Re-Accredited 'B++' 2.86 CGPA by NAAC
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વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
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–: પરિપત્ર :–

વાણિજય વિદ્યાશાખા હેઠળની સંલગ્ન તમામ કોમર્સ કોલેજોનાં આચાર્યશ્રીઓને જણાવવાનું કે, શૈક્ષણિક વર્ષ ૨૦૨૪–૨૫ થી અમલમાં આવનાર B.Com. Data Analytics વિષયનો નિમેલ પેટાસમિતિએ તૈયાર કરેલ Sem-1to 6 નું Structure, Sem-1 & 2 નો અભ્યાસક્રમ કોમર્સ ઈન્કલુડીંગ બી.એ. વિષયની અભ્યાસ સમિતિનાં ચેરમેનશ્રીએ બોર્ડવતી મંજૂર કરી વાણિજય વિદ્યાશાખાને કરેલ ભલામણ વાણિજય વિદ્યાશાખાના અધરધેન ડીનશ્રીએ વાણિજય વિદ્યાશાખાની મંજુરીની અપેક્ષાએ વાણિજય વિદ્યાશાખા વતી મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણને એકેડેમિક કાઉન્સિલની તા.૦૧/૦૩/૨૦૨૪ની સભાનાં ઠરાવ ક્રમાંકઃ૧૦૪ અન્વયે માન.કુલપતિશ્રીને આપેલ સત્તા અંતર્ગત માનનીય ઈ.ચા.કુલપતિશ્રી ધ્વારા મંજૂર કરેલ છે. જેની આથી જાણ કરવામાં આવે છે.

(બિડાણઃ ઉપર મુજબ)

ક્રમાંક : એસ./પરિપત્ર/૧૩૧૯૩/૨૦૨૪
તા. ૦૩/૦૭/૨૦૨૪

કુલસચિવ

પ્રતિ,
૧) વાણિજય વિદ્યાશાખા હેઠળની સંલગ્ન તમામ કોમર્સ કોલેજોના આચાર્યશ્રીઓ,
..... આપશ્રીની કોલેજના સંબંધિત શિક્ષકોને જાણ કરી અમલ કરવા સારૂ.
૨) અધરધેન ડીનશ્રી, વાણિજય વિદ્યાશાખા,
૩)પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ.ગુ. યુનિવર્સિટી, સુરત.
૪)એકેડેમિક વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.
૫) જોડાણ વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.
.....તરફ જાણ તેમજ અમલ સારૂ.

Veer Narmad South Gujarat University, Surat

Faculty of Commerce- B. Com. Data Analytics

(Syllabus effective from Academic Year 2024-25)

Credit Structure

SEMESTER-1

NO	COURSE	NAME OF THE COURSE	CREDIT	LECTURE / WEEK
1	MAJOR (8 Credits)	1. Introduction to data science 2. Statistics For Data Analytics paper-1	4 Cr. 3th+2Pr=4 Cr.	7th+2Pr
2.	MINOR (4 Credits)	Python Programming – 1	2th+4Pr=4 Cr.	2th+4Pr
3	MD/ID (4 Credits)	Principles of Accounting (Paper-1)	4Cr	4th
4	AEC (2 Credits)	Business Communication – I	2Cr	2th
5	SEC / Internship (2 Credits)	Mathematics for Data Analytics	2Cr	2th
6	VAC / IKS (2 Credits)	IKS	2Cr	2th
		TOTAL	22 Cr.	19th.+6Pr.

Practical: Practical problems based on courses Statistics for data analytics and Python Programming -1 in Python language

SEMESTER-2

NO	COURSE TYPE	NAME OF THE COURSE	CREDIT	LECTURE/WEEK
1	MAJOR (8 Credits)	1. Data Pre-processing Techniques 2. Statistics for Data Analytics Paper-2	4cr 3th+2Pr=4cr	7th+2Pr
2	MINOR (4 Credits)	Python Libraries for Data Visualization: Matplotlib & Seaborn	2th+4pr=4cr	2th+4Pr
3	MD/ID (4 Credits)	Business Economics	4Cr	4 th
4	AEC (2 Credit)	Business Communication – II	2 Cr	2 th
5	SEC / Internship (2 Credit)	Office Automation Skills (Word processor, presentation, and spreadsheets)	1Th. + 2Pr.=2cr	1th + 2Pr
6	VAC / IKS (2 Credit)	Any course from the VNSGU Basket offered for B.COM. (VAC)	2 Cr	2 th
		Total	22 Cr	18th + 8Pr

Practical: Practical problems based on courses Data Preprocessing and Data Visualization and Statistics for Data analytics - 2 in Python language

SEMESTER-3

NO	COURSE TYPE	NAME OF THE COURSE	CREDIT	LECTURE / WEEK
1	Major (12 Credits)	1. Statistical Inference 2. Python libraries for Data Analytics: NumPy, Pandas 3. SPSS for Data Analytics – 1	4th = 4cr 2th+4Pr = 4cr 2th+4Pr = 4cr	8th+8Pr
2	Minor	--	--	--
3	MD / ID (4 Credits)	Econometrics for Data Analytics	4Cr	4th
4	AEC (2 Credits)	Digital Marketing / Soft Skill	2Cr	2th
5	SEC / Internship (2 Credits)	Corporate Finance	2Cr	2th
6	VAC / IKS (2 Credits)	IKS	2Cr	2th
		Total	22Cr	19th+6Pr

Practical: Practical based on courses Statistical Inference, Python libraries for Data Analytics, and SPSS for Data Analytics-1

SEMESTER-4

NO	COURSE TYPE	NAME OF THE COURSE	CREDIT	LECTURE/ WEEK
1	MAJOR (12 Credit)	1. SPSS for Data Analytics - 2 2. Database Management System (DBMS) 3. Business Intelligence	3th+2Pr=4cr 2th+4Pr=4cr 4th=4cr	9th+6Pr=12cr
2	MINOR (4 Credit)	Managerial Economics.	4cr	4th
3	MD / ID	--	--	--
4	AEC (2 Credit)	Risk management & Analytics.	2cr	2th
5	SEC / Internship (2 Credit)	Financial Accounting Software (Tally)	2cr	2th
6	VAC / IKS (2 Credit)	E-Commerce	2cr	2th
		Total	22cr	19th+6Pr

Practical: Practical of course SPSS for Data Analytics-2 in SPSS and for course DBMS in SQL.

SEMESTER-5

NO	COURSE TYPE	NAME OF THE COURSE	CREDIT	LECTURE/ WEEK
1	Major (12 Credit)	1. R for Data Analytics 2. Front End Technology 3. Multivariate Techniques for Data Analytics	2th+4Pr=4cr 2th+4Pr=4cr 4cr	8th+8Pr
2	MINOR (8 Credit)	1. Optimization Techniques 2. Data Ethics and Privacy	4cr 4cr	4th 4th
3	MD / ID	--	--	--
4	AEC	--	--	--
5	SEC / Internship (2 Credit)	Introduction to Stock exchange Softwares**	2cr	2
6	VAC/IKS	--	--	--
		Total	22cr	18th+8Pr

Practical: Practical of course R for Data Analytics is in R. Practical of Front-End technology is based on chosen Front End

**: Exam will be conducted MCQs based or as per subject expert's opinion for Introduction to Stock exchange Softwares.

SEMESTER-6

NO	COURSE TYPE	NAME OF THE COURSE	CREDIT	LECTURE /WEEK
1	Major (12 Credit)	1. Financial Analytics 2. Introduction to Machine Learning and Big Data 3. Select any ONE 1. Supply Chain Analytics 2. Customer Analytics 3. Social Media Analytics 4. Healthcare Analytics	3th+2Pr=4cr 3th+2Pr=4cr 3th+2Pr=4cr	9th+6Pr
2	Minor (4 Credit)	Research Methodology	4	4
3	MD / ID	--	--	--
4	AEC (2 Credit)	Advance Data Visualization Tool : Tableau	2	2
5	SEC / Internship (4 Credit)	Internship	4	4
6	VAC / IKS	--	--	--
		Total	22	19th+6Pr

Internship: Student is expected to take up a live / real data analytics project in-house / industry. At the end of internship students are required to prepare and present report for the work carried out.

B.Com Data Analytics

(SEMESTER - I)

Course Code:

Course Title: **INTRODUCTION TO DATA SCIENCE**

Course Category: MAJOR

Teaching per week: 4 Hours (4 Credit)

Implementation year: A. Y. 2024-25

Course Objective: To learn how to use tools for acquiring, cleaning, analyzing, exploring, and visualizing data; making data-driven inferences and decisions; and effectively communicating results

CourseOutcomes:

CO1	Acquire data through web-scraping and data APIs
CO2	Clean and reshape messy datasets
CO3	Use exploratory tools such as clustering and visualization tools to analyze data
CO4	Perform regression analysis
CO5	Perform basic analysis of network data
CO6	Evaluate outcomes and make decisions based on data
CO7	Effectively communicate results

Teaching Methodology: Class work, discussion, self study, seminars/ presentations and assignments.

Evaluation method:30% Internal Assessment and 70% External Assessment.

Course Content

Unit-I: Introduction (20%)

Introduction to Data science - Evolution of Data Science - Data Science Roles - Stages in a Data Science Project - Applications of Data Science in Commerce -Data Security Issues.

Unit-II: Data–Driven decision-making process (25%)

Meaning- Importance-Steps for making data driven decisions-Data driven decisions making examples in E-Commerce, Finance, Transportation - Benefits.

Unit-III: Data Collection and Data Pre-Processing (25%)

Data Collection Strategies - Data Pre-Processing Overview - Data Clearing - Data Integration and transformation - Data Reduction - Data Discretization.

Unit-IV: Introduction to Statistical Analysis (30%)

Descriptive Statistics: Mean, Standard Deviation, Skewness and Kurtosis - Box plots - Heat Map - Correlation, Regression

REFERENCE BOOKS:

1.JojoMoolayil, "Smarter Decision: The Intersection of Internet of Things and Data Science", PACKT, 2016.

2.Cathy O'Neil and Rachel Schutt, "Doing Data Science", O'Reilly, 2015.

3.David Dietrich, Barry Heller, Beibei Yang, "Data Science and Big data Analytics", EMC 2013.

4.Raj, Pethuru, "Handbook of Research on Cloud Infrastructures for Big Data Analytics", IGI Global.

B.Com Data Analytics

(SEMESTER - I)

Course Code:

Course Title: **STATISTICS FOR DATA ANALYTICS PAPER - I**

Course Category: MAJOR

Teaching per week: 5 (3th + 2 Practical) (4 Credit)

Implementation year: A. Y. 2024-25

Course Objective: The main objective of this course is to acquaint students with some basic concepts in Statistics. Learner will be introduced to some elementary statistical methods of analysis of data to compute various measures of central tendency, dispersion, Correlation and Regression.

Course Outcomes:

CO1	Students can understand the elementary knowledge and fundamental concept in Statistics.
CO2	Articulate the data and its type and summarize information in the data using different Summary measures.
CO3	Students will be able to differentiate between different types of data.
CO4	Learner will be able to develop to reasoning about statistical tools.
CO5	Compute various measures of Central tendency, Dispersion, Correlation and Regression.
CO6	Students will be able to understand relation between two variables and attributes.
CO7	Students will be able to get idea about Major concept of correlation and Regression analysis.

Teaching Methodology: Class work, discussion, self study, seminars/ presentations and assignments.

Evaluation method: 30% Internal Assessment and 70% External Assessment.

Course Content:

Unit-I: Collection of Data (20%)

- Definition and Scope of Statistics.
- Concepts of Data: Variables and Attributes.
- Types of Data: Quantitative and Qualitative data, Discrete and Continuous data Variables.
- Different Types of Scales.
- Tabulation of Data.
- Frequency distribution: Discrete and Continuous frequency distribution, Cumulative frequency distribution.
- Bivariate frequency distribution: Discrete and Continuous bivariate frequency distribution.

Unit-II: Measures of Central Tendency (25%)

- Concept of central tendency:
  Mean, Median, Mode, Combined Mean, Harmonic mean, Geometric Mean, Weighted Mean: Definition, Merits, Demerits and its uses. Examples and Problems.

Unit-III: Measures of Dispersion (25%)

- Range, Quartile Deviation, Mean Deviation, Standard Deviation, Merits and Demerits, Coefficient of variations and its uses. Examples and Problems.

Unit-IV: Correlation and Regression (30%)

Correlation:

- Definition, Types of Correlation, Scatter Diagram
- Karl Pearson Correlation co-efficient, Spearman Rank Correlation co-efficient.
- Examples

Regression:

- Definition
- Regression Two Lines
- Meaning and it's uses
- Examples\

***Practical:** Practical programs to solve the problems from units 1 to 4 of the subject using MS Excel.

REFERENCE BOOKS:

1. Hooda, R.P:Statistics for Business and Economics; Macmillan. New Delhi.
2. Kendall M.G. (1976): Time Series, Charles Griffin.
3. Goon A.M., Gupta M.K. and Dasgupta B. (2000):Fundamentals of Statistics, Vol. I & II, 8th Edition. The World Press, Kolkata.
4. Mood, A.M. Graybill, F.A. And Boes,D.C. (2007):Introduction to the Theory of Statistics, 3rd Edition.,(Reprint), Tata McGraw –Hill Pub. Co. Ltd.
5. Gun. A. M. Gupta, M. k. and DasguptaB.(2008):Fundamental of Statistics, Vol. II, 9th Edition World press.
6. Ya-Lun Chou: StaticalAnalysis with Business and Economics Application; Holt, Rinehart &Winston. New York.

7. Hole & Jessen: Basic Statistics for Business and Economics: John Wiley and Sons, New York.

B.Com Data Analytics

(SEMESTER - I)

Course Code:

Course Title: **PYTHON PROGRAMMING-1**

Course Category: MINOR

Teaching per week: 6 (2th +4Practicals*) (4 Credit)

Implementation year: A. Y. 2024-25

Course Objective: i) Introduction of Interpreter-based Programming language Python.

ii) Enhancing basic programming skills using Interpreter based

Course Outcomes:

CO1	Students will be able to understand the concept of programming
CO2	Students will be able to solve basic problems with implementing the Python scripts.
CO3	Students will be able to explore the fundamental concepts like variables, datatypes, strings and operators in Python.
CO4	Student will be able to use regular expressions to perform complex operations in less code.
CO5	Students will be able to understand the Python Library.

Teaching Methodology: Class work, discussion, self study, seminars/ presentations and assignments.

Evaluation method:30% Internal Assessment and 70% External Assessment.

Course Content

Unit-I: Introduction to Programming Language Concepts (20%)

Algorithm & flowchart - Compiler and Interpreter - Concepts of Interpreter based programming language: Python Program Structure, Python Program Indention and Execution - Python Variables & Datatypes: Variables: Naming and Declaration, Global variables, Text (str), Numeric Type (int, float, complex), Boolean (bool), Type conversion (int, float, complex), casting (int, float,str) - Python Comments

Unit-II: Strings, Operators & Functions (30%)

Strings in Python: Multiline string, String as character array, triple quotes, Slicing string, negative indexing, string length, concatenation - Operators Uses and its types:

Arithmetic operators (+, -, *, /, %, ++, --,), Logical Operators (&&, ||, !), Relational Operators (>, =, <=, !=), Bit-wise operators (&, |, ^ , <>), Assignment operators (=, +=, -=, *=, /=, %=) , Ternary Operator and use of sizeof() function - Function in Python: User Defined Functions, Function Definition & declaration, Functions with parameters, default parameter and returning values, Built-in Functions (string built-in methods: centre, count, join, len, max, min, replace, lower, upper, replace, split)

Unit-III: Program Flow Controllers (Conditional & Iterative) (25%)

Conditional statements: If, If..elif, if..elif.. else, nested if – Looping / Iterative Statements: While, nested while, break, continue, for loop, range, break, continue, pass and Else with for loop, nested for loop

Unit-IV: Python List and Tuples (25%)

Creating lists - Indexing and Accessing List members - Range in List - List Operations (Repetition, Concatenation, Length, Iteration, Membership) - List Methods (append, clear, copy, count, index, insert, pop, remove, reverse, sort).

***Practical:** Practical programs to solve the given problems from their units 2 to 4 of the subject Fundamentals of Python Programming.

REFERENCE BOOKS:

1. Learning Python -Mark Lutz : O'Reilly Media
2. Core Python Programming – by Wesley J Chun ISBN-13: 978- 0132269933
3. Python for Everybody: Exploring Data in Python 3, by Charles Severance (Author), Aimee Andrion (Illustrator), Elliott Hauser (Editor), Sue Blumenberg (Editor)
4. An Introduction to Python - by van Rossum Guido ISBN: 9780954161767, 0954161769
5. Core Pyhton Application Programming – by Wesley J Chun Prentice Hall

B.Com Data Analytics

(SEMESTER - I)

Course Code:

Course Title: **Principles of Accounting (Paper-1)**

Course Category: Multi-Disciplinary

Teaching per week: 4 Hours (4 Credit)

Implementation year: A. Y. 2024-25

Course Objective: To impart basic accounting knowledge as applicable to business. To impart the further knowledge of concepts, theories and principles and their application in the subject of accounting.

Course Outcomes:

CO1	Students will be able to understand concept, theoretical knowledge and applications of accounting.
CO2	Students will be able to understand Recording and Analyzing Financial Transactions.
CO3	Students will be able to prepared Financial Statements.
CO4	Concepts of accounting will be useful for analyzing financial data.

Teaching Methodology: Class work, discussion, self study, seminars/ presentations and assignments.

Evaluation method: 30% Internal Assessment and 70% External Assessment.

Unit	Course Content	Weightage
1	**Basics of Financial Accounting:** • Definition of Accounting • Scope Of Accounting • Objectives of Accounting • Importance Of Accounting • Accounting Principles: Concepts & Conventions • Branches of Accounting • Types Of Accounts: Real, Personal & Nominal	**20%**
2	**Recording and Analyzing Financial Transactions:** • Financial & Non-Financial Transactions • Double Entry System, Debit-Credit Effect • Accounting Equation; Assets=Capital+Liabilities • Journalising • Recording in Cash Book,Subsidiary book & Journal Proper • Ledger Posting • Preparation of Trial Balance	**50%**
3	**Preparation of Financial Statements:** • Trading Account of Sole Proprietorship • Profit & Loss Account of Sole Proprietorship • Balance Sheet of Sole Proprietorship	**30%**

REFERENCE BOOKS:

1. Bhushan Kumar Goyal: Fundamentals of Financial Accounting.
2. P. C. Tulsian & Bharat Tulsian & Tushar Tulsian: Financial Accounting. S. chand publication:
3. Dr. Alok kumar: Fundamentals of Financial Accounting.
4. R. K. Arora: Financial Accounting in fundamentals analysis and reporting
5. Kalpesh Ashar: Financial Accounting.

B.Com. Data Analytics
SEMESTER-I
Subject: Business Communication – I
Course Type: AEC (A.Y. 2024-25)

Paper Code:	**Total Credit**
Subject: Business Communication – I	2

Objective:

Unit	Course Contents	Weightage
I	**Business Communication: An Introduction** Concept, Definition and Characteristics (Attributes) of Communication / Business Communication The Process of Communication (Communication Cycle) Objectives of Communication Importance of Communication in Business, Types of Communication, Barriers to Communication Communication v/s Correspondence	25%
II	**Business Correspondence** Structure, format, layout of a business letter (Regular parts / Occasional parts; essentials Parts; Other) Qualities of an effective Business Letter (Correctness, Conciseness, Clarity, Courtesy, Coordination, Appropriateness, 'You' attitude, etc.) Submit at list five Business Correspondence to your teacher	25%
III	**Inquiry letters (Requests) and Replies to Inquiries** Letters concerning catalogues, prices, quotations, samples, demonstration, discount, credit, mode of delivery, package, concession, terms of sale, mode of payment, transportation	25%
IV	**Placing of Orders** Letters concerning trial order, routine order, postponing the order, reserving the right to reject the goods, requests for changes in orders already placed, order with conditions attached, cancellation of orders **Execution of Orders** Delay in execution of order, request for extension of time in delivery of goods, partial execution of order, declining the order, offering substitute goods, cancellation of orders	25%

Basic Text & Reference Books

- Developing Communication Skills by Krishna Mohan and Meera Banerji (Macmillan)
- Effective Business Communication by Asha Kaul (Prentice Hall – Economy Edition)
- Principles and Practice of Business Communication by Rhoda Doctor and Aspi Doctor (Sheth Publishers Ltd)
- Business Communication by Urmila Rai and S M Rai (Himalaya Publishing House)
- Essentials of Business Communication by Rajendra Pal and J. S. Korlahalli (Sultan Chand and Sons, New Delhi)
- Oxford Practice Grammar by John Eastwood (OUP)

B.Com. Data Analytics

(SEMESTER - I)

Course Code:

Course Title: **MATHEMATICS FOR DATA ANALYTICS**

Course Category: SEC

Teaching per week: 2 Hours (2 Credit)

Implementation year: A. Y. 2024-25

Course Objective:

Fundamentals Mathematical concepts are required for understanding of data analytics courses, so this course introduces for beginner learners.

Course Outcomes:

CO1	Students will be able to understand basic concept of equations.
CO2	Students will be able to understand basic logic, graphs and trees.
CO3	Students will be deeply able to understand Set theory, so they will be able to do programming in Python etc.
CO4	Students will be deeply able to understand permutation, so they will be able to do programming in general.
CO5	Students will be deeply able to understand combination, so they will be able to do programming in general.

Teaching Methodology: Class work, discussion, self-study, seminars/ presentations and assignments.

Evaluation method: 30% Internal Assessment and 70% External Assessment.

Course Content

Unit-I: Equations (25%)

- Definition.
- Linear equation.
- Uses of linear equation in economics.
- Analysis of taxes.
- Types of equations
  - Simultaneous Equations.
  - Quadratic equation.
- Methods of solution of linear equation of two variables.
  - Substitution method.
  - Cross multiplication method.
  - Elimination method.
  - Cramer's method.
  - Graphical method.

Unit-II: Basic Logic, Graphs & Trees (25%)

Basic Logic:

- Propositional logic
- Logical Connectives
- Truth Tables
- Disjunctive normal form
- Validity of a well-formed formula
- Propositional inference rules
- Universal and existential quantifiers and their negations

Graphs & Trees:

- Properties
- Traversal Strategies
- Undirected graphs
- Weighted graphs
- Spanning trees
- Graph isomorphism

Unit-III: Set Theory (25%)

- Methods of describing a set:
  - Tabular method
  - Rule or Property method
- Definitions of some sets:
  - Subset of a set
  - Equality of two sets
  - Power set
  - Universal set
  - Singleton set
  - Disjoint set
- Set Operations
  - Intersection of sets
  - Union of sets
  - Complement of a set
  - Difference of two sets
  - Symmetric difference set
  - Ven diagrams
- Algebraic rules of set operations without proof
  - Laws for complementation
  - Commutative laws
  - Distributive laws
  - Associative laws
  - De Morgan's laws
  - Cartesian product of two sets
  - Example

Unit-IV: Permutations and Combinations (25%)

- Fundamental principle of counting.
- Permutations.
  - Theorem.
  - Permutation of things not all different.
  - Permutation when repetition is allowed.
  - Examples.
- Combinations.
  - Theorem.
  - Examples

REFERENCE BOOKS:

1. Robert R. Stoll1 October 1979: Set Theory and Logic (Dover Books On Mathematics) Paperback – 1 October 1979.
2. Charles C. Pinter (2014): A Book of SET THEORY, Dover Publications, Inc. Mineola, New York.
3. Robert R. Stoll Robert R. Stoll: Linear Algebra and Matrix Theory (Dover Books on Mathematics) Kindle Edition.
4. Steve Warner(2018) Pure Mathematics for Beginners: A Rigorous Introduction to Logic, Set Theory, Abstract Algebra, Number Theory, Real Analysis, Topology, Complex Analysis, and LinearAlgebraPaperback-25 September 2018.
5. B J Venkatachala (2020): Functional Equations Revised & Updated 2nd Edition (9788172867812) Paperback-1 January 2020.

B.Com. Data Analytics

(SEMESTER - II)

Course Code:

Course Title: Data Preprocessing Techniques

Course Category: MAJOR

Teaching per week: 4 Hours (4 Credit)

Implementation year: A. Y. 2024-25

Course Objective: By Data Preprocessing, Data Preparation stage of a Data Science development lifecycle will ensure reliable, robust, and consistent results. The main objective of this concept is to ensure and check the quality of data before applying any Machine Learning or Data Mining methods for Data Analytics.

Course Outcomes:

CO1	By applying the preprocessing techniques, the Datasets become more accurate and complete.
CO2	To learn various technique to clean the incomplete, inconsistent real-world data.
CO3	By applying the techniques ensure the completeness and consistency of retrieved data.
CO4	Implementing the methods in real time applications

Teaching Methodology: Class work, discussion, self study, seminars/ presentations and assignments.

Evaluation method: 30% Internal Assessment and 70% External Assessment.

Course Content

Unit-I: Introduction (35%)

Data Collection – Need of Data Collection – Method of Data Collection – Tools of Data Collection – Keys of Data Collection Process – Common challenges in data Collection

Unit-II: Data Preprocessing (25%)

Introduction to Data Preprocessing – Need of Data Preprocessing – Applications of Data Preprocessing – Quality Measures of data

Unit-III: Data Preprocessing Techniques (40%)

Data Cleaning – Data Integration – Data Transformation – Data Reduction – Data Discretization, Handling Missing data

REFERENCE BOOKS:

- Best Practices in Data Cleaning: A Complete Guide to Everything You Need to Do Before and After Collecting Your Data First Edition by Jason W. Osborne (Author)
- Data Cleaning By Ihab Ilyas and Xu Chu Publisher: ACM

B.Com Data Analytics

(SEMESTER - II)

Course Code:

Course Title: **STATISTICS FOR DATA ANALYTICS PAPER - II**

Course Category: MAJOR

Teaching per week: 5hours (3 th + 2 Practical*) (4 Credit)

Implementation year: A. Y. 2024-25

Course Objective: The main objective of this course is to provide fundamental knowledge of probability, moments and moments generating functions. The purpose is to make the students aware about the application of probability and probability distributions in data science.

Course Outcomes:

CO1	Understand the basic concept of probability and its uses for advance study.
CO2	Understand the basic idea about how to utilize the concept of probability to find expected value of a random variable.
CO3	Understand basic concept of probability distribution and its application.
CO4	Understand basic terminology about discrete and continuous variable. Also students can able to understand difference between p.m.f and p.d.f.
CO5	Course content will be useful to learners for further study of data science.

Teaching Methodology: Class work, discussion, self study, seminars/ presentations and assignments.

Evaluation method: 30% Internal Assessment and 70% External Assessment.

Unit -I: Probability (30%)

- Probability as a concept:
  Random experiments, Sample space, Events,Mutually exclusive events, Exhaustive event, Equally likely event, Independent events the three approaches for defining probability, Addition and Multiplication laws of probability; Conditional probability.

Unit-II:Distribution Function (15%)

- Difference between variable and Random variable
- Continuous and Discrete Random variable
- Distribution Function of a Random Variable – Probability Mass Function and Probability Density Functions-Central Limit Theorems.

Unit-III:Moments (15%)

- Definition of central moments.
- Raw Moments.
- Relations between raw moments and central moments.
- Use of moments for measuring skewness and kurtosis of frequency distribution (Up to fourth order)

Unit-IV: Probability Distributions (40%)

- Probability Distributions – Recurrence Relationships– Moment Generating Functions – Cumulant Generating Functions – Continuous Probability Distribution - Rectangular Distribution – Binomial Distribution - Poisson Distribution – Continuous Probability Distributions – Uniform Distribution – Normal Distribution–Exponential Distribution.

* **Practical:** Practical based of unit 1 to 4 of the subject using MS-Excel

REFERENCE BOOKS:

1. Gupta, S.C. and Kapoor, V.K.: "Fundamentals of Mathematical Statistics", Sultan & Chand & Sons, New Delhi, 11th Edition, 2002.

2. Hastie, Trevor, et al. "The elements of Statistical Learning", Springer, 2009.

3. Practical Statistics for Data Scientists, 2nd Edition, Peter Bruce, Andrew Bruce and Peter Gedeck, May 2020.

4. Statistics for Machine Learning, By Pratap Dangeti, July 2017.

B.Com Data Analytics

(SEMESTER - II)

Course Code:

Course Title: Python Libraries for Data Visualization: Matplotlib & Seaborn

Course Category: Minor

Teaching per week: 6 Hours (2 th + 4 Practical*) (4 Credit)

Implementation year: A. Y. 2024-25

Course Objective: Using the Python plotting libraries: namely Matplotlib, Seaborn and many other such data visualization packages with different features for creating informative, customized, and appealing plots to present data in the most simple and effective way.

Course Outcomes:

CO1	Use python libraries for data visualization
CO2	Conduct exploratory data analysis using Python
CO3	Interpret results of exploratory data analysis
CO4	Paraphrase the results for documentation

Teaching Methodology: Class work, discussion, self study, seminars/ presentations and assignments.

Evaluation method: 30% Internal Assessment and 70% External Assessment.

Course Content

Unit-I: Introduction to Python Libraries (20%)

Python Library – How it works – Standard Libraries of Python – Use of Python Libraries – Importing the Python Library

Unit-II: Data Visualization Concepts in Data Science (20%)

Data Visualization – Features of Data Visualization in Data Science - Importance of Data Visualization in Data Science – Types of Data visualization – Data Visualization workflow – Tools and techniques for Data Visualization in Data Science – Advantages and Disadvantages of Data Visualization.

Unit-III: Library for Data Visualization: Matplotlib (30%)

Basics – Architecture – Installation –Graph plotting with marker, line, labels, grid, subplots, pyplot – Types of graph (Line graph, Bar graph, Pie Chart, Histogram, Scatter Plot, 3d Graph plot).

Unit-IV: Library for Data Visualization: Seaborn (30%)

Objective – Categories of Seaborn – Installation – Chart plotting using the seaborn library (Line plot, Dist plot, Lmplot, violin plot etc.) - .

***Practical:** Practical programs to solve the given problems from the subject.

REFERENCE BOOKS:

- Data Visualization with Python and Java Script by Kyran Dale. Publisher(s): O'Reilly Media, Inc.
- Mastering Python Data Visualizationby Kirthi Raman, Publisher(s): Packt Publishing
- Data Visualization in Python with Pandas and Matplotlib Paperback – June 16, 2021by David Landup. Publisher: StackAbuse

B.Com Data Analytics

(SEMESTER - II)

Course Code:

Course Title: **Business Economics**

Course Category: MD

Teaching per week: 4 Hours (4 Credit)

Implementation year: A. Y. 2024-25

5Course Objective: To give a complete and rigorous introduction of the basic concept of business economics. To demonstrate how application of economic theory can improve decision making.

Course Outcomes:

CO1	Students will be able to understand and identify the economic variables in general business atmosphere.
CO2	Students will perceive the knowledge about Economics at Micro level and various economic concepts, such as, opportunity cost, Marginal Concepts, Demand Function and Law of variable proportion.
CO3	Students will be able to understand the relationship between Production and Costs.
CO4	Concepts of Business Economics will be useful for analyzing economical data.
CO5	Learners will be acquaint with economical knowledge which will be useful for advances data analysis techniques.

Teaching Methodology: Class work, discussion, self study, seminars/ presentations and assignments.

Evaluation method: 30% Internal Assessment and 70% External Assessment.

Course Inputs:

Unit 1. Business Economics Overview **25%**

1.1 Introduction Basic Problem of on Economy working of Price Mechanism.

1.2 Business Economics:,- Meaning, Characteristic and Scope.

1.3 Basic Concepts of Business Economics Opportunity Cost– Incremental Principle–Principle of Time perspective Discounting Principle Equi-Marginal Principle.

Unit 2 Demand Analysis Elasticity of Demand and Demand Forecasting. 25%

2.1 Demand—Meaning, Types, Law of Demand- Demand Function and determinant of Demand.

2.2 Price Elasticity of Demand,-- Income Elasticity of Demand --Cross elasticity of demand Advertising Elasticity of Demand,-- Meaning Types, Methods of Measurement (Numerical Calculation through Percentage Methodology

2.3Demand Estimation and Forecasting—Meaning, Significance of Methods (Survey and Trend Methods) and Criteria for an ideal method of demand for casting.

Unit 3 Supply Analysis and Production Function. **25%**

3.1. Supply Meaning, Low of Supply, Elasticity of Supply- Meaning and Types with Diagram..

3.2. Production Function-- Meaning Short Run and Long Run Production Function Low of Returns-- Low of Variable Proportion-- Economies and Diseconomies of Scale.

Unit 4 Cost and Revenue Analysis. **25%**

4.1. Concept of Costs–Historical Cost Replacement Cost, Accounting Cost and Economic cost Direct and Indirect Cost, Opportunity Cost, Incremental Cost(Only Definition) Total cost, Average Cost in Marginal Cost (Simple Numerical Calculation Based on Cost)--Behaviour of Cost Curves in Short run and Long Run.

4.2. Total Revenue (TR), Average Revenue(AR)Marginal Revenue(MR)

References:

1. Joel Dean, Managerial Economics, Prentice Hall, Englewood Cliffs, N.J.
2. Spencer M. H. and Siegelman, Managerial Economics, Richard Irwin –1964
3. Graham P, Managerial Economics, Adission – Wisely Publishing Co. Massachusetts,1980.
4. G. S. Gupta, Managerial Economics, Tata McGrawHill
5. H. L. Ahuja – Business Economics, S. Chand & Co, NewDelhi.
6. Dr. Raj & Prof. Kuldip Gupta, Business Economics, Application and Analysis, UDHBooks

B. Com. Data Analytics
SEMESTER-II
Subject: Business Communication – II
Course Type: AEC (A.Y. 2024-25)

Paper Code:	**Total Credit**
Title of the Paper: Business Communication - II	2

Objective:

Unit	Course Contents	Weightage
I	**Office/ Organization Memorandum:** Letters asking permission, granting permission, refusing permission, seeking explanation, reprimand and warning	25%
II	**Banking Correspondence:** Letters concerning opening of accounts, Stopping payment of acequia; dishonoring of cheques; overdrawn accounts, loans and overdraft facilities)	25%
III	**Agency Correspondence:** Letters concerning finding an agent, application for agencies; offers of agencies, formal agency agreements, agency commission; working and services of agents, poor sales, termination of agency, friction between the principal and an agent etc.	25%
IV	**Press Reports:** Drafting of Press reports on accidents, disasters, natural calamities, celebration of national holidays and celebration of important days in your HEIs, Report of any current events	25%

Basic Text & Reference Books:

- Essentials of Business Communication - Rajendra Pal and J S Korlahalli (Sultan Chand & Sons)
- Principles and Practice of Business Communication - Rhoda A Doctor & Aspi H Doctor (A R Sheth & Company, Mumbai)
- Business Communication - U S Rai & S M Rai (Himalaya Publishing House, Mumbai)
- Developing Communication Skills - Krishna Mohan & Meera Benerjee (Macmillan)
- Effective Business Communication - Asha Kaul (Prentice Hall - Economy Edition)
- Business Communication - Asha Kaul (Prentice Hall of India Pvt. Ltd, New Delhi)
- Effective Business Communication - M V Rodrigues (Concept Publishing House)
- Business Communication and Report Writing - R P Sharma and Krishna Mohan (Tata McGraw Hill 2002)
- Contemporary Business Communication - Scot Ober (Biztantra)

B.Com. Data Analytics

(SEMESTER - II)

Course Code:

Course Title: **Office Automation Skills**

Course Category: SEC

Teaching per week: 2 Hours (1 th + 2 Practical*) (4 Credit)

Implementation year: A. Y. 2024-25

Course Objective: To make students understand and learn various Office Automation Tools like MS Word, MS Excel & MS PowerPoint.

Course Outcomes: The students will be able to use various Office Automation Tools like MS Word, MS Excel & MS PowerPoint.

Teaching Methodology: Class work, discussion, self study, seminars/ presentations and assignments.

Evaluation method: 30% Internal Assessment and 70% External Assessment.

Course Content

Unit - 1 Word Processing Package

Typing, Editing, Proofing & reviewing - Formatting text & Paragraph - Automatics Formatting and Styles - Working with Tables - Graphics and Frames - Mail Merge

Unit - 2 Spreadsheet package

Concept of worksheet - Working & Editing in Workbooks - Creating Formats & Links - Protecting and Hiding data - Built in Functions (Mathematical, Statistical, String & Date) - Formatting a Worksheet & Creating graphics objects - Creating Charts (Graphics), Formatting and analyzing data, Pivot table/charts, Organizing Data in a List (Data Management) - Sharing & Importing Data – Printing

Unit - 3 Presentation Package

Creating and Editing Slides - Creating and Editing objects in the slide – Animation - Creating and Running Slide Show – Templates

***Practical:** practical based on the Office package of word, power-point and excel.

REFERENCE BOOKS:

1. EXCEL 2007 Made Simple by Satish Jain, BPB
2. Word 2007 by Rutkosky, BPB
3. PowerPoint 2007 Made Simple by Satish Jain, BPB
4. Mastering EXCEL 4 for Windows - Chester – BPB
5. Microsoft Office Word 2007 Plain & Simple, Joyce & Moon, PHI
6. Microsoft Office Excel 2007 Plain & Simple, Frye, PHI
7. Microsoft Office PowerPoint 2007 Plain & Simple, Muir, PHI
8. 2007 Microsoft Office System Plain & Simple, Joyce & Moon, PHI
9. EXCEL 5 for Windows Quick & Easy -Jones TECH
10. Excel Functions & formulas by Bernd Held, BPB
11. Mastering Windows 2000 Cowat-BPB
12. MS OFFICE 2007 - TRAINING GUIDE by Satish Jain, BPB
13. P C Software for Windows 2003 Made Simple, R K Taxali, TMH