

# GANPAT UNIVERSITY

## FACULTY OF SCIENCE

### TEACHING AND EXAMINATION SCHEME

Programme	Bachelor of Science	Branch/Spec.	Mathematics																	
Semester	VI																			
Effective from Academic Year	2015-16			Effective for the batch Admitted in										July 2013						
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	UMTA601RTH	Ring Theory	3	--	3	--	--	--	3	--	3	-	--	--	40	60	100	--	--	--
2	UMTA602RAS	Real Analysis - II	3	--	3	--	--	--	3	--	3	-	--	--	40	60	100	--	--	--
3	UMTA603NTH	Number Theory	3	--	3	--	--	--	3	--	3	-	--	--	40	60	100	--	--	--
4	UMTA604GTH	Graph Theory	3	--	3	--	--	--	3	--	3	-	--	--	40	60	100	--	--	--
5	USEA605DMT	Discrete Mathematics	2	--	2	--	--	--	2	--	2	-	--	--	40	60	100	--	--	--
	USEA605MTS	Mathematical Statistics - II																		
6	UENA606ENG	English - VI	2	--	2	--	--	--	2	--	2	-	--	--	40	60	100	--	--	--
7	UPTA607PRA	Practical Module - VI	--	--	--	6	--	6	--	--	--	12	--	12	--	--	--	--	200	200
<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	VI				Version	1.0.0.0			
Effective from Academic Year	2015-16				Effective for the batch Admitted in	July 2013			
Subject code	UMTA601RTH	Subject Name			Ring Theory				
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:									
Concept of Group and its properties.									
Learning Outcome:									
After successful completion of the course, students shall be able to check irreducibility of polynomials as well as characterise prime ideals and maximal ideals.									
Theory syllabus									
Unit	Content								Hrs
1	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								12
2	Subrings: Definition and examples, necessary and sufficient criterion for subring, Ideals: Definition and examples, necessary and sufficient criterion for ideal, principal ideal ring, quotient ring and its operation tables Homomorphism: Definition and some examples, Kernel of homomorphism, Isomorphism of rings, Fundamental theorem on homomorphism, homomorphism and characteristic.								11
3	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, Remainder and factor theorem, solution of polynomial equation, zero of polynomial, Eisenstein's criterion for irreducibility, rational zero of polynomial.								11
4	Fields: Fields, Subfields, Extension field, The field of quotients and integral domain, Prime fields, Finite fields, Maximal ideals, Prime ideals and their characterization through quotient ring.								11
Reference Books									
1	Abstract Algebra - I. H. Sheth, PHI, New Delhi, Second edition-2009.								
2	Topics in Algebra - I. N. Herstein, Vikas Publishing, New Delhi.								
3	A First Course in Abstract Algebra – J. B. Fraleigh, Narosa Publishing, New Delhi.								
4	Basic Abstract Algebra – P.B. Bhattacharya, S.K. Jain and S. R. Nagpal, Foundation Books, New Dehli.								
5	Arup Bijganit (Gujarati) - I. H. Sheth, University Granth Nirman Board, Ahmedabad.								

# GANPAT UNIVERSITY

## FACULTY OF SCIENCE

Programme	Bachelor of Science				Branch/Spec.	Mathematics			
Semester	VI				Version	1.0.0.0			
Effective from Academic Year		2015-16			Effective for the batch Admitted in			July 2013	
Subject code	UMTA602RAS	Subject Name			Real 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:									
Metric space and its properties, Properties of derivative and integration.									
Learning Outcome:									
After successful completion of the course, students shall be able to check convergence of sequence and series of function as well as determine the basic topological properties of subsets of the real numbers.									
Theory syllabus									
Unit	Content								Hrs
1	Limits and Continuity: Limits and Continuity for a functions from a metric space into another metric space, continuity of a composite function, Structural properties of continuous functions from a metric space in to , Continuity and Compactness, Continuity and connectedness, Discontinuities, Monotonic function, Discontinuities of a monotonic function, Infinite limits and limits at infinity.								12
2	Differentiation: Derivatives of a real function, Continuity and differentiability, Structural properties of the class of differentiable functions, Mean value theorems, Continuity of derivatives, L'Hospital rule, Derivatives of higher order, Taylor's theorem.								11
3	The Riemann – Stieltje's Integral: Riemann - Stieltje's integral, properties of Riemann - Stieltje's integral, Integration and Differentiation, Integration of Vector Valued Functions, Rectifiable curves.								11
4	Sequences and Series of functions: Sequences of functions, Limit of a Sequence of functions, Uniform convergence, tests for uniform convergence and continuity, Uniform convergence and differentiation.								11
Reference Books									
1	Principles of Mathematical Analysis" by Walter Rudin, McGraw Hill (International Student Edition), 3rd Edition.								
2	A First Course in Mathematical Analysis" by D. Somasundaram & B. Choudhary, Narosa Publishing House								
3	Principle of Real Analysis "by S.C.Malik , Wiley Eastern Limited New Delhi 1982.								
4	Principle of Mathematical Analysis" by T.M.Apostol								
5	Fundamentals of Mathematical Analysis" by G. Das & S. Pattnayak Tata Mcgraw Hill Pub.Co								

GANPAT UNIVERSITY									
FACULTY OF SCIENCE									
Programme	Bachelor of Science				Branch/Spec.	Mathematics			
Semester	VI				Version	1.0.0.0			
Effective from Academic Year	2015-16				Effective for the batch Admitted in	July 2013			
Subject code	UMTA603NTH		Subject Name		Number Theory				
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:									
Principles of Mathematical Induction, Well Ordering Principle, Archimedean property, Binomial Theorem.									
Learning Outcome:									
After successful completion of the course, students shall be able to solve real life problem using various results of Number theory.									
Theory syllabus									
Unit	Content								Hrs
1	Some Preliminary Consideration: Well-Ordering Principle, Mathematical Induction, the Binomial Theorem & binomial coefficients. Divisibility Theory: the division algorithm, divisor, remainder, prime, relatively prime, the greatest common divisor, the Euclidean algorithm (Without proof), the least common multiple, the linear Diophantine equation & its solution.								12
2	Prime Numbers: Prime and composite number, the Fundamental Theorem of Arithmetic (without proof), canonical form of a number, the Sieve of Eratosthenes.								11
3	Theory of Congruence: Definition and basic properties of congruence, Residue class & complete system of residues, special divisibility test, linear congruence, Chinese Remainder Theorem. (without proof)								11
4	Fermat's Theorem: Fermat's Factorization method, Fermat's little theorem, Wilson theorem, Euler's theorem: Euler's Phi-function and formula for $\phi(n)$ , Euler's theorem (without proof) and only problems on Euler's theorem.								11
Reference Books									
1	Elementary Number Theory - David M. Burton, Sixth Edition, Universal Book stall, New Delhi.								
2	A first course in Theory of Numbers - K. C. Chowdhary, Asian Books Pvt Ltd New Delhi								
3	An introduction to the Theory of numbers - Niven and Zuckerman, Wiley Eastern Ltd.								
4	Number Theory - S. G. Telang, Tata Mc Graw-Hill Publishing Company Limited, New Delhi								
5	Number Theory - George E. Andrews, Hindustan Publishing Corporation- Delhi.								

# GANPAT UNIVERSITY

## FACULTY OF SCIENCE

Programme	Bachelor of Science	Branch/Spec.	Mathematics	
Semester	VI	Version	1.0.0.0	
Effective from Academic Year	2015-16	Effective for the batch Admitted in	July 2013	
Subject code	UMTA604GTH	Subject Name	Graph Theory	
Teaching scheme		Examination scheme (Marks)		
(Per week)	Lecture(DT)	Practical(Lab.)	Total	
	L TU	P TW		
Credit	3	--	3	Theory 40 SEE 60 Total 100
Hours	3	--	3	Practical -- -- --

**Pre-requisites:**

Basic concept of Set theory and elementary Number theory.

**Learning Outcome:**

After successful completion of the course, students shall be able to model and solve real world problems using Graphs and Trees.

**Theory syllabus**

Unit	Content	Hrs
1	Graphs, Basic Definitions, Undirected Graphs, Mixed Weighted Graphs, Incidence and Degree, Bipartite Graph and Bipartition, Regular and K-regular Graph, Graph Isomorphism	12
2	Sub Graphs, Graph Operations, Walk, Trail, Paths, Circuits, Connected Graph, Disconnected Graph, Eccentricity, Radius and Diameter, Adjacency Strong, Weak and Unilateral Components, Euler Graphs, Hamilton Paths, Trees, Binary Trees And marray Tree, Spanning Trees.	11
3	Cut set, Internaly Disjoint Paths, Connectivity and Separability, Planar Graphs and their different Representation, Detection Of Planarity, Geometric and Combinatorial duals, Vector Space Associated With a Graph. Circuit and Cut set Subspaces, Orthogonal Vectors And spaces.	11
4	Incidence Matrix, Adjancy Matrix Of a Graph. Path matrix and their relationships. Coloring of a Graph, Chromatic Number, Chromatic Partitioning, Covering. A cyclic Digraphs and dia cyclizations.	11

**Reference Books**

1	Graph Theory with Applications to Engineering and Computer Science by Narsing Deo
2	A First Look at Graph Theory - John Clark and Derek Allan Holton, Allied Publishers Limited
3	Introduction to Graph Theory - Douglas B. West, Prentice-Hall of India, Second Edition, 2006, ISBN-81-203-2142-1.
4	An Introduction To Discrete Mathematics, Udayan M. Prajapati, Dr.Ajay S. Gor, Nirav Prakashan
5	Graph Theory – G. Suresh Singh, Prentice Hall of India

# GANPAT UNIVERSITY

## FACULTY OF SCIENCE

Programme		Bachelor of Science			Branch/Spec.	Mathematics			
Semester		VI			Version	1.0.0.0			
Effective from Academic Year			2015-16		Effective for the batch Admitted in			July 2013	
Subject code		USEA605DMT	Subject Name		Discrete Mathematics				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	--	--	--	2	Theory	40	60	100
Hours	2	--	--	--	2	Practical	--	--	--
Pre-requisites:									
Integers, Graphs, Logical statements.									
Learning Outcome:									
After successful completion of the course, students shall be able to formulate and interpret statements presented in Boolean logic as well as reformulate statements from common language to formal logic.									
Theory syllabus									
Unit	Content								Hrs
1	Binary Relation, Reflexive, Irreflexive, Symmetric, Antisymmetric, Transitive, Partial Ordering (omit lexicographic ordering), Hasse Diagram, Upper bound, lower bound, lub, glb, Lattice as a poset, Properties of lattices, Lattice as an algebraic system (only definition), Sublattice, Homomorphism, Some Special Lattices.								15
2	Boolean Algebra, Subalgebra, Direct Product, Homomorphism, Join Irreducible, Atoms, Boolean Expression, Equivalent Boolean Expression, Minterm, Maxterm, Values of Boolean Expressions, Stone's Representation Theorem for finite Boolean Algebra, Sum of Products Canonical forms, Product of Sums Canonical forms, Symmetric Boolean expression.								15
Reference Books									
1	Discrete Mathematical Structures with Applications to Computer Science -J. R. Tremblay and R. Manohar, Macgraw-Hill International Editions, ISBN 0-07-065142-6.								
2	Boolean Algebra and its Application – J. E. Whitesitt, Addison-Wesley Publishing Co. Inc.								
3	Foundation of Discrete Mathematics – K. D. Joshi, New Age International Limite Publishers, ISBN 81-224-0120-1.								
4	Logic and Boolean Algebra – B. H. Arnold, P H Inc LCCN 62-19100.								
5	Sets Lattices and Boolean Algebras - James C Abbott.								

GANPAT UNIVERSITY									
FACULTY OF SCIENCE									
Programme	Bachelor of Science				Branch/Spec.	Mathematics			
Semester	VI				Version	1.0.0.0			
Effective from Academic Year	2015-16				Effective for the batch Admitted in	July 2013			
Subject code	USEA605MTS		Subject Name		Mathematical Statistics - II				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	--	--	--	2	Theory	40	60	100
Hours	2	--	--	--	2	Practical	--	--	--
Pre-requisites:									
Logical arguments and theory of probability.									
Learning Outcome:									
After successful completion of the course, students shall be able to find optimization as well as use the correlation and regression analysis.									
Theory syllabus									
Unit	Content								Hrs
1	LPP Formulation & Graphical Method: Introduction, Structure of linear programming, problems, Important terms used in L P Problems, Objective function, constraints, Solution, feasible solution, Basic solution, BFS, Non-degenerate B.F.S, Degenerate solution, Infeasible, Unbounded & Multiple optimal solution, Slack & Surplus variables, Artificial variable, Formulation of LPP & a solution by Graphical method.								15
2	Correlation & Regression analysis :Definition of correlation, positive & negative correlation, Scatter diagram, Carl- Pearson's coefficient of linear correlation, Properties of correlation coefficients and its examples, regression coefficient, properties of regression coefficient and its examples.								15
Reference Books									
1	Operation Research, by J.K.Sharma.								
2	Business Statistics , by R.S.Bhadyaj								
3	Business Statistics , by Bharat Jhnujhunwala								

# GANPAT UNIVERSITY

## FACULTY OF SCIENCE

Programme	Bachelor of Science				Branch/Spec.	Mathematics			
Semester	VI				Version	1.0.0.0			
Effective from Academic Year		2015-16			Effective for the batch Admitted in			July 2013	
Subject code	UENA606ENG	Subject Name			English-VI				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total	CE	SEE	Total	
	L	TU	P	TW					
Credit	2	--	--	--	2	Theory	40	60	100
Hours	2	--	--	--	2	Practical	--	--	--
Pre-requisites:									
<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>									
Learning Outcome:									
<ul style="list-style-type: none"> <li>• Development of reading and writing skills.</li> <li>• Writing for newspapers.</li> <li>• Development of electronic communication skills.</li> <li>• Acquaintance with Target Language Vocabulary and writing practices.</li> </ul>									
Theory syllabus									
Unit	Content								Hrs
1	Les Miserables by Victor Hugo								8
2	Les Miserables by Victor Hugo								7
3	Writing For Newspapers <ul style="list-style-type: none"> <li>➤ Drafting News Article</li> <li>➤ Press Release for College Event, University Event,</li> <li>➤ Educational News</li> </ul>								8
4	Electronic Communication <ul style="list-style-type: none"> <li>➤ Participating in Telephonic Communication,</li> <li>➤ Making Notes of phone calls received on behalf of others,</li> <li>➤ Communicating through email,</li> <li>➤ Voice Mail</li> </ul>								7
Reference Books									
1	Les Miserables by Victor Hugo								
2	Business Communication by Anjali Karkar and Others, Orient Black Swan Publication								
3	Business Communication by Urmila Rai and S.M.Rai								
4	Business Communication by Rodha Doctor and Aspi Doctor								



# GANPAT UNIVERSITY

## FACULTY OF SCIENCE

Programme	Bachelor of Science	Branch/Spec.	Mathematics
Semester	VI	Version	2.0.0.0
Effective from Academic Year	2016-17	Effective for the batch Admitted in	July 2014
Subject code	UPTA607PRA	Subject Name	Practical Module - VI
Teaching scheme	Examination scheme (Marks)		
(Per week)	Lecture(DT)	Practical(Lab.)	Total
	L	TU	P
			TW
Credit	--	--	6
Hours	--	--	12
			6
			Theory
			--
			200
			200

Students should have theoretical knowledge of Ring theory, Real Analysis, Number Theory and Graph Theory.

After successful completion of the course, students shall be able improve problem solving skill as well as implement the Mathematical concept to solve real world problems.

Unit	Content	Hrs
1	Problems based on ring, Subring and ideals, fundamental theorem of Isomorphism, division algorithm for polynomial, Eisenstein's criterion for irreducibility, modulo p test, prime ideal, maximal ideal, Contraction of field with finite elements, rational roots of polynomial.	45
2	Problems based on L'Hospital rule, uniform continuity of functions from a metric space to a metric space, uniform convergence of sequences and series of functions, Discontinuity of functions, Taylor's theorem, Riemann Stieltje's integral, mean value theorems, integration of vector valued functions, compactness and connectedness of a mapping from a metric space to a metric space.	45
3	Problems based on Division Algorithm, Euclidean Algorithm, greatest common divisors and least common multiple its application, Congruence relation, Linear congruence equation and its solution, Chinese Remainder theorem, Fermat's theorem, Euler's phi function, Wilson theorem.	45
4	Problems based on degree sum formula, isomorphic graphs, eccentricity, radius and diameter, spanning tree, cut vertex, Euler graph, Hamiltonian graph, planar graph, coloring of graphs, matrix representation of graphs.	45

1	"Abstract Algebra", I. H. Sheth, PHI, New Delhi.
2	"Topics in Algebra", I. N. Herstein, Vikas Publishing, New Delhi.
3	"Principles of Mathematical Analysis", Walter Rudin, McGraw Hill.
4	"A First Course in Mathematical Analysis", D. Somasundaram & B. Choudhary, Narosa Publishing House.
5	"Elementary Number Theory", David M. Burton, Sixth Edition, Universal Book stall, New Delhi.
6	"A first course in Theory of Numbers", K. C. Chowdhary, Asian Books Pvt Ltd New Delhi.
7	"Graph Theory with Applications to Engineering and Computer Science", Narsing Deo.
8	"A First Look at Graph Theory", John Clark and Derek Allan Holton, Allied Publishers Limited.