

SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY

(Established under section 3 of UGC Act, 1956)

Jeppiaar Nagar, Rajiv Gandhi Salai, Chennai-600119.



SYLLABUS

SCHOOL OF SCIENCE AND HUMANITIES

DEPARTMENT OF MATHEMATICS

2020

SMTA2301	SPSS for STATISTICS	L	T	P	CREDITS	TOTAL MARKS
		0	0	2	2	100

Course Objectives

1. To reinforce the basic skills to organize, manage and present data using SPSS.
2. To impart to the students the knowledge of doing statistical data analysis and to demonstrate graphically using frequency distributions and cumulative frequency distributions.

S.No.	Exp. No	Name of experiments	Duration
1.	1	Creation of SPSS data file	2
2.	2	Frequency Analysis- preparation of charts and diagrams	2
3.	3	Descriptive Statistics	2
4.		Extended experiment – 1	2
5.	4	Parametric Test – One sample t-test	2
6.	5	Parametric Test – Independent t-test	2
7.	6	Parametric Test – Paired t-test	2
8.		Extended experiment -2	2
9.	7	Non-parametric Test- Chi-square test	2
10.	8	Non-parametric Test - Mann Whitney test	2
11.	9	Non-parametric Test - Kruskal Wallis test	2
12.		Extended experiment – 3	2
13.	10	Correlation-Bivariate	2
14.	11	Rank Correlation	2
15.	12	Regression	2
16.		Extended experiment -4	2

TEXT BOOKS

1. David M. Levine et al, Statistics for Managers using MS Excel,(6thEdition) Pearson, 2010
2. David R. Anderson, et al, An Introduction to Management Sciences, Quantitative approaches to Decision Making, (13th edition), South-Western College Pub, 2011.
3. William J. Stevenson, Ceyhun Ozgur, Introduction to Management Science with Spreadsheet, Tata McGraw Hill, 2009.
4. Wayne L. Winston, Microsoft Excel 2010, Data Analysis & Business Modeling, 3rdedition, Microsoft Press, 2011.
5. Vikas Gupta, Comdex Business Accounting with Ms Excel, 2010 and Tally ERP 9.0 Course Kit, Wiley India, 2012

6. Kiran Pandya and Smriti Bulsari, SPSS in simple steps, Dreamtech, 2011.

Course Outcomes: At the end of the course, the student will be able to:

CO1	Discuss the concepts in Data Analysis and create data files using SPSS. Compute measures of association and structural models for discrete data
CO2	Preparation of Charts and Tables for frequency distributions using SPSS. Visualize categorical data and conduct explorative data analysis.
CO3	Compute the parametric tests for real world problems. Conduct inference for model parameters.
CO4	Compute the Non-parametric tests for real world problems Check model assumptions and analyze residuals and goodness-of-fit.
CO5	Evaluate Bivariate Correlation Coefficient using Karl Pearson and Spearman.
CO6	Apply Multiple Regression analysis technique for real life problems and predict the future values

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks: 100

Exam Duration: 3 Hrs

CAE Evaluation of Regular Lab class 25 Marks

50 Marks

Model practical exam 25 Marks

ESE University Practical exam

50 Marks

SMTA2401	MAT LAB for NUMERICAL METHODS	L	T	P	CREDITS	TOTAL MARKS
		0	0	3	2	100

List of Experiments

1. Introduction to MATLAB
2. Study of Vector and Matrix Operations
3. Solution of System of equations
 - Gauss Elimination method
 - Gauss Seidal method
4. Numerical Differentiation
5. Numerical Integration
 - Trapezoidal
 - Simpsons rule
6. Least square polynomial approximation
7. Solution of ODE
 - Taylor's series method
 - Euler's method
 - Runge kutta method of fourth order

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks: 100

Exam Duration: 3 Hrs

CAE	Evaluation of Regular Lab class 25 Marks	50 Marks
	Model practical exam 25 Marks	
ESE	University Practical exam	50 Marks

SMTA1504	DATA ANALYTICS	L	T	P	CREDITS	TOTAL MARKS
		3	1	0	4	100

Course Objectives: To educate and motivate the students in the field of data analysis. To allow the students to have a deep knowledge in fundamentals of statistics

Unit I: Introduction to Data Analysis

10 Hrs

Introduction – collection, classification and tabulation of data – Concept of primary and secondary data – Data - quantitative and qualitative, attributes, variables, scales of measurement - nominal, ordinal, interval and ratio – Data visualization - Bar diagram, pie chart, histogram, frequency curve and frequency polygon – Ogives- Introduction to statistical learning and R-Programming

Unit II: Descriptive Statistics

10 Hrs

Measures of central tendency - Measures of location of dispersions - Practice and analysis with R.

Unit III: Bivariate data

10 Hrs

Definition, scatter diagram, simple, partial and multiple correlation (3 variables only), Simple linear regression, principle of least squares and fitting of polynomials and exponential curves –Practice and analysis with R.

Unit IV: Analysis of Time Series

10 Hrs

Introduction to times series data - Components of a time series- Decomposition of time series - Trend - Measure of trend – Graphical method, Semi Average method, Moving Average method and Least Square method – Measurement of Seasonal Variation – Simple Average method, Ratio Trend method and Ratio Moving Average method.

Unit IV Multivariate Analysis

10 Hrs

Multivariate Techniques - Multiple Regression Analysis - Factor Analysis – Discriminant Analysis – Cluster Methods - Artificial Neural Networks.

TEXT / REFERENCE BOOKS

1. D.C. Montgomery & E. Peck- Introduction to Linear Regression Analysis
2. A.M. Mood, F.A. Graybill & D.C. Boes. Introduction to the Theory of Statistics
3. N. Draper & H. Smith- Applied Regression Analysis
4. S. M. Ross, "A first course in Probability", Prentice Hall.
5. I. R. Miller, J.E. Freund and R. Johnson, "Probability and Statistics for Engineers". Fourth Edition, PHI.
6. A. M. Mood, F.A. Graybill and D.C. Boes, "Introduction to the Theory of Statistics", McGraw Hill Education.
7. Jared P. Lander- R for Everyone: Advanced Analytics and Graphics

Course Outcomes: At the end of the course, the student will be able to:

CO1	Recall the basics of statistics and Identify the level of measurement.
CO2	Estimate the measures of central tendency and location of dispersions using R
CO3	To conduct the Analysis of variance for randomized block design and latin squares using R.
CO4	Distinguish the different types of analysis, also explain about artificial neural networks, fuzzy logic and genetic algorithm.
CO5	Evaluate Type I and Type II errors in significance test using R.
CO6	Compose likelihood ratio property and create critical values using R.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100

Exam Duration: 3 Hrs.

PART A : 10 questions of 2 Marks each – No choice

20 Marks

PART B : 2 questions from each unit of internal choice, each carrying 16 Marks

80 Marks

SMTA2501	DATA ANALYTICS LAB	L	T	P	CREDITS	TOTAL MARKS
		0	0	3	2	100

Course Objectives: To acquire basic knowledge of R laboratory techniques. To educate the students the basics of data acquisition, data analysis and interpretation of results.

LIST OF EXPERIMENTS

1. Programming Method
2. Implementation using R & R-studio
3. Debugging
4. Library Function, file
5. R statistical programming language
6. Introduction to R, Functions
7. Control flow and Loops
8. Working with Vectors and Matrices
9. Reading in Data, Writing Data
10. Working with Data
11. Manipulating Data
12. Simulation
13. Linear model
14. Data Frame
15. Graphics in R

Course Outcomes: At the end of the course, the student will be able to:

CO1	Able to download R software and R studio software.
CO2	Get familiar with R software and learn basics of R with descriptive statistics. Access online resources for R and import new function packages into the R workspace. Import, review, manipulate and summarize data-sets in R.
CO3	To educate the basics of data acquisition ,data analysis and interpretation of results.
CO4	Perform correlation, regression analysis and appropriate statistical tests for real life situations using R
CO5	Fit the distributions to a real life data using R-software.
CO6	Compute probabilities and fitting of probability distribution with R environment.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks: 100

Exam Duration: 3 Hrs

CAE **Evaluation of Regular Lab class 25 Marks**

50 Marks

Model practical exam 25 Marks

ESE **University Practical exam**

50 Marks

SMTA1604	OPERATION RESEARCH	L	T	P	CREDITS	TOTAL MARKS
		3	0	0	3	100

Course Objective: This course gives students to understand the importance of Operation Research. Develop and Create Problem solving skills for any complex problems..Solve Linear Programming Problems, Transportation and Assignment Problems, Sequencing and Scheduling Problem, Inventory Control Replacement Model.

UNIT II INTRODUCTION TO OR

9 Hrs

Operations Research(OR)-Nature-Characteristics-Phases.-Role of OR in Decision making- Outline of OR Models Linear Programming - definition - mathematical formulation - graphical method.

UNIT II LINEAR PROGRAMMING PROBLEM

9 Hrs

General linear programming problems – canonical and standard forms – simplex method -Two Phase Method - Big M methods. Dual Simplex method - Duality - properties - fundamental theorems of duality(statements only) -principle of duality - dual simplex method.

UNIT III TRANSPORTATION AND ASSIGNMENT PROBLEM

9 Hrs

Transportation problem – Initial Basic feasible solution- Northwest corner method - Least Cost method - Vogel's approximation method –Optimum solution using MODI method - Assignment problems - Travelling salesman problems.

UNIT IV SEQUENCING AND SCHEDULING PROBLEM

9 Hrs

Sequencing Problem with N jobs and 2 machines N Jobs 3 machines N Jobs and m machines and 2 Jobs m machines (Graphical method) - Project Management -Basic concepts–Network construction - Scheduling Critical Path Method (CPM) & Program evaluation review technique (PERT) – simple applications.

UNITV INVENTORY CONTROL REPLACEMENT MODEL

9 Hrs

Inventory Control - Various Types of inventory models - deterministic inventory models - Production model, Purchase model -with and without shortage - Economic Order Quantity (EOQ) - Buffer stock -Shortage quantity - Probabilistic inventory models – Quantity Discount and Price Breaks.Replacement policy for items whose maintenance cost increases with time- Consideration of time value of money - Replacement policy- Individual, Group replacement of items that fail completely and suddenly.

TEXT / REFERENCE BOOKS

1. Kanthi Swarup, Gupta P.K., Man Mohan, "Operations Research, 12th Edition", Sultan Chand Sons, Educational Publishers, New Delhi, 2004
2. S.D Sharma,"operation research Theory, Methods and Application", 17th Edn., Kedar Nath Ram Nath Publication, 2010.
3. Panner Selvam R., "Operations Research", Prentice Hall of India Private Limited, New Delhi, 2006
4. Kalavathy S., "Operations research", 2nd Edition, Vikas Publishing House Private Limited, New Delhi, 2002.

Course Outcomes: At the end of the course, the student will be able to:

CO1	List the characteristics of operation research. Identify the decision variables and formulation of linear program. Recall to solve two variable problems.
CO2	Understand the slack and surplus variables to find the optimal solution of an optimization problem. Identify the artificial variable and form a new objective function.
CO3	Apply north west corner, least cost and vogel approximation method on transportation problem. Solve assignment problem using Hungarian method
CO4	Explain how to determine an optimal sequence in which the jobs should be performed on the machines so that the total elapsed time is minimum
CO5	Evaluate the various types of inventory models. Discriminate deterministic and probabilistic models in inventory.
CO6	Formulate the problem involves determining whether to replace them as a group or to replace individuals as they fail.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100

PART A : 10 questions of 2 Marks each – No choice

PART B : 2 questions from each unit of internal choice, each carrying 16 Marks

Exam Duration: 3 Hrs.

20 Marks

80 Marks

SMTA3510	CRYPTOGRAPHY	L	T	P	CREDITS	TOTAL MARKS
		3	0	0	3	100

Course Objectives: This course facilitate the students to improve knowledge and skills of standard concepts in cryptography and exhibits how cryptography plays an significant role in the present digital world by knowing encryption and decryption techniques and secure data in transit across data networks.

Unit I Introduction to Number Theory

9 Hrs

Finite Fields and Number Theory: Modular arithmetic, Euclidian Algorithm, Primality Testing: Fermats and Eulers theorem, Chinese Remainder theorem, Discrete Logarithms

Unit II Cryptography and its Techniques

9 Hrs

Overview of Cryptography, Computer security concepts, Security attacks, Symmetric cipher model, Cryptanalysis and brute-force attack, Substitution techniques, Caesar cipher, Mono alphabetic ciphers, Play fair cipher, Hill cipher, Poly alphabetic ciphers, One-time pad, Transposition techniques, Binary and ASCII.

Unit III Data Encryption Standard (DES) and Advanced Encryption Standard (AES)

9 Hrs

Pseudo-random bit generation, Stream ciphers and Block ciphers and the Feistel cipher.

The data encryption standard (DES), DES example, advanced encryption standard (AES), AES transformation functions, AES key expansion, AES example.

Unit IV Public-key Cryptography

9 Hrs

Principles of public-key cryptosystems, The RSA algorithm and security of RSA, Elliptic curve arithmetic, Elliptic curve cryptography, Cryptographic Hash functions, Secure Hash algorithm, Message Authentication, Message Authentication Code (MAC).

Unit V Digital Signatures and Network Security

9 Hrs

Digital signatures, Elgamal and Schnorr digital signature schemes, Digital signature algorithm. Wireless network and mobile device security, Email architecture, formats, threats and security, Secure/Multipurpose Internet Mail Extension (S/MIME) and Pretty Good Privacy (PGP).

References

1. Stallings, William (2017). *Cryptography and Network Security, Principles and Practice* (7th ed.). Pearson Education Limited. England.
2. Trappe, Wade & Washington, Lawrence C. (2006). *Introduction to Cryptography with Coding Theory* (2nd ed.). Pearson Education International.
3. Stinson, Douglas R. (2005). *Cryptography Theory and Practice* (3rd ed.). CRC Press.
4. William Stallings (2006), *Cryptography and Network Security: Principles and Practice*, 4th edition, Pearson Education, India.
5. Atul Kahate (2008), *Cryptography and Network Security*, 2nd edition, Tata Mc Grawhill, India.

Course Outcomes: At the end of the course, the student will be able to:

CO1	Understand the fundamentals of Cryptography including data and advanced encryption standard (DES & AES), RSA and elliptic curve cryptography.
CO2	Classify Encryption and decryption messages using block ciphers, sign and verify messages using well known signature generation and verification algorithms.
CO3	Identifying Authentication functions, the manner in which Message Authentication Codes and Hash Functions works.
CO4	Analyze Key Management techniques and importance of number Theory.
CO5	Developing knowledge of standard algorithms that can be used to provide confidentiality, integrity and authentication of data.
CO6	Design a security solution for a given application.

END SEMESTER EXAM PATTERN

Max. Marks: 100

PART A: 10 questions of 2 marks each – No choice -

PART B : 2 questions from each unit of internal choice, each carrying 16 marks -

Exam Duration: 3 Hrs

20 Marks

80 Marks

SMTA3511	MATHEMATICAL MODELING	L	T	P	CREDITS	TOTAL MARKS
		3	0	0	3	100

Course Objective: Identify the significance of Mathematical Modeling and the various types of Mathematical models applied in different fields.

Unit-I: INTRODUCTION

9 Hrs

Basic Steps of Mathematical Modeling, its needs, types of models, limitations, Elementary ideas of dynamical systems, Equilibrium point, node, saddle point, focus, centre and limit-cycle idea with simple illustrations and figures

Unit-II: POPULATION MODELS

9 Hrs

Basic concepts, Exponential growth model, formulation, solution, interpretation and limitations. Compensation and depensation, Logistic growth model, formulation, solution, interpretation and limitations.

Unit-III: EPIDEMIC MODELS

9 Hrs

Basic concepts, SI model, SIS model with constant coefficient, SIS model with coefficient as a function of time t , SIS model with constant number of carriers, SIS model when the carriers is a function of time t , SIR model, Epidemics with vaccination.

Unit-IV: ECONOMIC MODELS

9 Hrs

Production and supply functions, price-elasticity, utility of consumption and consumer surplus, theory of production, production function.

Unit-V: BIOLOGICAL MODELS

9 Hrs

Blood flow and oxygen transfer, Modeling blood flow, viscosity, Poiseuille law, mathematical formulation of the problem, solution and interpretation.

TEXT / REFERENCE BOOKS

1. Mark M. Meerschaert, Mathematical Modeling, Academic Press, New York, 1993
2. W. Meyer, Concepts of Mathematical Modeling, McGraw Hill, New York, 1994
3. Beltrami, Mathematics for Dynamic Modeling, Academic Press, Orlando, Florida, 1987
4. N. Bailey, The Mathematical Theory of Infectious Diseases, Hafner press, New York, 1975

Course Outcomes: At the end of the course, the student will be able to:

CO1	List the origin of Mathematical Modeling, needs and limitations
CO2	Discuss the components and facts of various Population models.
CO3	Sketch the models used to explore the epidemics
CO4	Analyze the nature of the Economic models
CO5	Summarize the science of blood flow and oxygen transfer
CO6	Organize how the Poiseuille law is applied for modeling biological flows

EXAM QUESTION PAPER PATTERN

Max. Marks : 100

Exam Duration: 3 Hrs.

PART A : 10 questions of 2 Marks each – No choice

20 Marks

PART B : 2 questions from each unit of internal choice, each carrying 16 Marks

80 Marks

SMTA3512	PROFESSIONAL COMMUNICATION	L	T	P	CREDITS	TOTAL MARKS
		3	0	0	3	100

Course objectives: To enable students to acquire a specialized knowledge of the essential professional skills. To train them to make effective presentations on a variety of topics. To help them participate in group discussions displaying teamwork skills. To build their confidence and help them attend interviews winningly. To groom them to become successful professionals

UNIT I Exposure to Professional Skills

9 Hrs

Introduction to Skills: hard skills and soft skills – communication skills – interpersonal skills – employability and career skills – planning and prioritizing work – time management – stress management – emotional intelligence – SWOT analysis.

UNIT II Preparing and Presenting Inspiring Talks

9 Hrs

Key elements of effective presentation – nonverbal communication – impressive self-introduction and short individual presentation – preparing outline – structuring and organizing content – presenting – introducing topic – developing points – concluding – answering questions.

UNIT III Measures to Crack Group Discussion

9 Hrs

Group discussion skills – team building – using key strategies – etiquette – content preparation – brainstorming – out of box thinking – mind mapping – turn taking and turn giving – speaking persuasively questioning and clarifying.

UNIT IV Interview Skills to Get Hired

9 Hrs

Interview skills – etiquette – body language – confidence – preparedness – types of interviews – Frequently Asked Questions (FAQs) – mock interview – job application and resume writing.

UNIT V Language Skills and Career Mapping

9 Hrs

Listening skills – understanding different accents – reading skills – verbal ability – email writing – professional grooming – leadership qualities – fundamentals of entrepreneurship – career planning – goal setting – future challenges

Course Outcomes: At the end of the course, the student will be able to:

CO1	Have sufficient knowledge of the skills required for professional development
CO2	Give formal and effective presentations
CO3	Participate actively in group discussions
CO4	Attend job interviews and answer questions confidently and effortlessly
CO5	Emerge as professionals ready for placement
CO6	Create goal setting and future challenges

commended Software:

1. Globearena
2. Win English

Textbook:

Interact English Lab Manual for Undergraduate Students, 2016, Hyderabad: Orient BlackSwan.

Reference Books:

1. Alex, K, 2019, Soft Skills: Know Yourself and Know the World, New Delhi: S. Chand & Company Limited.
2. Butterfield, Jeff, 2015, Soft Skills for Everyone. New Delhi: Cengage Learning.
3. Kumar, Suresh E et al, 2015, Communication for Professional Success, Hyderabad: Orient BlackSwan.
4. Mitra, Barun K, 2016, Personality Development and Soft Skills, New Delhi: Oxford University Press.
5. Raman, Meenakshi and Sangeeta Sharma, 2014, Professional Communication, Oxford: Oxford University Press.
6. Rizvi, Ashraf, M, 2018, Effective Technical Communication, Chennai: McGraw-Hill Education.

Web References:

1. <https://www.britishcouncil.in/english/online/resources-websites/moocs>
2. <https://alison.com/courses/communications>
3. <https://in.topresume.com/career-advice/15-free-resources-to-improve-your-presentation-and-speaking-skills>
4. http://www.washington.edu/doi/TeamN/present_tips.html

5. <https://www.softwaretestinghelp.com/how-to-crack-the-gd/>
6. <http://www.oxforddictionaries.com/words/writing-job-applications>
7. http://www.mindtools.com/pages/article/newCDV_34.htm
8. <https://myinterviewpractice.com/>

EXAM QUESTION PAPER PATTERN**Max. Marks : 100****Exam Duration: 3 Hrs.****PART A :** 10 questions of 2 Marks each – No choice**20 Marks****PART B :** 2 questions from each unit of internal choice, each carrying 16 Marks**80 Marks**

SMTA3513	ACTUARIAL MATHEMATICS	L	T	P	CREDITS	TOTAL MARKS
		3	0	0	3	100

Course Objective: To learn and gain the knowledge about the impact of economic and social conditions in the financial sector. Create awareness about the financial terminology and calculations in the policy designing.

UNIT I LIFE INSURANCE

9 Hrs

Introduction to life insurance - Insurance Payable at the Moment of Death- Insurance Payable at the End of Year of Death - Relationship between Insurance Payable at the Moment of Death and End of the Year of Death.

UNIT II LIFE ANNUITIES

9 Hrs

Introduction to Life Annuities - Continuous Life Annuities - Discrete Life Annuities - Life Annuities with monthly Payments - Complete Annuities-Immediate and Apportion able Annuities-Due.

UNIT III GENERAL INSURANCE FOR BUSINESS

9 Hrs

Describe the general insurance business environment Current business environment - Main provider of general insurance - Main types of general insurance Purposes - Benefits and perils- Exposure to which premiums are related - Claim characteristics - Risk factors and risk rating

UNIT IV OCCUPATIONAL PENSION PROVISION

9 Hrs

Occupational pensions scheme – main features, advantages and disadvantages, occupational pension scheme and personal pension - Defined benefit occupational pension schemes (state provisions, advantages and disadvantages)

UNIT V BONDS AND OTHER SECURITIES

9 Hrs

Premium and Discount - Valuation between Coupon Payment DGEates - Determination of Yield Rates - Callable and Puttable Bonds - Serial Bonds.

Course Outcomes: At the end of the course, the student will be able to:

CO1	Demonstrate an appropriate mastery of theory and techniques
CO2	Identify appropriate techniques based on theory and practice in Annuities.
CO3	Apply general insurance policy in business environment and exposure main types of general insurance
CO4	Analyse the benefits of occupational pension
CO5	Evaluate the quantitative data in premium and securities and performing calculations
CO6	Create a data sheet for bonds and securities

TEXT BOOKS/REFERENCES:

1. Neelam C Gulati "Principles of Insurance Management", Excel Books, New Delhi.
2. Harriett E Jones "Principles of Insurance "FLMI Insurance Education Program. Life Management Institute LOMA, (Dec 1995).
3. Micheal M Parmenter, 'theory of Interest and Life contingencies with Pension', 3rd Edition.
4. Gerber, Hans U. – "Life insurance mathematics" 3rd Edition – Springer. Swiss Association of Actuaries, 1997.
5. Chandra, P., Investment Analysis and Portfolio Management, 4th Edition, Tata McGraw-Hill Education, New Delhi, 2012.
6. Ranganathan, M. and Madhumathi, R., Security Analysis and Portfolio Management, 2nd Edition, Pearson, New Delhi, 2012.
7. Gupta P. K., Insurance and risk management, HPH, 2nd edition, 2018.

EXAM QUESTION PAPER PATTERN

Max. Marks : 100

Exam Duration: 3 Hrs.

PART A : 10 questions of 2 Marks each – No choice

20 Marks

PART B : 2 questions from each unit of internal choice, each carrying 16 Marks

80 Marks

SMTA3514	LATEX THEORY	L	T	P	CREDITS	TOTAL MARKS
		3	0	0	3	100

Course Objectives: To prepare a LaTeX document , To understand the fundamentals of LaTeX and utilization, Development of typesetting skills, Able to write article, project report, include figures and tables in a Latex document.

UNIT – I Basic LaTeX 9 Hrs

Sample document and Key Concepts – Type style – Environments - Vertical and Horizontal spacing.

UNIT – II Typesetting Mathematics 9 Hrs

Examples – Equation environments – Fonts, Hats and underlining – Braces – Arrays and Matrices – Customized commands – Theorems-like Environments - Math Miscellany.

UNIT – III Further essential LaTeX 9 Hrs

Document classes and the overall structure – Titles for documents – Sectioning Commands

UNIT – IV Pictures and Colors 9 Hrs

The picture Environment- Picture Objects-Curves.

UNIT – V Errors 9 Hrs

Finding the Error – LATEX's Error Messages – TEX's Error Messages- LATEX Warnings- TEX Warnings.

Course Outcomes: At the end of the course, the student will be able to:

CO1	Demonstrate the appropriate type of style, Math miscellany and Commands
CO2	Identify the appropriate fonts, braces and customized commands.
CO3	Apply the commands in documents
CO4	Analyze the LATEX's error message and Picture environment
CO5	Evaluate the equation environments and overall structures
CO6	Create the documents using LATEX commands

TEXT / REFERENCE BOOKS

1. David F Griffiths and Desmond J. Higham, Learning LaTeX, SIAM (Society for Industrial and Applied Mathematics) Publishers, Phidel Phia, 1996.
2. Leslie . Lamport. LATEX: A Document Preparation System, User's Guide and Reference Manual. Addison-Wesley Publishing Company, New York, second edition, 1994
3. Martin J. Erickson and Donald Bindner, A Student's Guide to the Study, Practice, and Tools of Modern Mathematics, CRC Press, Boca Raton, FL, 2011.

EXAM QUESTION PAPER PATTERN

Max. Marks : 100

Exam Duration: 3 Hrs.

PART A : 10 questions of 2 Marks each – No choice

20 Marks

PART B : 2 questions from each unit of internal choice, each carrying 16 Marks

80 Marks