

**GANPAT UNIVERSITY**

**FACULTY OF SCIENCE**

**TEACHING AND EXAMINATION SCHEME**

Programme		Bachelor of Science		Branch/Spec.	Mathematics															
Semester		IV																		
Effective from Academic Year			2016-17		Effective for the batch Admitted in										July 2015					
Sr. No.	Subject Code	Subject Name	Teaching scheme												Examination scheme (Marks)					
			Credit						Hours (per week)						Theory			Practical		
			Lecture(DT)			Practical(Lab.)			Lecture(DT)			Practical(Lab.)			CE	SEE	Total	CE	SEE	Total
			L	TU	Total	P	TW	Total	L	TU	Total	P	TW	Total						
1	UMTA401NAS	Numerical Analysis-II	3	--	3	--	--	--	3	--	3	-	--	--	40	60	100	--	--	--
2	UMTA402LIA	Linear Algebra	3	--	3	--	--	--	3	--	3	-	--	--	40	60	100	--	--	--
3	UPTA403PRA	Practical Module-IV	--	--	--	3	--	3	--	--	--	6	--	6	--	--	--	--	100	100
4	UPHA401EEP	Electromagnetism, Electronics and Plasma Physics	3	--	3	--	--	--	3	--	3	-	--	--	40	60	100	--	--	--
5	UPHA402MQR	Modern Physics, Quantum Mechanics and Relativity	3	--	3	--	--	--	3	--	3	-	--	--	40	60	100	--	--	--
6	UPPA403PRA	Practical Module-IV	--	--	--	3	--	3	--	--	--	6	--	6	--	--	--	--	100	100
7	UENA401ENG	English-IV	2	--	2	--	--	--	2	--	2	-	--	--	40	60	100	--	--	--
8	UDMB401DMT	Disaster Management-II	2	--	2	--	--	--	2	--	2	-	--	--	40	60	100	--	--	--
<b>Total</b>			16	--	16	6	--	6	16	--	16	12	--	12	240	360	600	--	200	200

GANPAT UNIVERSITY									
FACULTY OF SCIENCE									
Programme		Bachelor of Science				Branch/Spec.		Mathematics	
Semester		IV				Version		1.0.1.0	
Effective from Academic Year			2016-17			Effective for the batch Admitted in			July 2015
Subject code		UMTA401NAS		Subject Name		Numerical Analysis -II			
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	--	--	--	3	Theory	40	60	100
Hours	3	--	--	--	3	Practical	--	--	--
Pre-requisites:									
Algebraic and transcendental equation, Interpolation, Solution of differential equation.									
Learning Outcome:									
After successful completion of the course, students shall be able to compare analytic solution with numerical solution of non-linear equations as well as numerical differentiation and integration.									
Theory syllabus									
Unit	Content								Hrs
1	Solution of Algebraic and Transcendental equations: Ramanujan's method and its related examples, Secant method, Muller's method, Graeffe's Root-Squaring method.								11
2	Divided differences and its related theory for interpolation: Lagrange's interpolation formula for equal intervals, Lagrange's interpolation formula for unequal intervals, Error in Lagrange's interpolation formula, Newton's divide difference interpolation formula.								11
3	Numerical differentiation and integration: Numerical differentiation: Errors in Numerical differentiation, Cubic spline method, Differentiation Formula with function values. Numerical integration: Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule.								11
4	Numerical Solutions of Ordinary differential Equations: Solution by Taylor's series, Picard's method of successive approximations, Euler's method, Modified Euler's method, Runge-Kutta method.								12
Text Books									
1	"Introductory Methods of Numerical Analysis", S.S.Sastry, PHI Publication, New Delhi, 5 <sup>th</sup> Edt., 2012.								
Reference Books									
1	"Numerical Analysis and Computational Procedures", S.A.Mollah, New Central Book Agency, Calcutta								
2	"Numerical Analysis", Kunz, McGraw Hill								
3	"Numerical Analysis", R Gupta, Anmol Pub.Pvt.Ltd.- New Delhi								
4	"Numerical Analysis", P.N.Chetterji, Rajhans Prakashanmandir, Meerut								
5	"Numerical Methods in Engineering and Sciences", Dr.B.S.Grewal, Khanna Publisher								

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FACULTY OF SCIENCE									
Programme		Bachelor of Science				Branch/Spec.		Mathematics	
Semester		IV				Version		1.0.1.0	
Effective from Academic Year			2016-17			Effective for the batch Admitted in			July 2015
Subject code		UMTA402LIA		Subject Name		Linear Algebra			
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	--	--	--	3	Theory	40	60	100
Hours	3	--	--	--	3	Practical	--	--	--
Pre-requisites:									
Set theory, Binary operations, Algebraic structures, Vectors and scalars, Matrix, Polynomial									
Learning Outcome:									
After successful completion of the course, students shall be able to construct a vector space, linear transformation as well as solve the system of linear equations; finding Eigen values and Eigen vectors.									
Theory syllabus									
Unit	Content								Hrs
1	VECTOR SPACE AND LINEAR TRANSFORMATION: Vector spaces, Subspaces, Span of a set and its examples, Linear dependence and Independence, Basis of Vector Space, Linear transformation and its examples, Inverse of a linear transformation, Range and Kernel of a linear map, Rank and Nullity, Rank-nullity theorem and its consequences.								12
2	MATRICES OF A LINEAR TRANSFORMATION & DUALITY OF LINEAR FUNCTIONALS: Definition of a Matrix of a linear transformation, Linear Transformation associated with a matrix, Rank and Nullity of a Matrix, Dimension of $L(U,V)$ and its determination, System of linear equations, Definition of linear functional and its examples, Definition of Dual space and Dual basis and its examples.								11
3	INNER PRODUCT SPACE AND LINEAR OPERATOR: Definition of inner product space, Norm, Orthogonality, Schwarz's inequality and Triangular inequality, Parallelogram law, Orthonormal basis, Gram-Schmidt Orthogonalization Process and its examples, Adjoint of a linear operator, its properties and examples.								11
4	EIGEN VALUES AND EIGEN VECTORS: Eigen values and Eigen vectors of a linear transformation, Characteristic polynomial, Cayley-Hamilton theorem and its application to find inverse of a matrix, minimal polynomial deductions.								11
Text Books									
1	"An Introduction to Linear Algebra", V.Krishnamurthy, V P Manira, J L Arora, Affiliated East-West Press PVT Ltd., New Delhi.								
Reference Books									
1	"Topics in Algebra", I N Herstein, Wiley Eastern Ltd								
2	"Surekh Bij Ganit", I H Seth, University Granth Nirman Board(Gujarati)								
3	"Linear Algebra", Sharma and Vashishtha, Krishna Prakshan, Meerut								
4	"Linear Algebra", Gupta K P, Pragati Prakshan, Meerut								
5	"Linear Algebra", Ramchandra Rao, P.Bhimasankar, Tata MacGrawHill								

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FACULTY OF SCIENCE									
Programme		Bachelor of Science				Branch/Spec.		Mathematics	
Semester		IV				Version		1.0.0.0	
Effective from Academic Year			2014-15			Effective for the batch Admitted in			July 2013
Subject code		UPTA403PRA		Subject Name		Practical Module-IV			
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	--	--	3	--	3	Theory	--	--	--
Hours	--	--	6	--	6	Practical	--	100	100
Pre-requisites:									
Concept of numerical methods and linear algebra.									
Learning Outcome:									
After successful completion of the course, students shall be able to improve problem solving skill as well as implement the Mathematical concept to solve real world problems.									
Practical content									
Sr. No.	Content								Hrs
1	Application of Ramanujan's method								4.5
2	Application of Secant method								4.5
3	Application of Muller's method								4.5
4	Application of Graeffe's Root-Squaring method								4.5
5	Application of Lagrange's interpolation formula								4.5
6	Application of Newton's divide difference interpolation formula								4.5
7	Application of Cubic spline method								4.5
8	Application of Trapezoidal rule								4.5
9	Application of Simpson's 1/3 rule and Simpson's 3/8 rule								4.5
10	Application of Taylor's Series								4.5
11	Application of Picard's method of Successive approximations								4.5
12	Application of Euler's method and Modified Euler's method								4.5
13	Application of Runge-Kutta method								4.5
14	Verification of Vector space, Subspace, Basis								4.5
15	To expand linearly independent set up to a basis of a vector space.								4.5
16	Verification of Linear transformation and find a matrix associated with it.								4.5
17	Verification of rank-nullity theorem								4.5
18	To solve system of Linear equation								4.5
19	Application of Cayley-Hemilton Theorem								4.5
20	Application of Gram-Schmidt Orthonormalization process								4.5

GANPAT UNIVERSITY									
FACULTY OF SCIENCE									
Programme	Bachelor of Science				Branch/Spec.	Mathematics			
Semester	IV				Version	1.0.1.0			
Effective from Academic Year				2016-2017		Effective for the batch Admitted in		July 2015	
Subject code	UPHA 401 EEP		Subject Name		Electromagnetism, Electronics & Plasma Physics				
Teaching scheme					Examination scheme (Marks)				
	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	--	--	--	3	Theory	40	60	100
Hours/Week	3	--	--	--	3	Practical	--	--	--
Pre-requisites:									
Basic concepts of Higher Secondary science and F.Y.B.Sc..									
Learning Outcome:									
Students gain a knowledge about Electromagnetism, Electronics & Plasma Physics									
Theory syllabus									
Unit	Content							Hrs	
1	1.1	<b>Electrostatics in Dielectric:</b> Gaseous Non-Polar Dielectrics (2.11), Gaseous Polar Dielectrics (2.12), Non- Polar Liquids (2.13), Solid Dielectrics-Electrets (2.14).							3
	1.2	<b>Magnetostatics:</b> The Magnetic Potentials (4.9- a & b), Magnetic Vector Potential due to Small Current Loop (4.12), An alternative method for finding the Vector Potential A and the Field B due to Current Loop (4.13), Magnetization (4.15), Magnetic Field Vector (4.16), Magnetic Susceptibility and Permeability (4.17), Boundary Conditions (4.18), Uniformly magnetized Sphere in External Magnetic Field (4.19), A Comparison of Static Electric and Magnetic Fields (4.20).							10
2	2.1	<b>A.C. Bridges:</b> A.C. Bridges (17.5), Maxwell's Bridge (17.6.1), Schering Bridge (17.7.3)							2
	2.2	<b>Transistors Biasing and Stabilization:</b> Bias Stabilization (Operating point stabilization) (8.7, 8.7.1 & 8.7.2), Stability factor (8.8), Stabilization by Collector Base Resistance (8.9) Stabilization by potential divider and Emitter resistor (8.10)							3
	2.3	<b>Basic Transistor Amplifier:</b> Transistor as a four pole (9.2), h-parameters with h-parameters equivalent circuit (9.5 complete), Grounded Emitter Circuit - Mathematical analysis using h parameters only (9.6), Comparative Study of three types of Amplifiers (9.9).							5
3	3.1	<b>Solid state Devices:</b> JFET (12.1 to 12.6), UJT (26.6, 26.6.1 to 26.6.3) . .							3
	3.2	<b>Digital Electronics:</b> Introduction (21.1), Number systems used in Digital Electronics (21.2), Decimal, Binary, Hexadecimal and Octal (21.2.1 to 21.2.4), Binary Codes-(A) BCD, (B) Gray, (C) Excess-3 Codes (21.4), Arithmetic Circuits – Exclusive - OR Gate (21.9), Applications of X-OR Gate: (i) Binary to Gray Code Converter (ii) A Parity Checker (iii) The Half Adder (iv) The Full Adder (v) Parallel Adder (vi)Half subtractor, (vii)Full subtractor.							9

4	4.1	<b>The Basic concepts of Plasma:</b> Introduction (1.1), Composition and Characteristics of a Plasma (1.2), Collisions (1.3), Elastic collisions (1.3.1), Inelastic collisions (1.3.2), Surface Phenomena (1.4), Transport Phenomena (1.5), Diffusion and Mobility (1.6), Viscosity, Conductivity (1.7), Recombination (1.8), Ohm's law (1.9), Gas Discharge (1.10), Composition of various natural and Man-made Plasma (1.11), Plasma diagnostics (1.12), Plasma waves and Instabilities Confinement of Plasma (1.13), Space Plasma (1.14).	10
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**Reference Books**

- 1) Electromagnetics by B.B. Laud, New Age Int. Publisher
- 2) Hand book of Electronics by Gupta & Kumar 30th Revised Edition, 2002 Pragati Prakashan
- 3) Electronics and Radio Engineering by M.L. Gupta (9th Edition-2002) D Raj & Sons
- 4) Elements of Plasma Physics by S.N. Goswami New Central book Agency (P) Ltd., Calcutta.
- 5) Electricity and Magnetism by Maharajan and Rangwala, THM
- 6) Electronic Devices and Circuits by A. Mottershead Prentice – Hall of India.
- 7) Electricity and Magnetism By K.K. Tewari (S. Chand & Company Ltd.)
- 8) Basic Electronics and Linear Circuits by N.N. Bhargava, D.C. Kulshreshtha, S.C. Gupta McGraw
- 9) Electricity and Magnetism Berkeley Physics course Vol.-II by EDWARD M PURCELL,
- 10) Integrated Electronics by Millman & Halkias

# GANPAT UNIVERSITY

## FACULTY OF SCIENCE

Programme		Bachelor of Science			Branch/Spec.	Mathematics			
Semester		IV			Version	1.0.1.0			
Effective from Academic Year				2016-2017		Effective for the batch Admitted in		July 2015	
Subject code		UPHA 402 MQR	Subject Name		Modern Physics, Quantum Mechanics and Relativity				
Teaching scheme					Examination scheme (Marks)				
		Lecture(DT)		Practical(Lab.)		Total			
		L	TU	P	TW		CE	SEE	
Credit		3	--	--	--	3	Theory	40	
Hours/Week		3	--	--	--	3	Practical	60	
								100	
								--	
Pre-requisites:									
Basic concepts of Higher Secondary science and F.Y.B.Sc..									
Learning Outcome:									
Students gain a knowledge about Modern Physics, Quantum Mechanics and Relativity									
Theory syllabus									
Unit		Content						Hrs	
1		1.1	<b>Atomic Structure:</b> Concept of gas discharge tube (54.1), Thomsan's method for measuring e/m for electron (54.3), Millikan's oil drop experiment for electric charge e (54.4), Rutherford's nuclear atomic model (55.4), Bohr's atomic model (55.5), Bohr's theory of hydrogen atom (55.6), Franck-Hertz experiment (2.16), Critical potentials (2.17), Shortcomings of Bohr's Theory (2.19), Summerfield extension of Bohr theory (2.20)						9
		1.2	<b>Evolution of Quantum Theories:</b> Failure of classical mechanics (56.1), Plank's hypothesis and radiation law (56.2), Plank's quantum theory (56.3), Properties of photon (56.4), Photoelectric effect (6.5).						4
2		2.1	<b>Waves and Particles:</b> De Broglie Waves (3.1), Particle in a box (3.6), Uncertainty principle (3.7 & 3.8),						4
		2.2	<b>Schrodinger Equations:</b> A free particle in one dimension (2.1), Generalization to three dimensions (2.2), The operator correspondence and the Schrodinger equation for a particle subject to forces (2.3), Normalization and Probability Interpretation (2.4), Non-Normalizable Wave functions and Box Normalization (2.5).						6
3		3.1	<b>Physical Interpretation and Condition on ' ':</b> Conservation of Probability (2.6), Expectation values, Ehrenfest's Theorem (2.7), Admissibility Condition on the Wave function (2.8)						5
		3.2	<b>Stationary States and Energy Spectra</b> Stationary states : The time Independent Schrödinger Equation (2.9), A particle in a square well potential (2.10), Bound States in a square well ( $E > 0$ ) (2.11), The square well: Non-localized states ( $E > 0$ ) (2.12).						7
4		4.1	<b>Special theory of Relativity:</b> Newtonian Relativity (14.1), Michelson-Morley experiment (14.2), Special theory of relativity (14.3), Lorentz Transformation (14.4), Consequences of Lorentz Transformation (14.5)-(a) Relativity of Simultaneity (b) the Lorentz-Fitz Gerald length Contraction (c) Time Dilation, Addition of Velocities (14.6), Mass-energy relation (14.8), Space time (14.9), Compton scattering (14.11).						10
Reference Books									

- 1) Atomic and Molecular Physics By Raj Kumar (Campus Books)
- 2) Quantum Mechanics by John L. Powell and Bernd Crasemann
- 3) A Textbook of Quantum Mechanics By P.M.Mathews and K.Venkatesan (TMH)
- 4) A Text Book of Quantum Mechanics by Mathews and K.Venkatesan Tata Mc-Graw Hill Publication
- 5) Introduction to Classical Mechanics by Takwale & Puranik Tata McGraw-Hill (7th reprint-1986)
- 6) Engineering Physics by R.K Gaur and S.L. Gupta
- 7) Concepts of Modern Physics by Arthur Beiser.



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## FACULTY OF SCIENCE

Programme	Bachelor of Science				Branch/Spec.	Mathematics			
Semester	IV				Version	1.0.0.0			
Effective from Academic Year		2014-15			Effective for the batch Admitted in		July 2013		
Subject code	UPPA 403 PRA		Subject Name		Practical Module -IV				
Teaching scheme					Examination scheme (Marks)				
	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	--	--	3	--	3	Theory	--	--	--
Hours/Week	--	--	6	--	6	Practical	--	100	100
<b>Pre-requisites:</b>									
Students should have Theoretical and Practical Knowledge of Higher Secondary and F. Y. B. Sc..									
<b>Learning Outcome:</b>									
Students gain knowledge on given practical with their uses in other field.									
<b>Practical content</b>									
01 Coaxial Viscometer 02 To determine wave length of bright lines of mercury light using grating. 03 R.P. of Telescope 04 Searl's Goniometer. Determination of cardinal points and „do“ 05 Kundt's tube. Determination of „y“ 06 Diffraction by Adser `A` Pattetrn 07 e/k by Power Transistor 08 Absolute value of capacity using B.G. or S.G. 09 Low resistance by method of Projection 10 Comparison of capacity (C1/C2) by Desauty method 11 To determine self inductance by Anderson Bridge 12 Characteristics of a C.B. Transistor (PNP) 13 Characteristics of JFET & Determination of $\mu$ , rd, gm 14 Construction of AND, OR, NOT Gates using NAND & NOR Universal gates.									

<b>GANPAT UNIVERSITY</b>									
<b>FACULTY OF SCIENCE</b>									
Programme	Bachelor of SCIENCE				Branch/Spec.	MATHEMATICS			
Semester	IV				Version	1.0.1.0			
Effective from Academic Year		2016-17			Effective for the batch Admitted in			July 2015	
Subject code	UENA 401 ENG	Subject Name			English IV				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total	CE	SEE	Total	
	L	TU	P	TW					
Credit	2	-	0	-	2	Theory	40	60	100
Hours	2	-	0	-	2	Practical	-	-	-
<b>Pre-requisites:</b>									
<ul style="list-style-type: none"> <li>• Students should have advance knowledge of English Language and grammar.</li> <li>• Students should have ability to speak and write correct sentences in their day to day language.</li> <li>• Students should be familiar with correct usage of language.</li> </ul>									
<b>Learning Outcome:</b>									
<ul style="list-style-type: none"> <li>• Knowledge of English grammar.</li> <li>• Understanding of prose and composition.</li> <li>• Ability to mix up with different dialects.</li> <li>• Development of vocabulary.</li> <li>• Knowledge of letter writing for various official purposes.</li> </ul>									
<b>Theory syllabus</b>									
<b>Unit</b>	<b>Content</b>								<b>Hrs</b>
<b>1</b>	Selected Prose								<b>8</b>
	How much land does a man need- Leo Tolstoy The Mother- Somerset Maugham A true story- Mark Twain								
<b>2</b>	Basic English Grammar								<b>7</b>
	Adverb clause, Adjective clause								
<b>3</b>	Note-making and Précis writing								<b>7</b>
	Unseen paragraphs for Note-making Unseen paragraphs for précis								
<b>4</b>	Composition								<b>8</b>
	Memo Writing, Notice, Agenda and Minutes Writing, Complaint Letters, Adjustment Letters								
<b>Practical content</b>									
<b>Text Books</b>									
1	Twelve selected short stories by C. S. Sharma								
2	Business Communication by Rodha Doctor and Aspi Doctor								
<b>Reference Books</b>									
1	Business Communication by Urmila Rai and S. M. Rai								
2	High-School English Grammar Wren and Martin								
3	Technical Communication by Meenakshi Raman and Sangeeta Sharma								

<b>GANPAT UNIVERSITY</b>									
<b>FACULTY OF SCIENCE</b>									
Programme		Bachelor of SCIENCE				Branch/Spec.		MATHEMATICS	
Semester		IV				Version		1.0.1.0	
Effective from Academic Year				2016-17		Effective for the batch Admitted in			July 2015
Subject code		UDMB 401 DMT		Subject Name		DISASTER MANAGEMENT –II			
Teaching scheme						Examination scheme (Marks)			
(Per week)	Lecture(DT)		Practical(Lab.)		Total	CE	SEE	Total	
	L	TU	P	TW					
Credit	2	-	0	-	2	Theory	40	60	100
Hours	2	-	0	-	2	Practical	-	-	-
<b>Pre-requisites:</b>									
<ul style="list-style-type: none"> <li>• Students should have advance knowledge of different disasters.</li> <li>• Students should have ability to think over the serious issues in the society.</li> <li>• Students should be familiar with the preventive methods of disasters.</li> </ul>									
<b>Learning Outcome:</b>									
<ul style="list-style-type: none"> <li>• Knowledge of different NGOs working methods during disaster.</li> <li>• Understanding the needs and expectations of relief camps at the level of post disaster.</li> <li>• Development of new strategies of Relief Operations.</li> <li>• Development of mental and physical strength as an individual.</li> <li>• Knowledge of Government Policies towards disaster.</li> </ul>									
<b>Theory syllabus</b>									
<b>Unit</b>	<b>Content</b>								<b>Hrs</b>
<b>1</b>	<b>Man Made Disasters:</b>								<b>15</b>
	1.1 War and Terrorism, Riots and Demonstrations, Residential and Industrial, Fires, Transportation Accidents, Nuclear Power Accidents, Hazardous Materials and Toxic Emission, Utility Failure.								
<b>2</b>	<b>Problems regarding victims and its awareness and Planning for disaster management:</b>								<b>15</b>
	1.1 Saving Victims – First Twenty-Four Hours, Conducting Medical Relief Operations, Managing Relief Operations, Psychological Issues, Carrying Out Rehabilitation Work.								
	1.2 Local Disaster Management Cell, How to Prepare a Business Recovery Plan? Government Response in Disaster.								
<b>Reference Books</b>									
<ol style="list-style-type: none"> <li>1) Disaster Management By G.K. Ghosh,A.P.H. Publishing Corporation</li> <li>2) Disaster Management By R.B. Singh, Rawat Publications</li> <li>3) Disaster Management: Through the New Millennium By Ayaz Ahmad, Anmol Publications</li> <li>4) Emergency Medical Services and Disaster Management: A Holistic Approach By P.K. Dave Jaypee Brothers Medical Publishers (P) Ltd</li> <li>5) Disaster Management By B Narayan, A.P.H. Publishing Corporation</li> <li>6) Modern Encyclopaedia of Disaster and Hazard Management By B C Bose, Rajat Publications</li> <li>7) Disaster Management By Nikuj Kumar, Alfa Publications</li> <li>8) Disaster Management - Recent Approaches By Arvind Kumar, Anmol Publications</li> <li>9) Tsunamis: Threats and Management by Dr. Jagbir Singh , I.K. International</li> <li>10) Disaster Management Future Challenges and Opportunities by Dr. Jagbir Singh. , I.K. International</li> <li>11) Citizen’s guide to disaster management by Satish Modh Publisher:-Macmillan Publishers India.</li> <li>12) Environment and Sismic Engineering By AtulPrakashan Ahmedabad.</li> </ol>									