

SANKALCHAND PATEL UNIVERSITY, VISNAGAR

Faculty of Science & Humanities



**Structure, Teaching Scheme and Syllabus of
B.Sc. (Honours) Mathematics as per NEP-2020**

Program Code: SC104

With effect from: 2023-24

Semester- III

Branch Name:	B.Sc. Mathematics
Program Code:	SC104
Course Name:	Linear Algebra-I
Course Code:	13-MAM205-2C
Pre-requisite Course:	

Course Objectives:

- To understand the basic concept of Vector Space.
- To understand the concept of Linear Transformations.
- To be able to understand the concept of Inner Product Space.

Teaching and Examination Scheme:

Teaching and Examination Scheme:								
Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	-	2	4	50	25	-	25	100

Subject Contents:

Sr. No	Topic	Total Hours	Weightage (%)
1	Vector Space: Vector spaces, Subspaces, Span of a set, Linear dependence and Independence, Dimension and basis.	15	34
2	Linear Transformations: Definitions and examples, Range and kernel of a linear map, Rank and nullity, Inverse of a linear transformation, The space $L(U, V)$, Composition of linear maps, Operator equations.	15	33
3	Inner Product Space: Definition of inner product space, Norm, Orthogonality, Schwarz's & Triangular inequality, Parallelogram law, Orthonormal basis.	15	33

Reference Books:

1. Vector Analysis, by Murry R. Spiegel.
2. An Introduction to linear algebra, by V. Krishnamurthy, JL Arora, East West Press Pvt Ltd, New Delhi.
3. Linear Algebra, Ramchandra Rao, P. Bhimasankar, Tata Mc Graw Hill.
4. Linear Algebra, S K Berberion, Oxford University Press.
5. Linear Algebra, Sharma and Vashishtha, Krishna Prakashan, Meerut.
6. Linear Algebra, Gupta KP, Pragati Prakshan, Meerut.
7. Linear Algebra, G Paria, New Central book agency Ltd, Calcutta.

List of Open Source Software/learning website:

1. <https://www.youtube.com/watch?v=uU2bT43wPJ8>
2. <https://www.youtube.com/watch?v=Li4PfR7v7n8>
3. <https://www.youtube.com/watch?v=HH2Md3dBlq4>

Practical

1. Application of Vector Space.
2. Application of Linear Transformation.
3. Application of Inner Product Space.

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Use Concept of Vector Space and solve its applications.	3 Applying
CLO2	Discuss Linear Transformations.	2 Understanding
CLO3	Create various types of example depend on Inner Product Space.	6 Creating,
CLO4	Explain Schwarz's & Triangular inequality.	4 Analysing
CLO5	Define Subspaces and Solve examples depend on it.	1 Remembering 3 Applying
CLO6	Justify Linear dependence and Independence.	5 Evaluating

Mapping of CLOs with POs & PSOs:

Course Learning Outcomes	Programme Outcomes (POs)																Programme Specific Outcome (PSOs)			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	PSO1	PSO2	PSO3	PSO4
CLO1		1		2	1				1								2			
CLO2	2	1	1	1			1		1								1	1		
CLO3	1	3	3	2	1	1	1			1							1	1		2
CLO4	1	2	1				2		2								1			2
CLO5		1		2	1				1								2			
CLO6		1		1	2	1		1		1							1	1		3

3: High, 2: Medium, 1: Low

Branch Name:	B.Sc. Mathematics
Program Code:	SC104
Course Name:	Numerical Analysis
Course Code:	13-MAM206-2C
Pre-requisite Course:	

Course Objectives:

- To understand concept of Finite Differences Table and Theory of Interpolation.
- To understand the basic concept of Interpolation for Equal and Unequal Interval.
- To know about Numerical Differentiation and Integration.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	--	2	4	50	25	--	25	100

Subject Contents:

Sr. No	Topic	Total Hours	Weightage (%)
1	Finite Differences table and theory of Interpolation: Introduction of Interpolation and Extrapolation, Ascending and Descending differences, Symbolic operators, Difference polynomials, Gregory- Newton's Forward and backward interpolation formula.	15	34
2	Interpolation for Equal and Unequal Intervals: Newton's divided difference interpolation formula, Lagrange's interpolation formula and its examples. Central Difference Formula: Gauss's Forward and Backward Interpolation Formula, Sterling's Formula.	15	33
3	Numerical Differentiation and Integration: Numerical differentiation using Newton Cote's Method, Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8th rule.	15	33

Reference Books:

1. Numerical Methods in Engineering and Science, Dr B.S Grewal, Khanna Publication.
2. Numerical Analysis and Computational Procedures, S.A Mollah, New Central Book Agency, Calcutta.
3. Numerical Analysis, Kunz, McGraw Hill
4. Methods in Numerical Analysis, K.W Nelson, Mac Millan.
5. Numerical Methods, Dr. N.Ch., S.N. Iyenger, Dr V.N. Vedomurthy, Vikas Publishing House Pvt. Ltd

List of Open Source Software/learning website:

1. https://www.youtube.com/watch?v=j5h-rFoiBgI&list=PLq-Gm0yRYwTizWtb_xwk0KEMzcoeLbOZq&index=2
2. <https://www.youtube.com/watch?v=-m0VofKtRwM>
3. <https://www.youtube.com/watch?v=5817fLmsTGE>

Practical

1. Application of Finite Differences Table and Theory of Interpolation.
2. Application of Interpolation for Equal and Unequal Interval.
3. Application of Numerical Differentiation and Integration.

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Explain Finite Differences Table and Theory of Interpolation.	4 Analysing
CLO2	Discuss Basic concept of Interpolation for Equal and Unequal Interval.	2 Understanding
CLO3	Justify Simpson's $1/3$ rule and Simpson's $3/8$ th rule.	5 Evaluating
CLO4	Describe Ascending and Descending differences.	1 Remembering
CLO5	Solve the example of Gregory- Newton's forward and backward interpolation formula.	3 Applying
CLO6	Create an example of Gauss's Forward and Backward Interpolation Formula.	6 Creating

Mapping of CLOs with POs & PSOs:

Course Learning Outcomes	Programme Outcomes (POs)																Programme Specific Outcome (PSOs)			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	PSO1	PSO2	PSO3	PSO4
CLO1	1	1		1	2				2								1	2		2
CLO2	1		1		1		1		2	1							1		1	
CLO3	1	3	1		2				1	1							1		2	3
CLO4	1	1		1			1		1	1								1		
CLO5	1	3	2	1	1	1			1	2							1	1	2	1
CLO6	1	2	3		1	2			2								1	1		2

3: High, 2: Medium, 1: Low

Branch Name:	B.Sc. Mathematics
Program Code:	SC104
Course Name:	Calculus
Course Code:	13-MAM207-2C
Pre-requisite Course:	

Course Objectives:

- To understand concept of Improper Integral.
- To understand the basic concept of Multiple Integral.
- To know about Limit, Continuity and Partial Derivatives.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	--	2	4	50	25	--	25	100

Subject Contents:

Sr. No	Topic	Total Hours	Weightage (%)
1	Limit, Continuity and Partial Derivatives: Function of several variables, their limits and continuity, partial derivatives, Differentiability and differential, Derivatives of implicit functions and applications.	15	34
2	Improper Integral : Beta function and Gamma function, Convergence of Beta function and Gamma function, Relation between them, Its Simple properties and applications.	15	33
3	Multiple Integral: Double Integral, Integral on non rectangle regions, transformation to polar Co-ordinate, Change of the order of integration, Triple integration, transformation to polar and cylindrical co-ordinate.	15	33

Reference Books:

1. Integral Calculus, Shantinirayan S. Chand, New Delhi (Course Book)
2. Advanced Calculus, D V Widder , Prentice Hall , New Delhi
3. Advanced Calculus Vol : I & II, T M Apostol, Blaisdoll
4. Advanced Calculus, R C Buck, MacMillan.

List of Open Source Software/learning website:

1. <https://www.youtube.com/watch?v=C3PmT6oNEew>
2. <https://www.youtube.com/watch?v=POxgfiSd9AM>
3. https://www.youtube.com/watch?v=6tQTRlbkbc8&list=PLtKWB-wrvn4nA2h8TFxzWL2zy8O9th_fy&index=5

Practical

4. Application of Improper Integral.
5. Application of Multiple Integral.
6. Application of Limit, Continuity and Partial Derivatives.

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Explain Improper Integral.	4 Analysing
CLO2	Discuss Multiple Integral.	2 Understanding
CLO3	Justify Limit, Continuity and Partial Derivatives of different types of functions.	5 Evaluating
CLO4	Describe Integral on non rectangle regions	1 Remembering
CLO5	Use Beta function and Gamma function and solve the example of its.	3 Applying
CLO6	Create an example Derivatives of implicit functions.	6 Creating

Mapping of CLOs with POs & PSOs:

Course Learning Outcomes	Programme Outcomes (POs)																Programme Specific Outcome (PSOs)			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	PSO1	PSO2	PSO3	PSO4
CLO1	1			2	1				2								1			1
CLO2	1	2		2	1				2								2			1
CLO3	1	1	1		1	1				2							2		1	1
CLO4		1		2	1		1		1								1	1		
CLO5	1		1	1			1		1									1		1
CLO6	1	3	3		1	1	1			1							2		1	2

3: High, 2: Medium, 1: Low

Branch Name:	B.Sc. Mathematics
Program Code:	SC104
Course Name:	Material Physics and Quantum Mechanics
Course Code:	13-MDC234-2C
Pre-requisite Course:	

Course Objectives:

- To understand the basic concept of atomic cohesion and crystal binding
- To understand the kinetic theory of gases
- To understand the Basic concepts of Quantum Mechanics

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	--	2	4	50	25	--	25	100

Subject contents:

Sr. No.	Content	Lectures	Weightage
1	Quantum Theory: Historical origin of quantum theory, difficulties with classical: models, optical spectra Black body radiation, frank-Hertz experiment, stationary states of atoms. The correspondence principal. Bohr atom, Spectroscopic series, quantization of the orbits. The elliptic orbits, Particle in a box, rigid rotator, harmonic oscillator, short coming of a old quantum theory, Compton effect, Particle diffraction, wave packets and Einstein de broge realtion	15	33%
2	Atomic Cohesion and Crystal Binding: Cohesion of Atoms, Primary Bonds, The Covalent Bond, The Metallic Bond, The Ionic Bond, Mixed Bond, Secondary Bonds, The Vander wall's Bond, The Hydrogen Bond, The Cohesive Energy, Ionic Crystal, Noble Gas Crystal, Atomic Radii vs Lattice constants, Elastic constants of crystals, Elastic Stress, Elastic Energy density, Application to Cubic crystal, Bulk modulus and compressibility.	15	33%
3	Heat and Thermodynamics: Reversible part of the second law (Clausius theorem), Entropy, entropy of the ideal gas, TS diagram, application of the entropy of ideal gas, TS diagram, Application of the Entropy Principle. Pure substances: Volume expansivity: cubic Expansion Coefficient, Compressibility, Mathematical methods in thermodynamics: Characteristic Functions, Enthalpy, Helmholtz & Gibbs functions, two mathematical theorems, Maxwell relations, Tds equation, Internal energy equations, Heat energy equations, Heat capacity equations. Open system: Joule-Thomson expansion, Liquification of gases by the Joule Thomson Expansion.	15	34%

Basic Reference book:

1. Introduction to solid state physics by C.Kittel(john Wiley)
2. Elements of solid state State Physics J.Psrivastava
3. Thermodynamics and Statistical Physics by Singhal, Agarwal and Prakash.
4. Physics- 301 semester 3 Nirav Prakashan

Physics Practical:

1. Coaxial Viscometer
2. To determine wave length of bright lines of mercury light Using Grating
3. R.P. of telescope
4. Searls Gonometer. Determination of cardinals Points and “do”
5. To Determine the high Resistance by equal method
6. To study bandwidth response of R C coupled commom emitter (CE) Amplifier
7. Absolute Value of Capacity using B.G or S.G (spot Galvanometer)
8. To study elliptically polarized light using photo cell and quarter wave (Length) Plate

List of Open Source Software/learning website:

1. <https://www.youtube.com/watch?v=8jpqPu59edI&list=PL88pFy>
2. <https://www.youtube.com/watch?v=2WPA1L9uJqo>

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Describe the knowledge on the cohesion of atoms and crystal bimding	1 Remembering
CLO2	Discuss quantum theory	2 Understanding
CLO3	Solve the numerical related on internal energy of an ideal gas depends on its temperature.	3 Applying
CLO4	Explain the Heat and thermodynamics.	4 analyzing
CLO5	Justify the Joule Thomson Expansion.	5 evaluating
CLO6	Design the refrigerator on the base of thermodynamics	6 creating

Mapping of CLOs with POs & PSOs:

Course Learning Outcomes	Programme Outcomes (POs)																Programme Specific Outcome (PSOs)			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	PSO1	PSO2	PSO3	PSO4
CLO1		2																		
CLO2			1																	
CLO3					3															
CLO4					2															
CLO5		1																		
CLO6										2										

3: High, 2: Medium, 1: Low

Branch Name:	B.Sc. Mathematics
Program Code:	SC104
Course Name:	Statistic-I
Course Code:	13-MDC239-2C
Pre-requisite Course:	Basics of Statistics

Course Objectives:

- To understand concept of Population Census.
- To understand the basic concept of Demography Methods.
- To know about Time Series.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	--	2	4	50	25	--	25	100

Subject Contents:

Sr. No	Topic	Total Hours	Weightage (%)
1	Population Census: Methods of population census and it uses. Study of India's population census. Limits of population census. Meaning and scope of demography, use of demographic statistics.	15	34
2	Demography Methods: Method of collecting demographic statistics: Death rates, Crude Death Rate (C.D.R.) and Standardized Death Rate (S.D.R.) Examples to find C.D.R., S.D.R., and to compare the healthiness of cities. Meaning of Infant Mortality Rate (I.M.R.), Crude Birth Rate (C.B.R.), Meaning of fertility rate, General Fertility Rate (G.F.R.), Specific Fertility Rate (S.F.R.) and total fertility rate (T.F.R.), Simple examples.	15	33
3	Time Series: Meaning of Time series, various components of time series: Trend, Seasonal, Cyclic and Random components. Methods of measuring Trend by (a) Graphical method (b) Moving average method, (c) Least squares method. Concept of principle of least squares, Curve fitting of linear and quadratic, functions by the principle of least squares and to estimate or to obtain trend for simple numerical data. Seasonal indices and simple examples to obtain seasonal indices.	15	33

Reference Books:

1. S.C.Gupta & V.K.kapoor :Fundamental of applied statistics Sultan chand & sons New delhi.
2. Sancheti & Kapoor: Business Mathematics”Sultan chand & Sons,New delhi.
3. Kapoor V.K.: Business Mathematics”Sultan chand & Sons,New delhi.
4. parimal Mukhopadhyay:Mathematical Statistics” Books & allied (p) Ltd.

List of Open Source Software/learning website:

1. https://www.youtube.com/watch?v=pgmRT8VBwRA&list=PLFW6lRTa1g80WOAEi_LA2IK_eUlzEQq
2. https://www.youtube.com/watch?v=_TKyWF31axQ
3. https://www.youtube.com/watch?v=IS_kv40uDpc

Practical

7. Application based on Population Census.
8. Application of Demography Methods.
3. Application of Time Series.

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Explain concept of Population Census.	4 Analysing
CLO2	Discuss Demography Methods.	2 Understanding
CLO3	Justify Crude Death Rate (C.D.R.) and Standardized Death Rate (S.D.R.)	4 Analysing
CLO4	Describe scope of demography and Time Series.	1 Remembering
CLO5	Solve example depend on Least squares method.	3 Applying
CLO6	Create an example of Population Census, Demography Methods and Time Series.	6 Creating

Mapping of CLOs with POs & PSOs:

Course Learning Outcomes	Programme Outcomes (POs)																Programme Specific Outcome (PSOs)			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	PSO1	PSO2	PSO3	PSO4
CLO1		1		1				1			1							1		
CLO2	1		1		1					1									1	
CLO3	1	2			2	1			1	1								1		
CLO4	1		1		1					1							1			
CLO5	1			1	2		1		1	1							1	2		1
CLO6	1	1	2	1	1	2			1	2							1	2	1	

3: High, 2: Medium, 1: Low

Branch Name:	B.Sc. Mathematics
Program Code:	SC104
Course Name:	Grammar and Communication Skill-1
Course Code:	13-AEC-203-2C
Pre-requisite Course:	Basics English Grammar Basics English up to F.Y.B.Sc.

Course Objectives:

- To inculcate human values among the students through poems and prose.
- To create an interest in literature and to develop language skills.
- The students will become familiar with formal vocabulary that is common in academic texts.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
2	--	--	2	25	25	--	--	50

Subject Contents:

Sr. No	Topic	Total Hours	Weightage (%)
1	VOCABULARY&GRAMMARLINK Phrasal Verbs, Antonyms, Synonyms, Misspelled Words , Part Of Speech:- Noun, Pronoun, Verb, Adverb, Articles :- A, An ,The etc.	9	30%
2	SPEAKING Dialogues Writing:- 1.A dialogue between a doctor and a patient 2.A dialogue between a teacher and a student about studies 3.A dialogue between a country child and a town child 4.A dialogue between mother and daughter about studies 5.A dialogue between a shopkeeper and a customer 6.A dialogue between a traffic warden and a taxi driver 7.A dialogue between the two friends about the choice of profession	6	20%
3	READING&WRITING Letter writing (Personal & Business Letters) and invitations, Telegrams and noti Paragraph Writing. Translation:- Translate the Accident/Incident Paragraphs given by your teacher from the English News Papers (Teacher has to give small paragraphs at least 5 to 6 paragraphs or morethan that for the entire semester based on especially from the pages no. 3 & 4 of The Times of India)	6	20%
4	TEXT Glimpses of Life-An Anthology of Short Stories (Orient Black Swan) Lesson 3 to 7	9	30%

Text Books:

1. Glimpses of Life-An Anthology of Short Stories (Orient Black Swan)
2. Easy to learn English grammar by Dr.Jayesh Patel

Reference Books:

1. Very Useful Verbs book (Enka Publication)
2. Contemporary English Grammar Structure & Composition
3. Murphy R. Intermediate English Grammar(New Delhi: Cambridge University)
4. The Art of Public Speaking by Vijay Kumar.
5. The Times of India/The Indian Express 6. Business Correspondence and Report Writing by R.C Sharma & Krishna Mohan.

List of Open Source Software/learning website:

1. englishpage.com
2. epaper.timesofindia.com
3. epaperindianexpress.com
4. <https://www.youtube.com/watch?v=QdAgyD4xhY>

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Describe how public speaking can be used to advocate or create change	1 Remembering
CLO2	Explain the goals and benefits of public speaking	2 Understanding
CLO3	Use parallel structures correctly and effectively.	3 Applying
CLO4	Identify strategies for researching and supporting a speech	4 Analyzing
CLO5	Recognize when to use visual aids	3 Applying
CLO6	Describe how public speaking can be used to advocate or create change	6 Creating

Mapping of CLOs with POs & PSOs:

Course Learning Outcomes	Programme Outcomes (POs)																Programme Specific Outcome (PSOs)			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	PSO1	PSO2	PSO3	PSO4
CLO1	2					3					2					3				
CLO2		1			2		1			3		1			2					
CLO3			3					2					2			2				
CLO4		2					2					2								
CLO5					2					2					2					
CLO6	1					1					1					2				

3: High, 2: Medium, 1: Low

Branch Name:	B.Sc. Mathematics
Program Code:	SC104
Course Name:	Vaccum Pump, Pressure Guage and Instruments
Course Code:	13-SEC210-2C
Pre-requisite Course:	Basic concept of instruments used in laboratory.

Course Objectives:

- To Develop and actual understanding about various Instruments
- To Know the Basic Application of Instruments
- To Know the working of electrical instruments in Laboratory

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
2	--	--	2	25	25	-	-	50

Subject Contents:

Sr. No.	Topic	Total Hours	Weightage
1	Vacuum Pumps, Pressure Guages: Exhaust Pumps and their characteristics, Rotary Oil Pumps, Molecular Pump, Diffusion Pump, Other methods of Producing Low Pressures, Pressure Gauges - McLeod Gauge, Pirani Gauge, Thermocouple Gauge, Ionization Gauge, Errors in measurement: Errors of observations, Types of errors, Normal law of errors, Average, standard and probable errors, Percentage error.	15	50%
2	Instrument: Travelling Microscope, Cathetometer, and Optical bench. Objective and Eyepiece, Kellner's Eyepiece, Huygens Eyepiece, Ramsden Eyepiece, Comparission of Ramsden Eyepiece and Huygens Eyepiece, Gauss Eyepiece, Telescopes, Refracting Astronomical Telescope, Reflecting Telescope, Newton's Telescope, Other reflecting Telescopes. Electrical Instruments: Moving coil Galvanometer, Ballistic Galvanometer, Calibration of Ballistic Galvanometer using different methods, Multimeters, Digital multimeter, Earphone and Headphone. Basic Reference	15	50%

Reference Books:

1. An Advanced Course in Practical Physics by D.Chattopadhyay, P.C. Rakshit, B.SAHA, New Central Book Ltd.
2. A text book of OPTICS by Dr. N, Subrahmanyam, Brijlal, Dr, M,N, Avadhanulu S.Chand.
3. Mechanics by D.S. Mathur S.Chand. (For Vacuum pumps)

List of Open Source Software/learning website:

1. <https://youtu.be/1OI-O1UcqoM>
2. <https://youtu.be/MmlpgjuMRjY>
3. <https://youtu.be/YIUHndbwnZE>

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Describe the vaccum pumps and pressure gauge.	1 Remembering
CLO2	Discuss the various optical instruments used in practicals	2 Understanding
CLO3	Solve the errors in measurements.	3 Applying
CLO4	Explain various meters used in practicals.	4 Analyzing
CLO5	Justify the usage of various galvanometers in practicals.	5 Evaluating
CLO6	Design various vaccum pumps.	6 creating

Mapping of CLOs with POs & PSOs:

Course Learning Outcomes	Programme Outcomes (POs)																Programme Specific Outcome (PSOs)			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	PSO1	PSO2	PSO3	PSO4
CLO1		2																		
CLO2			1															1		
CLO3	3																1			
CLO4			2														1			
CLO5			2																1	
CLO6			3																	

3: High, 2: Medium, 1: Low

Branch Name:	B.Sc. Mathematics
Program Code:	SC104
Course Name:	Business Mathematics-III
Course Code:	13-SEC211-2C
Pre-requisite Course:	

Course Objectives:

- To understand the concept of Logic and Set Theory.
- To understand the basic concept of Permutation and Combinations.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
2	--	--	2	25	25	--	--	50

Subject Contents:

Sr. No.	Topic	Total Hours	Weightage (%)
1	Logic: [only examples] Logical Statements, Truth table, Negation, Compound statements, Tautologies and Contradiction, Negation of Compound statements, Propositions, Conditional and Biconditional statements. Set Theory: [only examples] Definition and methods of sets, types of sets, Venn diagrams, Operations on sets, De-Morgan's law, Finite and infinite sets.	15	50
2	Permutations and Combinations: [only examples] Fundamental rules of counting, Definition of Permutations and Permutation of n different things, Permutation of repeated things, Circular Permutation, Definition of Combination standard results and examples.	15	50

Text Books:

1. HSC, Gujarat State Board.

Reference Books:

1. Business Mathematics by. D.C.Sancheti & V.K.Kapoor, Sultan Chad & Sons Publication, New Delhi.
2. Business Mathematics by. B.S.Shah Prakashsan, Ahmedabad.

List of Open Source Software/learning website:

1. <https://www.youtube.com/watch?v=6kYngPvoGxU>
2. <https://www.youtube.com/watch?v=tnF9f3zCCKI>

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Explain basic concept of Logic.	2 Understanding
CLO2	Discuss basic concept of Set Theory.	2 Understanding
CLO3	Solve example depend on Permutations.	3 Applying
CLO4	Describe Combinations.	1 Remembering
CLO5	Discuss Logical Statement and solve example of its.	2 Understanding 3 Applying
CLO6	Explain Circular Permutations.	4 Analysing

Mapping of CLOs with POs & PSOs:

Course Learning Outcomes	Programme Outcomes (POs)																Programme Specific Outcome (PSOs)			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	PSO1	PSO2	PSO3	PSO4
CLO1	1	2	1		1	1	1	1		1							1	1		1
CLO2	1	1	2		1		1			1	1					1	1	1		
CLO3	1	2	1		1								1				1	1		
CLO4	1	1	1		1								1				1	1		
CLO5	2	1	1			1	1	1		1							1	1		
CLO6	1	2	1		1								1				1			

3: High, 2: Medium, 1: Low

Branch Name:	B.Sc. Mathematics
Program Code:	SC104
Course Name:	Vedic Mathematics
Course Code:	13-IKS102-2C
Pre-requisite Course:	

Course Objectives:

- To understand the basic concept of Subtraction by Mental Calculation.
- To understand the concept of Multiplication by Mental Calculation.
- To be able to understand the Mental Calculation and Questions of Reasoning.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
-	-	4	2	--	--	25	25	50

Course Contents:

Unit	Topic	Total Hours	Weightage
1	Complement, Subtraction and Multiplication by specific numbers. - Complement of number - Starting Complements from the Middle of the Sum. - Leaving Complements in the middle of the Sum. - Some special and general case of subtraction. - Multiplication by 11 & 12 & 9 Key Words: Subtraction, Complement, Multiplication.	30	50%
2	Multiplication and Working Base Multiplication - Base Multiplication. - Multiplication of Numbers more than the Base. - Multiplication of One more and one less than the base number. - Working Base Multiplication. - Multiplication of 2, 3, 4 Digit number. Key Words: Multiplication, Base, Working base.	30	50%

Reference Books:

- 1) Vedic Mathematics for All Ages by Vandana Singhal: Motilal Banarsidass Publisher private limited-Delhi, 2008.
- 2) Vedic Mathematics by Bharti KrishnaTirthji Maharaj : Motilal Banarsidass Publisher private limited-Delhi, 1965.

List of Open Source Software/learning website:

1. https://www.youtube.com/watch?v=eyLsbv8E4Kg&list=PLVLoWQFkZbhUFSIAjbWPVv_mlAAX8BBD1
2. <https://www.youtube.com/watch?v=X98TJRMZRk&pp=ygUzc3VidHJhY3Rpb24gYW5kIG11bHRpcGxpY2F0aW9uIGJ5IHZlZGljIG1hdGh1bWF0aWNz>