups, Necessary and sufficient conditions for a subgroup, Intersection of subgroups, Relation  $a \equiv b \pmod{H}$ .

**Unit 2**

[ 15 marks ]

Cosets, Relation between equivalence class of element and the coset, Lagrange's theorem and applications, Permutations, cycles, transpositions, permutation groups, expressing a permutation as a product of transpositions, Even and Odd permutations.

**Unit 3**

[ 15 marks ]

Normal subgroups, Quotient groups, Group tables for quotient groups, Group Isomorphisms, Automorphisms.

**Unit 4**

[ 15 marks ]

Cyclic groups and their properties, Subgroups of a cyclic group, Group Homomorphisms, Properties of Homomorphism, Kernel of a homomorphism, First fundamental theorem of homomorphism

❖ **Reference Books :**

1. Dr. I. H. Sheth, "Abstract Algebra", Published by Prentice Hall of India
2. Bhattacharya P.B., Jain S.K. and Nagpal S.R., "Basic Abstract Algebra", Foundation books, New Delhi.
3. Fraleigh J. B., "A First Course in Abstract Algebra", Narosa Publishing, New Delhi
4. Gallian J.A., "Contemporary Abstract Algebra", Narosa Publishing House, New Delhi
5. Herstein I.N., "Topics in Algebra", Vikas Publishing, New Delhi

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SYLLABUS (CBCS)

**B. Sc. Semester V**

**MATHEMATICS**

CODE : CEMT-508

With effect from June 2018

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**KSKV Kachchh University, Bhuj - Kachchh****Syllabus of Mathematics for CBCS Semester V****Name of the Paper: Mathematical Analysis****Paper No. : CEMT-508****Unit 1 [15 marks]**

Prerequisites: Sets & operations on sets, Functions & their Properties.

Countable sets, Uncountable sets, Real valued Functions, Bounded subsets of  $\mathbb{R}$ .

**Unit 2 [15 marks]**

Sequences of real numbers, subsequence, Limit of sequence, Convergent sequences, Divergent sequences, Bounded sequences, Monotonic sequences, Operation on convergent sequences, Bolzano - Weierstrass Theorem (only statement), Cauchy sequences.

**Unit 3 [15 marks]**

Metric spaces- definition and examples, Limits of sequences in Metric space, Bounded sets in metric space, Limits of Functions in metric spaces (only definition), Continuous functions on metric spaces, open sets in metric spaces, Closed sets in metric spaces.

**Unit 4 [15 marks]**

Complete metric spaces, Properties of complete metric spaces, totally Bounded sets, Compact metric spaces, continuous functions on compact metric spaces.

The course is covered by : “A First course in mathematical Analysis” by D.Somasundaram, B.Choudhary (Narosa Publishing House).

Unit 1 (prerequisites) chapter: 1, Art. 1.1, 1.2

Chapter: 1, Art. 1.3, Art. 1.4 (up to thm: 7) Art 1.5, 1.6

Unit 2 chapter: 2, Art. 2.1 to 2.8, 2.10, 2.11

Unit 3 chapter: 5, Art. 5.1, 5.2, 5.4, 5.5, Art. 5.6 (In this article, only Defn. 1, Defn. 2), Art. 5.7 (omit Thm. 3 and Thm. 4), Art. 5.8

Unit 4 chapter: 6, Art 6.1, 6.2, Art 6.3 (omit thm 3), Art 6.4 (upto thm 4), Art 6.5 (up to thm 6), The theorems with proof : Art 1.3 (thm 1, 2), Art 1.4 (thm 4, 7), Art. 1.5 (thm 1), Art 1.6 (thm 1, 3, 4), Art 2.3 (thm 1), Art 2.6 (thm 1), Art 2.7 (thm 1), Art 2.8 (thm 1), Art 2.11 (thm 1), Art 5.2 (thm 1), Art 5.7 (thm 2), Art 6.2 (thm 1), Art 6.5 (thm 1).

Rest of the theorems' statements are to be discussed thoroughly.

❖ **Reference Books:**

1. Fundamental of Mathematical Analysis -G.Das, S.Pattanayak
2. Principles of Mathematical Analysis -Walter Rudin
3. Mathematical Analysis - T.M.Apostol.

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SYLLABUS (CBCS)

**B. Sc. Semester V**

**MATHEMATICS**

CODE : CEMT-509

With effect from June 2018



**KSKV Kachchh University, Bhuj - Kachchh**

## **Syllabus of Mathematics for CBCS Semester V**

### **Name of the Paper: Operations Research I**

#### **Paper No. : CEMT-509**

##### **Unit 1**

Theoretical Background: Introduction to Operations Research, Formulation of LPP:  
Examples on Production, Marketing, Finance, transportation.  
Examples of Graphical Method

##### **Unit 2**

Examples of Simplex Method to find the solution of the LPP

##### **Unit 3**

Examples of Two phase method to find the solution of the LPP  
Examples of Big – M method to find the solution of the LPP

##### **Unit 4**

Dual of an LPP (Examples to find the dual of a given LPP), Examples of Dual Simplex Method

##### **❖ Reference Books :**

1. Operations Research (Theory and Applications), J. K. Sharma, Third Edition, Published by MACMILLAN INDIA LTD.
2. Mathematical Models in Operation Research by J. K. Sharma-McGraw Hills
3. Linear Programming By G. Hadley- Narosa Publishing House.

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SYLLABUS ( CBCS )

**B. Sc. Semester VI**

**MATHEMATICS**

CODE: CEMT-610

With effect from June 2018

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**KSKV Kachchh University, Bhuj - Kachchh****Syllabus of Mathematics for CBCS Semester VI****Name of the Paper : Abstract Algebra II****Paper No. : CEMT-610****Unit 1****[ 15 marks ]**

Rings: Definition and examples, commutative ring, division ring, unity and unit elements of a ring, Field, properties of a ring, Boolean ring, Finite rings. Integral Domain: Zero divisor, Definition and examples of Integral Domain (Finite and of infinite order), Characteristic of a ring.

**Unit 2****[ 15 marks ]**

Subrings: Definition and examples, necessary and sufficient criterion for subring, Ideals: Definition and examples, necessary and sufficient criterion for ideal, principal ideal ring.

**Unit 3****[ 15 marks ]**

Quotient rings.

Homomorphism: Definition and some examples, Kernel of homomorphism, Isomorphism of rings, Fundamental theorem on homomorphism, homomorphism and characteristic.

**Unit 4****[ 15 marks ]**

Polynomial ring: Introduction and definition of polynomial, degree of polynomial, operation between polynomials, Integral domain  $D[x]$ , different types of polynomials, factorization of polynomials, Division algorithm for polynomials, irreducibility of polynomial over field, Maximal ideals, Prime ideals and their characterization through quotient ring.

**❖ Reference Books:**

1. Dr. I. H. Sheth, "Abstract Algebra", Published by Prentice Hall of India
2. Bhattacharya P.B., Jain S.K. and Nagpal S.R., "Basic Abstract Algebra", Foundation books, New Delhi.
3. Fraleigh J. B., "A First Course in Abstract Algebra", Narosa Publishing, New Delhi
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SYLLABUS (CBCS)

**B. Sc. Semester VI**

**MATHEMATICS**

CODE :USCEMT 611

With effect from June 2018

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KSKV Kachchh University, Bhuj - Kachchh

Syllabus of Mathematics for CBCS Semester VI (wef June 2018)

Name of the Paper :Graph Theory

Paper No. : USCEMT 611

Unit 1 [15 Marks]

The definition of a graph, vertex, edge and loop for a graph, Parallel edges, Isolated vertex, adjacent vertices, simple graph, Graph isomorphism, complete graph, Empty graph, Degree of a vertex, The first theorem of graph theory, Regular graph, Subgraph of a graph, Self complementary graph, Join of two graphs.

Unit 2 [15 Marks]

Walk in a graph, trivial walk, closed and open walks, Trail in a graph, Connected graph, wheel graph, eccentricity of a vertex, radius and diameter of a graph, The adjacency and the incidence matrix of a graph.

Unit 3 [15 Marks]

Tree, Forest, Bridge in a graph, spanning trees, cut vertex of a graph, Vertex connectivity of a graph, internally disjoint paths.

Unit 4 [15 Marks]

Plane and planar graphs, Jordan curve, Face of a graph, Euler's formula, Polyhedral graph, Platonic bodies, the dual of a plane graph.

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The course is covered by : "A first look AT Graph Theory" , John Clark, Derek Allam Holton. (Allied Publishers Limited)

Unit : 1 chapter 1, Art. 1.1, Art.1.3, Art.1.4,1.5.

Unit :2 chapter 1, Art. 1.6, Art.1.7

Unit : 3 chapter 2 Art.2.1, Art.2.2, Art.2.3,2.6

Unit : 4 chapter 5 Art. 5.1,Art. 5.2,5.3,Art.5.6.

The theorems with proof : Art 2.1 (thm 2.1), Art 2.2 (thm 2.8), Art. 2.6 (thm 2.19), Art 5.1 (thm 5.1, 5.2), Art 5.6 (thm 5.16). Rest of the theorems' statements are to be discussed thoroughly.

❖ **Reference Books :**

1. Graph Theory with Applications to engineering and computer science, Narsingh Deo.
2. Introduction to Graph Theory, Robin J. Wilson.
3. Discrete Mathematics and its Applications, Kenneth H. Rosen

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SYLLABUS (CBCS)

**B. Sc. Semester VI**

**MATHEMATICS**

CODE: CEMT-612

With effect from June 2018

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**KSKV Kachchh University, Bhuj - Kachchh**

**Syllabus of Mathematics for CBCS Semester VI**

**Name of the Paper :Operations Research II**

**Paper No. : CEMT-612**

**Unit 1**

Introduction to Transportation problems and assignment problems, Initial feasible solution to Transportation Problems by North – West Corner Method, Lowest Cost Entry Method, VAM Method, comparison of solutions by these three methods.

**Unit 2**

Modi Method for the optimization of the initial feasible solution of the transportation problems, Unbalanced transportation problems (Unbalanced supply and demand)

**Unit 3**

Assignment Problems, Minimization and maximization assignment problem using Hungarian Method to solve Assignment problems.

**Unit 4**

Introduction to Queuing theory, structure of a queuing theory, Calling population characteristics, Queuing process, Queue discipline, basic examples of queuing theory based on single server queuing models.

The course is mainly covered by :

Operations Research (Theory and Applications) ---- J. K. Sharma, Third Edition,  
Published by MACMILLAN INDIA LTD.

**❖ Reference Books :**

1. Mathematical Models in Operation Research by J. K. Sharma-McGraw Hills
2. Linear Programming By G. Hadley- Narosa Publishing House.