

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- IV

Branch Name:	B.Sc. Mathematics
Program Code:	SC104
Course Name:	Group Theory
Course Code:	14-MAM208-2C
Pre-requisite Course:	

Course Objectives:

- To understand the concept of Group.
- To be able to understand concept of Transportation and Cycle.
- To understand concept of Kernel of Homomorphism.

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	Definition of a Group and illustrations, Elementary property of a Group, Equivalent definitions of a Group, Generalized form of Associative Law, Finite Groups and their tables, Definition of a Subgroup and illustrations, Lagranges theorem and its applications.	14	34
2	Definition of a Permutation and illustrations, Transpositions and cycle, definition of a Normal subgroup and illustrations, Quotient group, Definition of an isomorphism of a group and its illustrations.	13	33
3	Properties of a cycle groups, Isomorphism of cyclic groups, Subgroup of a cycle group, Generator of a cycle group, Definition of a Homomorphism and its illustrations, Kernel of Homomorphism, Cayley's Theorem, Isomorphism of group, Groups of order four and six.	13	33

Reference Books:

1. Abstract Algebra, I H Sheth, Prentice Hall of India (PHI) Publication.
2. Topics in Algebra, I N Herstein, Wiley Eastern Ltd.
3. Basic Algebra Vol I & II, N. Jacobson, Hindustan Publishing company.
4. A text book of Modern Algebra, Shanti Narayan, S. Chand & Co.
5. Basics Abstract Algebra, (second Edition), P.B.Bhattacharya, S.K.Jain, S R Nagpal, Cambridge University Press.
6. University Algebra, N.S. Gopalkrishna, Wiley Eastern, New Delhi
7. Algebra, MacLane Saunders and Birkhoff Garrett, MacMillan, New York.
8. Introduction to Topology and Modern Analysis, G.F.Simmons, MacGraw Hill Inc., U.S.A.
9. Abstract Algebra, 3rd addition, Devid S. Dummit, Richard M. Foote, John Wiley & Sons.inc

List of Open Source Software/learning website:

1. <https://www.youtube.com/watch?v=JGBBEPLHXYU>
2. <https://www.youtube.com/watch?v=ePALDom47TQ>
3. <https://www.youtube.com/watch?v=FvRevDhelkA>

Practical

1. Application of Group and Subgroup.
2. Application of Lagrange's theorem.
3. Application of Permutation, Transpositions and cycle.
4. Application of Normal subgroup.
5. Application of Homomorphism of group.
6. Application of Isomorphism of group.
7. Application of Cyclic of group.

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

CLO	Description	Bloom's Taxonomy Level
CLO1	Use Group Theory and solve its applications.	3 Applying
CLO2	Discuss Permutation, Normal subgroup and Quotient group.	2 Understanding
CLO3	Create various examples of Homomorphism.	6 Creating,
CLO4	Justify Group and Subgroup.	5 Evaluating
CLO5	Describe Isomorphism of cyclic groups.	1 Remembering
CLO6	Explain Cayley's Theorem.	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	1		1				1								1	1		
CLO2	1		1	1	2		1		2								2	1		
CLO3	1	3	3	1	2	1	2		1	1							2	1		2
CLO4	1	2		1	2	1	1		1								1			1
CLO5	1	1		1					1								1			
CLO6		1		1	1												1			

3: High, 2: Medium, 1: Low

Branch Name:	B.Sc. Mathematics
Program Code:	SC104
Course Name:	Linear Algebra-II
Course Code:	14-MAM209-2C
Pre-requisite Course:	

Course Objectives:

- To understand the concept of Matrices of a Linear Transformation.
- To understand the concept of Linear Functional and Duality.
- To be able to know about Eigen Values and Eigen Vectors.

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	Matrices of a Linear Transformation: Definition of a Matrix of a linear transformation, Linear Transformation associated with a matrix, the dimension of $L(U, V)$, and its determination, Rank and Nullity of a Matrix, invertibility of system of linear equations.	14	34
2	Linear Functional And Duality: Definition of linear functional and its examples, Definition of Dual space and Dual basis and its examples, Adjoint of a linear operator, its properties and examples.	13	33
3	Eigen Values And Eigen Vectors: Eigen values and Eigen vectors of a linear transformation, Characteristic polynomial, Cayley – Hamilton theorem, Finding inverse of a matrix using C–H theorem, minimal polynomial deductions.	13	33

Reference Books:

1. An Introduction to Linear Algebra' by V. Krishnamurthy, V P Mainra, J L Arora, Affiliated East-west Press Pvt Ltd., New Delhi
2. Linear Algebra , Ramchandra Rao, P. Bhimasankar, Tata MacGrawHill.
3. Topics in Algebra, I N Herstein, Wiley Eastern Ltd.
4. Linear Algebra, S K Berberion, Oxford University Press.
5. Linear Algebra Problem Book, P R Holmes, Cambridge University Press.
6. Linera Algebra, Sharma and Vashishtha, Krishna Prakashan, Meerut.
7. Linear Algebra, Gupta K P, Pragati Prakashan, Meerut.
8. Linear Algebra, G Paria, New Central book agency Ltd, Calcutta.
9. Surekh Bij Ganit, I H Sheth, University Granth Nirman Board (Gujarati).

List of Open Source Software/learning website:

1. <https://www.youtube.com/watch?v=CeqNHmkLn2w>
2. <https://www.youtube.com/watch?v=PocfxH03Dgs>
3. <https://www.youtube.com/watch?v=RAHTb-TJWQs>

Practical

1. Application of Matrices of a Linear Transformation.
2. Application of Linear Functional and Duality.
3. Application of Eigen Values and Eigen Vectors.

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

CLO	Description	Bloom's Taxonomy Level
CLO1	Discuss Matrices of a Linear Transformation and Solve applications of its.	2 Understanding 3 Applying
CLO2	Describe Linear Functional and Duality.	1 Remembering
CLO3	Explain Eigen Values and Eigen Vectors.	4 Analysing
CLO4	Justify Rank and Nullity of a Matrix.	5 Evaluating
CLO5	Describe Dual space and Dual basis and Solve its examples	1 Remembering 3 Applying
CLO6	Create an example of linear functional.	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		2	1				2								1			
CLO2		1		1	1		1		1								1			
CLO3	1	1		2	1				1								1	1		
CLO4	1	2	1	1	1	1			1								1			2
CLO5		1		1	1		1		1								1			
CLO6		1	3		1	1	1		1	1							1	1	1	

3: High, 2: Medium, 1: Low

Branch Name:	B.Sc. Mathematics
Program Code:	SC104
Course Name:	Differential Equations
Course Code:	14-MAM210-2C
Pre-requisite Course:	

Course Objectives:

- To understand the concept of C.F and P.I.
- To be able to understand concept of exactness of the linear differential equations.
- To understand concept of Method of variation of Parameters.

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	Formation of Differential Equations, Symbolic Operator, Method of finding C.F., Symbolic Operator $1/f(D)$, Method of finding P.I., Shorter method of finding P.I., To find P.I. when $X=e^{ax}$, where a is constant, To finding P.I. when $X=\cos ax$ or $\sin ax$, To find the value of $1/f(D).x^m$, where m is positive integer, To find the value of $1/f(D).(e^{ax}V)$, where a is constant and V is a function of x. To evaluate $1/f(D).(XV)$, where V is a function of x.	14	34
2	Condition of Exactness of the linear differential equations, Solution of non-linear equations which are Exact, Equations of the form $y^{(n)}=f(x)$, Equations of the form $y^{(2)}=f(y)$, Equation do not contain x or y directly, Equation in which y appears in only two derivatives whose orders differ by two, Equation in which y appears in only two derivatives whose order differ by unity.	13	33
3	Method of solving $y^{(2)}+Py^{(1)}+Qy=R$ when an integral included in the C.F. is known, Method of solving $y^{(2)}+Py^{(1)}+Qy=R$ by changing the dependent variable, $y^{(2)}+Py^{(1)}+Qy=R$ by changing the independent variable, Solution by factorization of the Operator, Method of variation of Parameters, Method of Undetermined Co-efficient.	13	33

Reference Books:

1. Erwin Kreyszing, Advanced Engineering mathematics, By. John Wiley & Sons Inc. New York, 1999.
2. D.A.Murray, Introductory course on Differential Equations, By. Orient Longman,(India), 1967.
3. A.R.Forsyth, A Treatise on Differential Equations, Macmillan and Co.Ltd., London.
4. I.N. Sneddon, Elements of partial Differential Equations, McGraw-Hill Book Company, 1998.
5. Francis B. Hilderbrand, Advanced Calculus for Application, Prentice Hall of India Pvt. Ltd., New Delhi, 1977.
6. Jane Cronin, Differential Equations, Marcel Dekkar, 1994.
7. Frank Ayres, Theory and Problems of Differential Equations, McGraw-Hill Book Company, 1972.

List of Open Source Software/learning website:

1. <https://www.youtube.com/watch?v=U3QLQCIVW-4>
2. <https://www.youtube.com/watch?v=-sGXl7aw7xs>
3. <https://www.youtube.com/watch?v=xyFL-xYwi6Q>

Practical

1. Applications of Complimentary Function and Particular Integral for Differential Equations.
2. Applications of Exact linear differential equations.
3. Applications of Exact Non linear differential equations.
4. Application of Equation do not contain y directly.
5. Application of Equation do not contain x directly.
6. Application of Equation in which y appears in only two derivatives whose order differ by unity.
7. Application of second order linear differential equation by changing dependent and independent variable.
8. Application of factorization of the Operator.
9. Application of variation of Parameters.
10. Application of Undetermined Co-efficient.

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

CLO	Description	Bloom's Taxonomy Level
CLO1	Solve Differential Equations.	3 Applying
CLO2	Discuss Exactness of Differential Equations.	2 Understanding
CLO3	Create various examples of Equation do not contain x or y directly.	6 Creating,
CLO4	Justify Method of variation of Parameters and Undetermined Co-efficient.	5 Applying
CLO5	Find P.I. of different types of functions.	1 Remembering
CLO6	Explain Method of solving $y^{(2)} + Py^{(1)} + Qy = R$ when an integral included in the C.F. is known.	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	1			1	1	1										2	1		
CLO2	1			2			2		1								1			1
CLO3		2	3	1	1		1		1	1							1	1		
CLO4	1	2		1	1	1	1			1							2			2
CLO5		1			1	1	2										1	1		
CLO6	2	1			1		2										2			1

3: High, 2: Medium, 1: Low

Branch Name:	B.Sc. Mathematics
Program Code:	SC104
Course Name:	Mathematical & Quantum Physics
Course Code:	14-PHE203-2C
Pre-requisite Course:	

Course Objectives:

- To understand the basic concept of Mathematical physics
- To know the basic concept of equation of classical mechanics
- To understand the use of Schrödinger equations in various fields.

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	Total Hours	Weightage
1	Classical Mechanics: Equation of motion (a) Motion Under constant Force(b) Motion under a force which depend on time only(d) Case(1) Motion of Particle subjected to Resistive force Case (2) Motion of Particle falling under the action of gravity near the surface earth , Mechaics of system of Particles, Angular Momentum of the system, (a)Energy of the system, (b)Kinetic energy of the system,(c)Motion of system with variable mass, Related Examples	15	33%
2	Physical Interpretation and Condition on 'Ψ': Conservation of Probability, Expectation values, Ehrenfest's Theorem, Admissibility Condition on the Wave function. Stationary States and Energy Spectra Stationary states: The time Independent Schrödinger Equation, A particle in a square well potential, Bound States in a square well ($E > 0$), The square well: Non localized states ($E > 0$).	15	34%
3	Fourier series: Introduction, Periodic functions, Application of Fourier series, Average values of a function, Fourier Co-efficient , Diriclet's conditions, Complex form of Fourier series, Perseval Theorem. Related examples	15	33%

Basic Reference book:

1. Introduction to classical mechanics by R.G Takwalwe and P.S.Purani.
2. Element of properties of metal By D.S Mathur
3. Quantum mechanics by P M Mathews
4. Mathematical Physics by B.D.Gupta
5. Physic Paper 402. Semester 4 Nirav Prakashan

Physics Practical:

1. Resonance Pendulum. Determination of 'l', 'r' & 'a'
2. Study of X-ray diffraction(Powder) Pattern
3. Decay of Temperature when body is allowed to cool.(thermocouple)
4. To study Characteristics of UJT. Plot graph V_E - I_E
5. Low resistance by projection method.
6. To find the wave length of given monochromatic Source (newton ring)
7. To find the frequency response of a R.C Coupled emitter
8. Melde experiments(i) to prove p^2 Constant

List of Open Source Software/learning website:

1. <https://www.youtube.com/watch?v=OKn6Mb9xtYU>
2. <https://www.youtube.com/watch?v=Mw3I-a-QOXo>

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

CLO	Description	Bloom's Taxonomy Level
CLO1	Describe the Conservation of Probability	1 Remembering
CLO2	Discuss the Motion under constant force which depend on time only	2 Understanding
CLO3	Illustrate the numerical part related to Classical and Mathematical physics.	3 Applying
CLO4	Explain Mechanics of system of particles	4 Analyzing
CLO5	Justify the time independent Schrödinger equation	5 Evaluating
CLO6	Evaluate the complex form of fourier 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			
CLO2			2															1		
CLO3	3																1	1		
CLO4			2																1	
CLO5			2														1			
CLO6			1														1		1	

3: High, 2: Medium, 1: Low

Branch Name:	B.Sc. Mathematics
Program Code:	SC104
Course Name:	Statistic-II
Course Code:	14-MAE204-2C
Pre-requisite Course:	Basics of Statistics

Course Objectives:

- To understand concept of Sampling Methods.
- To understand the basic concept of Probability Distribution.
- To know about Normal distribution and Negative Binomial distribution.

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	Sampling Methods: Concept of population survey and sample survey, Characteristics of a good sample. The importance of size of a sample. Meaning of sampling (With replacement and without replacement). Method of sampling- Simple random sampling and its simple numerical examples upto 3 strata.	15	34
2	Probability Distribution-I: Concept of probability mass function and probability density function: Binomial distribution and Poisson distribution. Mean and variance, application, Properties of these distributions (Without proof) and Simple examples based on these distributions.	15	33
3	Probability Distribution-II: Normal distribution and Negative Binomial distribution Mean and variance, application, Properties of these distributions (Without proof) and Simple examples based on these distributions.	15	33

Reference Books:

1. S.C.Gupta & V.K.kapoor :Fundamental of applied statistics Sultan chand & sons New delhi.
2. D.S.Sancheti & Kapoor: Business Mathematics”Sultan chand & Sons,New delhi.
3. Goon,Gupta,Dagupta: An outline of statistical Theory” Vol 1&2 World press, Calcutta.

List of Open Source Software/learning website:

1. <https://www.youtube.com/watch?v=qNqrHO3woyE>
2. <https://www.youtube.com/watch?v=N-IVFB8Rlfo>
3. https://www.youtube.com/watch?v=Sr_oC-iaXIs

Practical

1. Application of Sampling Methods.
2. Application of Probability Distribution.
3. Application of Normal distribution.

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

CLO	Description	Bloom's Taxonomy Level
CLO1	Explain Sampling Methods.	4 Analysing
CLO2	Discuss Probability Distribution.	2 Understanding
CLO3	Explain Normal distribution.	4 Analysing
CLO4	Describe concept of probability mass function and probability density function.	1 Remembering
CLO5	Use properties of distributions and solve examples of its.	3 Applying
CLO6	Justify Binomial distribution and Poisson distribution Create an example of its.	5 Evaluating 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			
CLO2		1		1			1										1			1
CLO3	1	1		1			1										1			
CLO4		2		1	1	1			1								1			
CLO5	1	1			2				1								1		1	
CLO6	2	2	3		2	1	1		1	2							2	1		1

3: High, 2: Medium, 1: Low

Branch Name:	B.Sc. Mathematics
Program Code:	SC104
Course Name:	Grammar and Communication Skill-II
Course Code:	14-AEC204-2C
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 Prefix-Suffix, Gerund and Participle, Concord, Apply capitalization and comma use rules. Sentences: Simple Sentences, Compound Sentences, Complex Sentences.	9	30%
2	SPEAKING conversations:- College/School related conversations:- Parent – teacher, Advice from a teacher, Admission to a college , Getting ready for a school trek. Family conversations:- A family get together , Cleaning the house , Sharing the day’s experiences Job related Enquiries:- Job seekers’ course , Job seekers - a discussion , Job opportunities , Short courses during a vacation	6	20%
3	READING&WRITING Paragraph Writing. List of Topics for Paragraph Writing: Personal: (a) My Ambition in Life (b) India - My Country (c) College Life (d) My Favorite Movie State/ nation/ media: (a) My City/ Village (b) My Favorite Sports person (c) Gandhi Ashram (d) Importance of English in India Environment/ social life: (a) Pollution (b) Traffic Awareness (c) Trees – Our Best Friends (d) Gender Discrimination 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 more than 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 8 to 12	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	3					2					2					3				
CLO2		2			2		1			2		1			2					
CLO3			3					1					3			2				
CLO4		2					3					2								
CLO5					2					2					3					
CLO6	1					1					1					2				

3: High, 2: Medium, 1: Low

Branch Name:	B.Sc. Mathematics
Program Code:	SC104
Course Name:	Sound Engineering
Course Code:	14-SEC215-2C
Pre-requisite Course:	

Course Objectives:

- Develop and actual Understanding about acoustics
- To Know the basic Factor effecting acoustic of Building and their remedies
- To know Microphone appliances in physical world.

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	Sound: Microphones,CarbonMicrophone,Condenser,Microphone,Loudspeaker-(i) Fixed coil or moving iron type loudspeaker and (ii) Moving coil type loudspeaker Recording of sound: Miller Phonodiek, phonograph-recording and reproduction	15	50%
2	Architectural Acoustics: Introduction Classification of sound, Classification of audible sound Intensity Intensity level, Loudness Absorption coefficient, Reverberation and reverberation time. Measurement of aborsption coefficient , Factors Affecting Acousticas of Building and their Remedies	15	50%

Reference Books:

1. A Textbook of Oscillations, Waves and Acoustics
2. Engineering Physics by G Vijayakumari, Vikas Publishing house pvt LTD
3. Engineering Physics by N. Avadhanulu, S. Chand & company

List of Open Source Software/learning website:

1. <https://www.youtube.com/watch?v=yQL5b-aNCKU>
2. <https://www.youtube.com/watch?v=11w5zELCaTg>

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

CLO	Description	Bloom's Taxonomy Level
CLO1	Describe the Microphones.	1 Remembering
CLO2	Discuss the construction of Loud speaker.	2 Understanding
CLO3	Compare the Carbon Micro Phone, Condenser and Loud speaker	3 Applying
CLO4	Explain the loudness of Absorption coefficient	4 Analyzing
CLO5	Evaluate the factors affecting Acoustics of Building and their Remedies	5 Evaluating
CLO6	Design the auditorium using Acoustic Effect of sound	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		3																		
CLO3					2															
CLO4						1														
CLO5					2															
CLO6			3																	

3: High, 2: Medium, 1: Low

Branch Name:	B.Sc. Mathematics
Program Code:	SC104
Course Name:	Business Mathematics-IV
Course Code:	14-SEC216-2C
Pre-requisite Course:	

Course Objectives:

- To understand basic concept of Laplace Transforms and its Properties.
- To understand basic concept of Inverse Laplace Transforms.
- To know about Convolution Theorem.

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	Laplace transform- Definition and its properties. Rules of manipulation. Laplace transform of derivatives and integrals.	15	50
2	Properties of inverse Laplace transform. Convolution theorem. Solve Differential equation using Laplace Transforms.	15	50

Reference Books:

1. The Laplace Transform: Theory and applications, by Joel L. Schiff.
2. Schaum's outline of Laplace Transforms, by Murray Spiegel.

List of Open Source Software/learning website:

1. <https://www.youtube.com/watch?v=9RJml41PFn>
2. https://www.youtube.com/watch?v=FdVS3tSilZ4&list=PLNKD1qB9pptsco8EAskJWARKrXQze2r_Y

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

CLO	Description	Bloom's Taxonomy Level
CLO1	Describe basic concept of Laplace Transforms and its Properties.	1 Remembering
CLO2	Explain Laplace Transforms for derivatives and Solve its example.	4 Analysing 3 Applying
CLO3	Illustrate Laplace Transforms for Integrals.	3 Applying
CLO4	Describe Properties of Inverse Laplace Transforms.	1 Remembering
CLO5	Discuss Convolution theorem.	2 Understanding
CLO6	Solve Differential equation using Laplace Transforms.	3 Applying

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	1			1	1											2	1		1
CLO2	2	2			1	1											1	1		
CLO3	2	1			1	1											1	1		
CLO4	1	2			1	1											1	1		
CLO5		1			1	1											1	1		
CLO6	1	2			1	2											1	1		

3: High, 2: Medium, 1: Low

Branch Name:	B.Sc. Mathematics
Program Code:	SC104
Course Title:	Environmental Science
Course Code:	14-VAC202-2C
Pre-requisite Course:	Basic knowledge of Environmental topic

Course Objectives:

1. To provide students with a broad interdisciplinary liberal arts framework for understanding the relationship between humans and their environment.
2. To prepare students for careers, citizenship and environmental stewardship through experiential curricular and co-curricular opportunities.
3. To equip students with the knowledge and skills necessary to pursue professional careers and advanced study related to the multi-faceted nature of environmental studies.
4. Students by offering this course will get proper understanding of important aspects that affects environment and ecology

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	Introduction to Environment and Environmental Studies: Definition and Components of Environment, Relationship between the different components of Environment, Man and Environment relationship, Impact of technology on Environment, Environmental Degradation, Multidisciplinary nature of the Environment studies, its scope and importance in the present day Education System Ecology and Ecosystems: Introduction: Ecology- Objectives and Classification , Concept of an ecosystem- structure and functions of ecosystem Components of ecosystem- Producers, Consumers, Decomposers Bio-Geo- Chemical Cycles- Hydrologic Cycle, Carbon cycle, Energy Flow in Ecosystem, Food Chains, Food webs ,Ecological Pyramids Major Ecosystems: Forest Ecosystem, Grassland Ecosystem, Desert Ecosystem, Aquatic Ecosystem, Estuarine Ecosystem.	15	50
2	Human Population and Environment: Population Growth, World and Indian scenario, Population and Environmental Degradation, Malthusian theory, Optimum theory, Population explosion – Causes, Effects and Control. Urbanization: Urban population growth and Environmental problems Environmental pollution: Types of Environmental Pollution: 1) Water Pollution: Introduction – Water Quality Standards, Sources of Water Pollution: Industrial ,Agricultural, Municipal; Classification of water pollutants, Effects of water pollutants, Eutrophication 2)Air Pollution: Composition of air, Structure of atmosphere, Ambient Air Quality Standards, Classification of air pollutants, Sources of common air pollutants like PM, SO₂, NO_x, Natural & Anthropogenic Sources, Effects of common air pollutants 3) Land Pollution: Land uses ,Land degradation: causes, effects and control, soil erosion 4) Noise Pollution: Introduction, Sound and Noise, Noise measurements, Causes and Effects 5) Thermal Pollution: Causes and effects Role of individual in the prevention of pollution	15	50

Text Books:

1. Textbook of Environmental Studies for Undergraduate Courses by ErachBharucha Second edition,2013Publisher:Universities Press (India) Private Ltd, Hyderabad.

Reference Books:

1. Basics of Environmental Studies by Prof Dr N S Varandani ,2013 Publisher: LAP -Lambert Academic Publishing , Germany
2. Environmental Studies by AninditaBasak ,2009 Publisher: Drling Kindersley(India)Pvt. Ltd Pearson
3. Textbook of Environmental Studies by Deeksha Dave & S SKateva ,Cengage Publishers.
4. Environmental Sciences by Daniel B Botkin& Edward A Keller Publisher: John Wiley & Sons.
5. Environmental Studies by R. Rajagopalan, Oxford University Press
6. Environmental Studies by Benny Joseph, TMH publishers
7. Environmental Studies by Dr. Suresh K Dhameja, 2007 Published by : S K Kataria& Sons New Delhi
8. Basics of Environmental Studies by U K Khare, 2011 Published by Tata McGraw Hill

List of Open Source Software/learning website:

1. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=0Xvq9yUM2ILDrJ07FvlArQ==>
2. <https://nptel.ac.in/courses/120108004>

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

CLO	Description	Bloom's Taxonomy Level
CLO1	Use critical thinking, problem-solving, and the methodological approaches of the social sciences, natural sciences, and humanities in environmental problem solving	3 Apply
CLO2	Demonstrate an integrative approach to environmental issues with a focus on sustainability;	2 Understanding
CLO3	Communicate complex environmental information to both technical and non-technical audiences.	2 Understanding 3 Apply
CLO4	Understand and evaluate the global scale of environmental problems.	1 Remembering 2 Understanding
CLO5	Predicting the consequences of human actions on the web of life, global economy and quality of human life	1 Remembering 2 Understanding
CLO6	Adopting sustainability as a practice in life, society and industry	2 Understanding

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													3	1						
CLO2		2			3	1						2		1						
CLO3				1						3				1		2				
CLO4	1											3		1						
CLO5							2							1						
CLO6			3					1						1						

3: High, 2: Medium, 1: Low

Branch Name:	B.Sc. Mathematics
Program Code:	SC104
Course Title:	Integrated Personality Development Course
Course Code:	14-VAC203-2C
Pre-requisite Course:	Zeal to Learn the Subject

Course Objectives:

1. To provide students with a holistic education – focused on increasing their intelligence quotient, spiritual quotient, emotional quotient and physical quotient.
2. To provide students with hard and soft skills, making them more marketable when entering the workforce.
3. To educate students on their social responsibilities as citizens of India and have a greater sense of social responsibility.
4. To provide students with a value-based education which will enable them to be successful in their family, professional, and social relationships by improving their moral and ethical values?
5. To teach self-analysis and self-improvement exercises to enhance the potential of the participants.
6. To have a broader sense of self-confidence and a defined identity

Teaching and Examination Scheme:

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

Subject Contents:

Sr. No	Topic	Total Hours	Weightage (%)
1	The Need for Values, Remaking Yourself , Restructuring Yourself, Power of Habit Learning from Legends , Tendulkar & Tata From House to Home , Listening & Understanding	20	34
2	Facing Failures - Welcoming Challenges, Significance of Failures My India My Pride - Glorious Past - Part 1, Glorious Past - Part 2 Learning from Legends - A.P.J. Abdul Kalam Soft Skills - Networking & Leadership, Project Management	20	33
3	Remaking Yourself - Handling Social Media Facing Failures - Power of Faith From House to Home - Bonding the Family Selfless Service - Seva	20	33

Text Books:

1. **IPDC Workbook-1** (Presented by B.A.P.S. Swaminarayan Sanstha)

Reference Books:

1. Thomas Edison's factory burns down, New York Times Archives, Page 1, 10/12/1914
2. Playing It My Way: My Autobiography, Sachin Tendulkar, Hodder & Stoughton, 2014
3. The Rise of Civilization in India and Pakistan, Raymond Allchin, Bridget Allchin, Cambridge University Press, 1982
4. Seven Habits of Highly Effective Teens, Sean Covey, Simon & Schuster, 2012

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

CLO	Description	Bloom's Taxonomy Level
CLO1	To provide students with a holistic value-based education that will enable them to be successful in their academic, professional, and social lives.	1 Remembering 2 Understanding 3 Applying
CLO2	To give the students the tools to develop effective habits, promote personal growth, and improve their wellbeing, stability, and productivity.	1 Remembering 2 Understanding 3 Applying
CLO3	To allow students to establish a stronger connection with their family through critical thinking and devolvement of qualities such as unity, forgiveness, empathy, and effective communication.	1 Remembering 2 Understanding 3 Applying
CLO4	To provide students with soft skills that complement their hard skills, making them more marketable when entering the workforce.	1 Remembering 2 Understanding 3 Applying
CLO5	To enhance awareness of India's glory and global values, and to create considerate citizens who strive for the betterment of their family, college, workforce, and nation.	1 Remembering 2 Understanding 3 Applying
CLO6	To inspire students to strive for a higher sense of character by learning from role models who have lived principled, disciplined, and value-based lives.	1 Remembering 2 Understanding 3 Applying

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					
CLO2		1		2			1				1	2			2					
CLO3		1	2				1				2	2	1		2					
CLO4											3	1	2		1					
CLO5								2			1	2		3	2					
CLO6								1			2	3								

3: High, 2: Medium, 1: Low