GANPAT UNIVERSITY

FACULTY OF SCIENCE

TEACHING AND EXAMINATION SCHEME

Programme	Master of Science	Branch/Spec.	Mathematics
Semester	III		
Effective from Academic Year	2021-22	Effective for the batch Admitted in	July 2020

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	MMAT3FAS	Functional Analysis - I	4	1	5	--	--	--	4	1	5	-	--	--	40	60	100	--	--	--
2	MMAT3LME	Lebesgue Measure	4	1	5	--	--	--	4	1	5	-	--	--	40	60	100	--	--	--
3	MMAT3AAA	Advanced Abstract Algebra	4	1	5	--	--	--	4	1	5	-	--	--	40	60	100	--	--	--
4	MMAT3ITR	Integral Transforms	4	1	5	--	--	--	4	1	5	-	--	--	40	60	100	--	--	--
5	Discipline Specific Elective*		4	1	5	--	--	--	4	1	5	-	--	--	40	60	100	--	--	--
6	MOPE3SSD	Soft Skills and Development	2	--	2	--	--	--	2	--	2	--	--	--	40	60	100	--	--	--
		Total	22	05	27	--	--	--	22	05	27	-	--	--	240	360	600	--	--	--

*any one subject can be offered from the following list of discipline specific elective subjects.

Discipline Specific Elective

Sr.No.	Subject Code	Subject Name
1	MSEL3FMA	Financial Mathematics
2	MSEL3PAS	Probability and Statistics
3	MSEL3PRS	Problem Solving
4	MOOCs courses from SWAYAM PORTAL	

Program Outcomes (POs)

After completion of M.Sc. in Mathematics, students will be able to

PO-1 Apply knowledge of Mathematics, in all the fields of learning including higher research and its extensions

PO-2 Exposes students to the applications of physical and mathematical principles

PO-3 Provides a systematic understanding of the concepts and theories of mathematical and computing and their application in the real world.

PO-4 Solves critical problems by applying the Mathematical tools.

PO-5 Work as a Mathematics professional, and qualify for training as a scientific researcher.

PO-6 Enhances Logical reasoning skills, arithmetic skills, aptitude skills communication skills, self-confidence for better employability

PO-7 Participate in scientific work and independently handle business functions using learned skills

PO-8 Provide high quality and relevant education in the field of Mathematics

PO-9 Select interpret and critically evaluate information from a range of sources that include books, scientific reports, journals, case studies and the internet

PO-10 Equipped with the axiomatic nature of mathematics, and enable themselves to work creatively within this framework

PO-11 Apply ethical principles and commit to professional ethics, responsibilities and norms of the society.

PO-12 Crack lectureship and fellowship exams approved by UGS like CSIR – NET and SET.

Program Specific Outcomes (PSOs)

PSO-1 Graduates will expand and extend their comprehension of cutting edge numerical ideas and models to improve their prosperity as mathematician and teacher.

PSO-2 To prepare the graduates for getting work in various territories, for example, Educational/Research establishments, Administrative positions, Industries, Banks, Insurance Companies since the effect of the subject concerned is extremely wide and set themselves up to break serious assessments, lectureship and fellowship tests endorsed by UGC like CSIR – NET and SET

PSO-3 To create critical thinking aptitudes for competitive tests, to upgrade thinking and systematic abilities, to create showing aptitudes by partaking in classes/meetings/workshops and to create expertise to think fundamentally on conceptual ideas of Mathematics.

PSO-4 Graduates will be able to work successfully and execute multidisciplinary research, perceive the need to take part in long lasting learning through proceeding with instruction and exploration, apply moral standards and focus on proficient morals, obligations and standards in the general.

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Programme	Master of Science				Branch/Spec.	Mathematics		
Semester	III				Version	2.0.0.1		
Effective from Academic Year			2021-22		Effective for the batch Admitted in			July 2020
Subject code	MMAT3FAS		Subject Name		Functional Analysis – I			
Teaching scheme					Examination scheme (Marks)			
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	4	1	--	--	5	Theory	40	60	100
Hours	4	1	--	--	5	Practical	--	--	--

Objective:

The objective of this course is to introduce the elementary aspects of Banach Spaces and operators.

Pre-requisites:

Basic knowledge of linear algebra and topology.

Course Outcome:

COs	Description
CO1	Discuss the structure of normed linear spaces, Banach space, and Dual spaces
CO2	Appreciate the power of classical results of Functional Analysis such as Hahn-Banach theorem, closed graph theorem and open mapping theorem
CO3	Explain the concept of weak and weak* convergence, Bolzano Weierstrass Property
CO4	Examine the convergence of Quadrature formulae
CO5	Distinguish between finite and infinite-dimensional spaces
CO6	Apply linear operators in the formulation of differential and integral equations

Mapping of CO and PO/PSOs:

	PO - 1	PO - 2	PO - 3	PO - 4	PO - 5	PO - 6	PO - 7	PO - 8	PO - 9	PO - 10	PO - 11	PO - 12	PSO-1	PSO-2	PSO-3	PSO-4
CO1	3	2	2	1	2	2	2	3	2	2	0	2	2	0	1	2
CO2	2	3	2	2	3	2	2	3	3	3	0	1	3	1	2	3
CO3	3	3	2	2	2	3	2	2	3	2	0	1	1	1	1	1
CO4	2	3	2	2	3	2	2	1	2	2	0	1	1	0	1	1
CO5	3	2	2	2	3	1	2	2	3	2	0	2	1	1	0	2
CO6	3	2	3	3	2	2	2	2	2	3	0	2	2	1	1	1

Theory syllabus		
Unit	Content	Hrs
1	Normed linear spaces (examples and basic properties), Holder-Minkowski Inequalities; Bounded linear transformations. Space of bounded linear transformations.	15
2	Hahn-Banach Theorems (separation and extension), strict convexity and uniqueness of Hahn-Banach extension, Banach spaces, Uniform boundedness principle (consequences and examples), Convergence of Quadrature formulae.	15
3	Closed graph Theorem. Projections. Open mapping Theorem, bounded inverse theorem. Spectrum of a bounded linear transformation and its parts. Spectrum of a finite rank operator.	15
4	Duals and transposes, duals of and C([a, b]), weak and weak* convergence, Bolzano Weiestrass Property. Reflexivity, Uniform Convexity and Milman Theorem.	15
Reference Books		
1	"Functional Analysis", B. V. Limaye, New Age International (P) Ltd., 2001.	
2	"Introduction to topology and modern analysis", G. F. Simmons, McGraw –Hill Book Co.1963;	
3	"Text book of Functional Analysis: A problem oriented approach", V. K. Krishnan, Prentice Hall of India, 2001.	
4	"Functional Analysis-a first course", Thamban Nair, Printice Hall of India, 2002.	
5	"Foundations of Functional Analysis", S. Ponnusamy, Narosa Pub. House, 2004.	
6	"An introductory functional analysis with application", E.Kreyszig, WSE edition, 1989.	

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Programme	Master of Science				Branch/Spec.	Mathematics		
Semester	III				Version	2.0.0.1		
Effective from Academic Year		2021-22			Effective for the batch Admitted in			July 2020
Subject code	MMAT3LME	Subject Name			Lebesgue Measure			
Teaching scheme					Examination scheme (Marks)			
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	4	1	--	--	5	Theory	40	60	100
Hours	4	1	--	--	5	Practical	--	--	--

Objective:

The initial objective of the course is to introduce the concept of Lebesgue measure for bounded subsets of R. This concept of Lebesgue measure is later used in developing the theory of (Lebesgue) integration which gives stronger (and better) results as compared to the theory of Riemann integration.

Pre-requisites:

Basic knowledge of set theory and mathematical analysis.

Course Outcome:

COs	Description
CO1	Appreciate the niceties provided by Lebesgue Integration theory.
CO2	Define Lebesgue integral for bounded functions, non-negative and unbounded functions
CO3	Compare Riemann integral with Lebesgue integral
CO4	Establish continuity theorem like Fatou's Lemma, BCT, MCT, LDCT
CO5	Derive countable additivity of the Lebesgue integral
CO6	Apply the fundamental theorem of calculus

Mapping of CO and PO/PSOs:

	PO - 1	PO - 2	PO - 3	PO - 4	PO - 5	PO - 6	PO - 7	PO - 8	PO - 9	PO - 10	PO - 11	PO - 12	PSO-1	PSO-2	PSO-3	PSO-4
CO1	2	2	2	2	2	2	2	2	2	2	0	1	1	0	0	1
CO2	3	2	2	1	2	3	2	2	3	3	0	2	2	1	1	1
CO3	3	2	2	2	2	3	2	3	3	3	0	2	1	2	1	0
CO4	2	2	1	2	2	3	2	2	2	2	0	1	1	1	1	1
CO5	3	2	2	2	2	2	3	3	3	3	0	2	2	1	0	1
CO6	2	2	2	2	2	3	2	2	2	2	0	2	1	1	2	3

Theory syllabus		
Unit	Content	Hrs
1	Algebra and σ- algebra of sets, Borel sets in $\mathbb{R}$, Lebesgue outer measure in $\mathbb{R}$, measurable sets and its properties, Lebesgue measure on $\mathbb{R}$.	15
2	Further properties of measurable sets, Non-measurable sets, Definition and the properties of Measurable functions.	15
3	Convergence in measure and the related important results, Approximations of measurable functions by bounded measurable functions and continuous functions.	15
4	Littlewood's three principles, Egoroff's theorem,	15
Reference Books		
1	"Real Analysis", H.L.Royden, (3rd Edition) Mc. Millan, 1998.	
2	"An introduction to measure and integration", Rana, I. K., Narosa Publ. House, New Delhi, 1997.	
3	"Introduction to measure theory", De Barra G., Van Nostrand Reinhold Co., 1974	
4	"Methods of Real Analysis", Richard Goldberg – Oxford & IBH Publishing Company, 1964.	
5	"Theory of Functions of a real variable", I. P. Natanson, Frederic Ungar Publishing Co., New York 1964.	
6	"Real and Abstract Analysis", E. Hewitt and K. Stromberg , Springer Verlag, 1965.	

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Programme	Master of Science	Branch/Spec.	Mathematics
Semester	III	Version	2.0.0.1
Effective from Academic Year	2021-22	Effective for the batch Admitted in	July 2020
Subject code	MMAT3AAA	Subject Name	Advanced Abstract Algebra

Teaching scheme						Examination scheme (Marks)			
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	4	1	--	--	5	Theory	40	60	100
Hours	4	1	--	--	5	Practical	--	--	--

Objective:

The objective of this course is to study Ring theory and Field theory, and introduce Galois theory with some applications.

Pre-requisites:

Basic knowledge of Abstract Algebra.

Course Outcome:

COs	Description
CO1	Distinguish fields and field extensions in a mathematical mature way
CO2	Discuss Ideals and Quotient rings, Field of quotients of an integral domain
CO3	Concentrate on a particular Euclidean rings and other forms of Polynomial rings
CO4	Apply the fundamental theorem of Galois theory
CO5	Check solvability of polynomials by radicals
CO6	Appreciate the role of algebra in solving some old classical problems of geometry and algebra

Mapping of CO and PO/PSOs:

	PO - 1	PO - 2	PO - 3	PO - 4	PO - 5	PO - 6	PO - 7	PO - 8	PO - 9	PO - 10	PO - 11	PO - 12	PSO-1	PSO-2	PSO-3	PSO-4
CO1	3	2	2	2	2	2	2	3	3	3	0	3	2	1	2	2
CO2	3	2	2	2	3	3	3	3	3	2	0	3	2	1	1	1
CO3	2	3	1	2	2	2	2	2	2	3	0	2	1	3	2	1
CO4	2	2	2	2	2	3	2	3	3	3	0	3	1	2	2	1
CO5	3	2	3	3	3	2	2	3	3	2	0	3	3	3	2	2
CO6	2	2	2	3	3	3	3	3	3	3	0	2	1	1	2	1

Theory syllabus		
Unit	Content	Hrs
1	Ideals, Factor rings, Prime ideals, Maximal ideals, Ring homomorphisms and their properties, Ring isomorphisms, The field of quotients, Polynomial rings, The division algorithm and consequences, Principal ideal domains.	15
2	Extension fields, Splitting fields, Zeros of an irreducible polynomial, Characterization of extensions, Types of extensions, Properties of algebraic extensions	15
3	Finite fields, Geometric constructions, Fundamental theorem of Galois theory.	15
4	Cyclotomic polynomials, Cyclotomic extensions, The constructible regular n-gons, Solvability of polynomials by radicals, Insolvability of a quintic,.	15

Reference Books	
1	“Contemporary Abstract Algebra” - Joseph A. Gallian, Narosa Publishing Hous.
2	“Basic Abstract Algebra”, P. B. Bhattacharya, S. K. Jain and S. R. Nagpaul, Cambridge University Press, South Indian Edition.
3	“Topics in Algebra”, I. N. Herstein, Wiley Eastern. Ltd., New Delhi.
4	“Algebra”, M. Artin, Prentice Hall of India.
5	“Basic Algebra”, Vol. II’, N. Jacobson, Hundastan Publ. Co., Delhi.
6	“Algebra”, Thomas W., Hungerford, Springer.

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Programme	Master of Science				Branch/Spec.	Mathematics		
Semester	III				Version	2.0.0.1		
Effective from Academic Year		2021-22			Effective for the batch Admitted in			July 2020
Subject code	MMAT3ITR	Subject Name			Integral Transforms			
Teaching scheme					Examination scheme (Marks)			
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	4	1	--	--	5	Theory	40	60	100
Hours	4	1	--	--	5	Practical	--	--	--

Objective:

Integral transforms are one of the usual tools in solving differential equations.The objective of this course is to introduce various integral transforms and study its applications.

Pre-requisites:

Basic knowledge of calculus and differential equations.

Course Outcome:

COs	Description
CO1	Discuss the different Integral Transforms which play an important role in solving differential equations.
CO2	Find the Laplace transform of a several function
CO3	Solve an initial value problem using the Laplace transform
CO4	Express the periodic function as a Fourier series
CO5	Obtain the Fourier transform of a several function
CO6	Derive the Z transform of a several function

Mapping of CO and PO/PSOs:

	PO - 1	PO - 2	PO - 3	PO - 4	PO - 5	PO - 6	PO - 7	PO - 8	PO - 9	PO - 10	PO - 11	PO - 12	PSO-1	PSO-2	PSO-3	PSO-4
CO1	3	3	3	3	3	2	2	3	3	3	0	3	2	3	2	2
CO2	2	3	3	3	3	2	3	3	3	2	0	3	3	3	3	3
CO3	2	3	3	3	3	2	3	3	3	3	0	3	2	3	2	2
CO4	3	3	3	3	3	3	3	3	3	3	0	3	2	1	2	1
CO5	2	3	3	3	3	3	3	3	3	2	0	3	1	1	1	1
CO6	2	3	3	3	3	3	3	3	3	2	0	3	2	2	1	2

Theory syllabus		
Unit	Content	Hrs
1	Fourier series and applications to boundary value problems and summation of infinite series.	15
2	Fourier integral representation and applications. Fourier transforms, computations of Fourier transforms of functions, properties of Fourier transforms, convolution and Fourier transform, applications to the boundary value problems involving Heat equation, Wave equation and Laplace equations.	15
3	Laplace transform, Laplace transforms of some functions, properties of Laplace transform, inverse transform, convolution theorem, applications to solutions of ordinary differential equations, applications to the solutions of diffusion equation and wave equation.	15
4	Introduction and properties of Z-transform, change of scale and shifting property. Inverse Z-transforms, Multiplication and division by K, Initial and Final value, Partial sums, Convolution property of Casual sequence, Inverse of Z-transform by division, binomial expansion and partial fractions, Inversion by Residue Method, Solution of difference equations	15
Reference Books		
1	“Advanced Engineering Mathematics”, Erwin Kreyszig, Wiley Student Edition, Eighth Edition 1999.	
2	“Mathematical Methods”, Courant and Hilbert.	
3	“Advanced Engineering Mathematics”, H. K. Dass, S. Chand 2006.	
4	“Special Functions of Mathematical Physics and Chemistry”, I.N. Sneddon.	
5	“Higher Engineering Mathematics”, B.S. Grewal, , Khanna Publishers, New Delhi, 2004.	
6	“Applied Mathematics for Engineers and Physicists”, L. A. Pipes.	

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Programme	Master of Science		Branch/Spec.	Mathematics	
Semester	III		Version	2.0.0.1	
Effective from Academic Year	2021-22		Effective for the batch Admitted in		July 2020
Subject code	MSEL3FMA	Subject Name	Financial Mathematics		

Teaching scheme						Examination scheme (Marks)			
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	4	1	--	--	5	Theory	40	60	100
Hours	4	1	--	--	5	Practical	--	--	--

Objective:

The course aims to introduce the basic concepts and products of modern financial mathematics.

Pre-requisites:

Basic knowledge of Mathematical Concepts.

Course Outcome:

COs	Description
CO1	Expose main tools used in the pricing of bonds, European, American and Exotic Options
CO2	Discuss the types of interest rates
CO3	Explain Stochastic Processes like Markov process, Wiener process.
CO4	Derive one step and two step Binomial models for European options
CO5	Solve Black-Schole-Merton differential equation
CO6	Derive a simple model for stock price it's properties

Mapping of CO and PO/PSOs:

	PO - 1	PO - 2	PO - 3	PO - 4	PO - 5	PO - 6	PO - 7	PO - 8	PO - 9	PO - 10	PO - 11	PO - 12	PSO -1	PSO -2	PSO -3	PSO -4
CO1	1	1	2	1	1	1	1	2	0	1	0	1	1	1	3	1
CO2	1	2	1	2	2	1	2	2	0	1	0	2	0	1	0	0
CO3	1	2	2	1	1	1	3	2	0	2	0	3	1	2	1	2
CO4	2	2	2	2	2	1	3	2	0	2	0	3	0	2	0	1
CO5	1	1	1	3	2	1	2	2	0	3	0	2	1	0	1	1
CO6	2	2	2	1	2	1	3	2	0	3	0	3	0	2	1	2

Theory syllabus		
Unit	Content	Hrs
1	Basic option theory, European and American options, forward and future contracts, hedgers, speculators and arbitrageurs, hedging, arbitraging and speculation using options.	15
2	Types of interest rates: treasury rate, LIBOR rate, LIBID rate, Repo rate, continuously compounding interest rate, Forward rate, n-year zero interest rate, Stochastic Processes: Markov process, Wiener process, Ito process.	15
3	A simple model for stock price, Ito's lemma, the lognormal property. One step and two step Binomial models for European options, risk-Neutral valuation.	15
4	Partial differential equations. Put call parity, Black-Schole-Merton differential equation and its formulae, examples.	15
Reference Books		
1	"The mathematics of financial derivatives", P. Wilmott, S. Howison and J. Dewynne, Cambridge Uni. Press, 1995.	
2	"An elementary introduction to mathematical finance", Sheldon M. Ross, Cambridge Uni. Press, 2003.	
3	"Options, futures and other derivatives", John C. Hull, Prentice Hall.	
4	"Financial derivatives: theory, concepts and problems", Gupta S. L., Prentice Hall of India.	
5	"Financial Derivatives in Theory and Practice", J.B. Hunt and J.E. Kennedy, Wiley, 2005.	
6	"Financial Calculus: An introduction to Derivative Pricing", M. Baxter and A. Rennie.	

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Programme	Master of Science				Branch/Spec.	Mathematics			
Semester	III				Version	2.0.0.1			
Effective from Academic Year		2021-22			Effective for the batch Admitted in				July 2020
Subject code	MSEL3PAS	Subject Name			Probability and Statistics				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	4	1	--	--	5	Theory	40	60	100
Hours	4	1	--	--	5	Practical	--	--	--

Objective:

The course aims to introduce the basic concepts Probability and Statistics

Pre-requisites:

Logical arguments, Permutations and combinations.

Course Outcome:

COs	Description
CO1	Organize, manage and present the data graphically using frequency distributions and cumulative frequency distributions.
CO2	Find the harmonic and geometric means and analyze the statistical data using measures of central tendency.
CO3	Discuss the measures of dispersion in terms of range and deviation.
CO4	Use the basic probability rules by including additive and multiplicative laws and the terms of independent and mutually exclusive events.
CO5	Calculate the probabilities, and derive the marginal and conditional distributions of bivariate random variables.
CO6	Use discrete and continuous probability distributions like binomial, poisson, normal, and exponential distribution

Mapping of CO and PO/PSOs:

	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3	PSO -4
CO1	1	1	1	2	1	1	1	1	0	2	0	2	1	3	1	1
CO2	1	2	2	1	1	1	2	1	0	2	0	3	1	2	1	0
CO3	2	2	1	2	2	2	3	1	0	1	0	2	1	1	1	1
CO4	2	1	2	2	1	1	3	1	0	2	0	3	1	2	1	1
CO5	1	1	1	1	1	2	2	1	0	1	0	2	1	2	0	1
CO6	2	2	1	2	1	1	2	1	0	2	0	2	1	2	1	2

Theory syllabus		
Unit	Content	Hrs
1	Measures of central tendency: Mean, mode and median, harmonic and geometric means. Measures of dispersion: Range, standard deviation, mean deviation.	15
2	Correlation & Regression analysis :Definitions of correlation, positive & negative correlations, Scatter diagram, Karl- Pearson's coefficient of linear correlation, Properties of correlation coefficients and examples, regression coefficient, properties of regression coefficient and examples.	15
3	Classical- Statistical (or Empirical)- Axiomatic (Modern) definition of probability, Definitions of event, equally likely, mutually exclusive and exhaustive events, Probability theorems, Statements of Baye's theorem and examples, Conditional probability and examples.	15
4	Definitions of a Random variable, Probability Distribution of a random variable, Binomial distribution, Poisson distribution, Normal distribution, Exponential distribution and examples.	15
Reference Books		
1	"Comprehensive Statistical Method", P.N.Arora, Sumeet Arora, S. Arora.	
2	"Business Statistics", Bharat Jhunjhunwala, S. Chand Prakashan.	
3	"Business Statistics", R.S. Bhardwaj.	
4	"Statistics", R.S.N.Pillai, V. Bagavathi, S. Chand & Company, New- Delhi.	
5	"Biostatistics", Veerbala Rastogi.	

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Programme	Master of Science	Branch/Spec.	Mathematics
Semester	III	Version	2.0.0.1
Effective from Academic Year	2021-22	Effective for the batch Admitted in	July 2020
Subject code	MSEL3PRS	Subject Name	Problem Solving

Teaching scheme						Examination scheme (Marks)			
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	4	1	--	--	5	Theory	40	60	100
Hours	4	1	--	--	5	Practical	--	--	--

Objective:

The objective of this paper is to develop and enhance the problem solving skills of the students. The focus will be on using the theory results skillfully to solve the mathematical exercises.

Pre-requisites:

The focus will be on using the theory results skill fully to solve the mathematical exercises. The students opting for this paper are expected to have good understanding of Mathematics.

Course Outcome:

COs	Description
CO1	Develop and enhance the problem-solving skills.
CO2	Appreciate the power of classical results of Functional Analysis
CO3	Apply Egorffe's theorem
CO4	Distinguish between the fields and field extensions in a mathematical mature way
CO5	Discuss the different Integral Transforms which play an important role in solving differential equations.
CO6	Solve a system of linear congruence equations using Chinese remainder theorem

Mapping of CO and PO/PSOs:

	PO - 1	PO - 2	PO - 3	PO - 4	PO - 5	PO - 6	PO - 7	PO - 8	PO - 9	PO - 10	PO - 11	PO - 12	PSO-1	PSO-2	PSO-3	PSO-4
CO1	3	3	3	3	3	2	3	3	3	3	0	3	3	3	3	3
CO2	3	2	2	2	2	3	2	3	2	3	0	2	2	2	2	1
CO3	2	2	2	2	2	2	2	2	2	3	0	1	1	0	0	1
CO4	3	2	2	2	2	3	2	2	2	3	0	3	2	2	1	1
CO5	2	3	3	3	3	2	3	3	3	3	0	3	2	3	1	2
CO6	3	2	3	3	3	3	3	3	3	3	0	3	3	2	2	1

Theory syllabus

Problems form topics of the syllabus of current semester which appear in recent syllabus of CSIR UGC NET exam.

References

1 Model question papers available at http://csirhrdg.res.in/csirnetmqs.htm

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Programme	Master of Science	Branch/Spec.	Mathematics
Semester	III	Version	2.0.0.1
Effective from Academic Year	2021-22	Effective for the batch Admitted in	July 2020
Subject code	MOPE3SSD	Subject Name	Soft Skills and Development

Teaching scheme						Examination scheme (Marks)			
(Per week)	Lecture(DT)		Practical(Lab)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	02	--	-	-	02	Theory	40	60	100
Hours	02	--	-	-	02	Practical	--	--	--

Objective:

This course aims at developing soft skills as well as written and oral Professional Communication skills to enhance the ability to act with confidence, develop the overall personality of the student and its application in professional world.

Pre-requisites:

Considerable (Intermediate level) ability to use skills like Listening, Reading, Speaking and Writing

Course Outcome:

COs	Description
CO1	Preparing students for the job with things llike Resume preparation, Job Application, and Interview techniques.
CO2	Encouring students to broaden their understanding and apply their knowledge in writing Proposals, Technical Papers, and Research Papers.
CO3	Sharpening their interpersonal skills, students are expected to do Debate, a Public speech and also to learn the craft of becoming an effective leader.
CO4	Inspiring the students to have the first hand understanding of Time Management, SWOT Analysis, Mantoring and Decision Making.
CO5	Practicing telephonic conversation in Lab and class-room with fellow beings students can apply their brain and practice into the real practical way/ Professionally.
CO6	Acquiring communication knowledge which help students to understand people in professionalism in its efficient way.

Mapping of CO and PO/PSOs:

	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO-1	PSO-2	PSO-3	PSO-4
MOPE3SSD-CO1	1	0	1	0	1	1	1	0	1	0	1	0	0	1	1	1
MOPE3SSD-CO2	1	0	1	0	1	1	1	0	1	0	1	0	0	1	1	1
MOPE3SSD-CO3	1	0	1	0	1	1	1	0	1	0	1	0	0	1	1	1
MOPE3SSD-CO4	1	0	1	0	1	1	1	0	1	0	1	0	0	1	1	1
MOPE3SSD-CO5	1	0	1	0	1	1	1	0	1	0	1	0	0	1	1	1
MOPE3SSD-CO6	1	0	1	0	1	1	1	0	1	0	1	0	0	1	1	1

Theory syllabus		
Unit	Content	Hrs
1	**Technical Writing skills** Drafting of Job Application, Resume preparation, Different types of resume, Guidelines for Writing an Impressive Resume, and recommendation letter, Scientific / Technical writing skills; Proposal writing, Report writing, Bibliography writing, Research paper writing: format and rules	07
2	**Interpersonal Skills** Interviewing: How to face an Interview Board, Proper Body Posture, Group Discussion, Debating Importance of Gestures and Steps to Succeed in Interviews, Self-introduction – highlighting positive and negative traits and Face to Face Communication Leadership: Team building, Strategic Planning, Mentoring, Decision making Delivery of Public Speech, self-confidence and professionalism.	08
3	**Communication Skills:** Verbal and Nonverbal communication, Public Speaking, Listening, Presentation skill: Planning for effective presentation, Discuss 6 great helpers of effective presentation, How to Make Presentation, Presentation Tools, Boredom Factors in Presentation and How to Overcome them.	08
4	**Professional Skills** Etiquettes and Manners, Ethics, Telephonic Etiquettes, Expressing thanks and appreciation, greetings, conversation, Time management, SWOT Analysis	07

Reference Books	
1	Technical Communication - Raman, Meenakshi & Sharma Sangeeta, 2006, OUP, New Delhi
2	Robinson, David; Business Etiquette, Kogan Page.
3	Kaul, Asha; Business Communication, 1998, Prentice-Hall of India Ltd, New Delhi
4	Improve Your Communication Skills - Barker, Alan, 2007, Kagan Page (I) Pvt. Ltd.
5	The Handbook of interviewing - Taylor, Poul J & O'Driscoll Michael P.,2001, Infinity Books.
6	Business Communication - Lesikar, Raymond V & Pettit John D, 1999, AIIBS Publishers, New Delhi.