AC: 21/02/2026
Item No.: 5.3

SIES (Nerul) College of Arts, Science & Commerce (Autonomous)
RISE WITH EDUCATION

SIES (Nerul) College of Arts, Science and Commerce (Autonomous)
Syllabus for Approval
M.Sc. (Data Science)

Sr. No.	Heading	Particulars
1	Title of the course	M.Sc.(Data Science)
2	Eligibility for admission	Minimum 50% aggregate marks in a 3-year graduation degree in B.Sc. (Computer Science) /BCA/B.Sc. (IT)/ B.Sc.(Data Science) / B.Sc. (AI-ML) /B.Sc. (Big Data Analytics)/ B.Sc. (Statistics)/ B.Sc. (Mathematics) degree from a UGC-approved institution/university in India.
3	Passing Marks	40%
4	Semesters	I
5	Level	PG
6	Pattern	1-2 years & 2-4 semesters Choice Based Grading System
7	Status	New
8	To be implemented from	From Academic year 2026-27 in a progressive manner

Date: 21/02/2026
Signature:

Dr. Koel Roychoudhury
AC Chairperson

Dr. Nutan Sawant
Course Coordinator

SIES (NERUL) COLLEGE OF ARTS, SCIENCE AND COMMERCE (AUTONOMOUS) NERUL NAVI MUMBAI 400 706.

SIES(Nerul) College of Arts, Science and Commerce
(Autonomous)

M.Sc. Data Science

Semester I

(To be implemented from the Academic Year 2026-27)

SIES (Nerul) College of Arts, Science and Commerce
(Autonomous)
(Affiliated to University of Mumbai)
RE-ACCREDITED GRADE "A" BY NAAC (3rd CYCLE)
BOARD OF STUDIES SYLLABUS FOR
M.Sc (Data Science)

(WITH EFFECT FROM THE ACADEMIC YEAR 2026-2027)

OBJECTIVES OF THE PROGRAMME

- Provide a strong foundation in data science principles, including statistics, mathematics, and computational techniques for effective data analysis.
- Develop proficiency in advanced data science methods, such as machine learning, artificial intelligence, and big data analytics for solving real-world problems.
- Equip students with practical and industry-oriented skills using modern tools, programming languages, and data platforms.
- Instill ethical, legal, and social awareness related to data privacy, security, and responsible use of data and AI technologies.
- Prepare graduates for professional careers, research, and continuous learning in data science and related fields.

PREAMBLE

In today's data-driven world, the ability to analyze and interpret large volumes of data is essential. The M.Sc. Data Science programme is designed to provide advanced knowledge and practical skills in statistics, machine learning, artificial intelligence, big data, and data engineering.

The curriculum emphasizes hands-on experience with modern tools and platforms, ethical use of data, and research-oriented learning. It prepares graduates for careers in industry, research, and academia, enabling them to address complex data challenges and contribute effectively to society.

Programme Outcomes

After completing the M.Sc. Data Science programme, students will be able to:

1. Apply advanced mathematical, statistical, and computational techniques to analyze and interpret complex data.

2. Design, develop, and deploy data-driven solutions using machine learning, artificial intelligence, and big data technologies.

3. Use modern data science tools, programming languages, and platforms for practical problem-solving in industry and research contexts.

4. Understand and apply ethical, legal, and social considerations in data handling, analytics, and AI applications.

5. Engage in research, innovation, and lifelong learning to adapt to evolving technologies and contribute to the field of data science.

SIES(Nerul) College of Arts, Science and Commerce(Autonomous)

MSc Data Science Semester I

	SEM I		
Course Code	**Course Type**	**Course Title**	**Credit**
M26DS1MJ01	Major	Introduction to Time Series	**4**
M26DS1MJ02	Major	Foundations of Data Science	**4**
M26DS1MJP03	Major	Practical's of Introduction to Time Series and Foundations of Data Science	**4**
M26DS1MJ04	Major	Business Intelligence	**2**
M26DS1E01	Elective	Introduction to Cloud Computing	
M26DS1EP01		Introduction to Cloud Computing Practical	
M26DS1E02		Analysis of Algorithms	
M26DS1EP02		Analysis of Algorithms Practical	**4**
M26DS1RM01	RM	Research Methodology	**4**
		Total	**22**

Major (Credit 4)

Introduction to Time Series

COURSE CODE: M26DS1MJ01 **COURSE CREDIT: 04**

1 credit - 15 lectures **1 lecture is 60 minutes**

Course objectives:

This course aims to:

1. Understand basic probability concepts and rules.
2. Learn key probability distributions
3. Study time series components and classical methods.
4. Learn ARIMA-type time series models.

Course outcomes:

After completion of the course, learners would be able to:

1. Apply probability laws and Bayes theorem to problems.
2. Use distributions to compute mean, variance, and probabilities.
3. Estimate trend and seasonal components.
4. Fit models and forecast time series data.

UNIT	TOPIC	No of Lectures
I	**Basic Probability:** Concepts of experiments, Outcomes, Sample space, Events, Combinatorial probability, Examples, Birthday paradox, Principle of inclusion & exclusion with examples, Conditional probability with examples, Independence, Bayes Theorem with examples.	15
II	Probability Distribution: Random Variables: discrete and continuous probability models, some probability distributions: Binomial, Poisson, Geometric, Hypergeometric, Normal, exponential, Chi-square, expectation, variance and other properties of the distribution with examples.	15

III	Definition of Time series. Its components. Models of Time Series. Estimation of trend by: Freehand curve method; Method of Semi Averages; Method of Moving Averages; (Simple and Weighted) Method of Least Squares. Estimation of seasonal component by: Method of simple averages; Ratio to moving average method; Ratio to trend method; Method of link Relatives. Exponential Smoothing methods. Holt's Two Parameter method; Winter's Three Parameter method.	**15**
IV	Introduction to Time Series, Components of time series, Smoothing auto correlation, stationarity, concepts of AR, MA, ARMA & ARIMA models with illustrations. Basic properties Introduction to ARMA process. Forecasting stationary time series	**15**

Text Books:

1. Gupta, S. C., & Kapoor, V. K. Fundamentals of Mathematical Statistics. Sultan Chand & Sons.
2. Elhance, D. N. Fundamentals of Statistics. Kitab Mahal.

References:

1. Chatfield, C. The Analysis of Time Series: An Introduction (6th ed.).Chapman & Hall / CRC Press.
2. Makridakis, S., Wheelwright, S. C., & Hyndman, R. J. Forecasting: Methods and Applications (3rd ed.). Wiley.
3. Brockwell, P. J., & Davis, R. A. Introduction to Time Series and Forecasting (2nd ed.).
   Springer.
4. Gujarati, D. N., & Porter, D. C. Basic Econometrics (5th ed.). McGraw-Hill Education.
   – Regression trend analysis, quadratic models, time series regression.

Major (Credit 4)

Foundations of Data Science

COURSE CODE: M26DS1MJ02 **COURSE CREDIT: 04**

1 Credit – 15 lectures **1 lecture is 60 minutes**

Course Objectives:

1. To introduce the fundamentals of Data Science, its scope, project roles, and the lifecycle of a data science project.
2. To familiarize students with the Data Science technology stack, frameworks, and architectural layers used in real-world data systems.
3. To develop basic skills in data handling and management using R for preparing data for analysis.
4. To provide foundational knowledge of data processing, exploratory analysis, modeling techniques, and model evaluation methods.

Course Outcome:

By the end of this course, students will be able to:

1. Explain the concept of Data Science, identify project roles, and describe the stages of a data science project lifecycle.
2. Describe the components of the Data Science technology stack and apply suitable frameworks for organizing data science solutions.
3. Use R to manage, clean, and prepare datasets for analysis and modeling.
4. Perform basic data analysis, apply introductory machine learning models, and evaluate model performance effectively.

Unit	Topics	No of Lectures
I	**Introduction to Data Science & Project Lifecycle:** What is Data Science and its definition, Applications of Data Science, Difference between Data Science, AI, ML, and Big Data. **Data Science project roles:** Data Scientist, Data Engineer, Business Analyst, Domain Expert. **Stages of a Data Science project:** Problem definition, Data collection, Modeling, Evaluation, Presentation, Deployment. **Setting expectations:** Model performance bounds, feasibility, limitations, ethics	15

II	**Data Science Technology Stack & Frameworks: Data storage:** Data Lake, Data Warehouse, Data Vault. **Data processing tools:** Spark, Kafka, Cassandra. **Programming languages:** R, Python, Scala. **Search & streaming:** ElasticSearch, MQTT. **Data Science Framework:** Definition and need. CRISP-DM model. Layered framework for Data Science. Business layer and Utility layer	**15**
III	**Data Management & R Programming:** Installing and using R & RStudio, Vectors and Data Frames, Reading CSV files and exploring data frames, Sorting, renaming, removing rows and columns, Structured and semi-structured data, Working with databases using R, Handling missing values, Data transformation, Train-test split and data provenance.	**15**
IV	**Data Processing, Analysis & Model Evaluation: Data Science process:** Retrieve, Assess, Transform, Report. Introduction to Data Lakes and Data Warehouses. Exploratory Data Analysis (Univariate & Bivariate). Summary statistics and visualization. **Introduction to models:** Linear Regression, Logistic Regression, Clustering, Decision Trees. Model evaluation for classification and regression. Overfitting and underfitting. Cross-validation and model quality	**15**

References:

1. Cathy O'Neil & Rachel Schutt, Doing Data Science, O'Reilly Media
2. Foster Provost & Tom Fawcett, Data Science for Business, O'Reilly
3. Hadley Wickham & Garrett Grolemund, R for Data Science, O'Reilly
4. Gareth James et al., An Introduction to Statistical Learning, Springer
5. Ralph Kimball & Margy Ross, The Data Warehouse Toolkit, Wiley

Major (Credit 4)

Practical's of Introduction to Time Series and Foundations of Data Science

COURSE CODE:M26DS1MJP03 **COURSE CREDIT: 04**
1 Credit – 15 lectures **1 lecture is 120 minutes**

Course Objectives:

This course aims to:

1. To develop practical skills in time series analysis and forecasting using trend estimation, decomposition, smoothing techniques, and ARIMA-based models.
2. Develop practical competency in R programming for data science, enabling students to acquire, clean, analyze, model, store, and visualize data using statistical techniques, databases, and industry-relevant analytics tools.

Course Outcome:

By the end of this course, students will be able to:

1. Students will be able to analyze time series data, identify its components, apply smoothing and ARIMA methods, and generate forecasts for stationary time series.
2. Design and implement an end-to-end data analytics workflow using R, including data preprocessing, exploratory analysis, statistical and machine learning models, database integration, model evaluation, and interactive reporting.

Sr. No.	Practical's of Introduction to Time Series
1	a. Time Series Plot and Identification of Components b. Trend Estimation using Moving Averages
2	Trend Estimation using Least Squares Method
3	Seasonal Indices using Ratio to Moving Average Method
4	Implement Single Exponential Smoothing
5	Implement Holt's Two-Parameter Exponential Smoothing
6	Implement Winter's Three-Parameter Exponential Smoothing

7	Time Series Components and Decomposition
8	AR and MA Model Identification and Fitting
9	ARMA Process Properties and Basic ARIMA
10	Forecasting Stationary Time Series

Sr. No.	**Practicals of Foundations of Data Science**
1	Basics of R Programming Study variables, data types, decision making (if-else), loops, and user-defined functions in R.
2	Statistical Analysis using R Perform descriptive statistics and advanced descriptive statistics (skewness, kurtosis, quantiles).
3	Working with CSV & Excel Files in R Import CSV and Excel datasets and perform basic plotting for data exploration.
4	Data Cleaning and Transformation Handle missing values, remove duplicates, rename columns, normalize data, and transform variables.
5	Exploratory Data Analysis & Visualization using ggplot2 Perform univariate and bivariate analysis using summary statistics and ggplot2 visualizations.
6	R and SQL Database Integration Connect R with SQL database and perform CRUD operations (Insert, Retrieve, Update, Delete).
7	Data Modeling & Validation Apply Linear Regression, Logistic Regression or Decision Tree and validate using train-test split and cross-validation.
8	Model Evaluation Techniques Evaluate classification, scoring, probability, and clustering models using appropriate metrics.
9	Data Storage & Processing using Cassandra and Data Workflow Create a simple data model using Cassandra and demonstrate retrieving, assessing, processing, and transforming data with logging/auditing.
10	Reporting & Visualization using Power BI / R Shiny Generate reports and dashboards using Power BI or build a simple web application using R (Shiny).

Major (Credit 2)
Business Intelligence

COURSE CODE: M26DS1MJ04 **COURSE CREDIT: 02**

~~1 credit - 15 lectures~~ ~~1 lecture is 60 minutes~~

Course Objectives:

This course aims to:

- Introduce students to data-driven decision support systems.
- Equip students with data preparation and knowledge discovery skills, enabling them to transform raw data into meaningful, actionable knowledge for analytics and decision-making.

Course Outcome:

By the end of this course, students will be able to:

- Explain and analyze the role of Business Intelligence, Knowledge Management, and Knowledge Discovery frameworks in supporting organizational decision-making.
- Apply data preprocessing, transformation, and discretization techniques within the KDD process to prepare high-quality datasets for analytics and data science tasks.

Unit	Topics	No of Lectures
I	**An Overview of Business Intelligence:** Changing business environments and the need for data-driven decision support, Decision-making processes and data-driven decision frameworks, Evolution from Decision Support Systems (DSS) to Business Intelligence to Data Science. Core characteristics, capabilities, and business value of Business Intelligence. **Business Intelligence architecture and framework:** Overview of Data sources, ETL processes, data warehouses, OLAP, dashboards, and reporting. **Industry applications of BI:** marketing, finance, operations, supply chain, and customer analytics. **Ethics and responsible use of BI:** data privacy, bias, transparency, and regulatory compliance. Comparative analysis of DSS, BI, and Data Science systems.	15

II	**Knowledge Management (KM):** Concepts, objectives, and business value. Approaches to Knowledge Management: codification vs. personalization; organizational and data-driven perspectives. Data Science In Knowledge Management. **Knowledge Discovery in Databases:** KDD process model Data Pre-processing: Cleaning, Missing Values, Noisy Values, Inconsistent values, redundant values, Outliers, Integration, transformation, reduction **Discretization:** Equal Width Binning, Equal Depth Binning, Normalization, Smoothing	15

Textbooks and References:

1. Business Intelligence, Analytics, Data Science, and AI – Ramesh Sharda, Dursun Delen, Efraim Turban (Pearson)
2. Business Intelligence and Analytics: Systems for Decision Support – Ramesh Sharda, Dursun Delen, Efraim Turban
3. Business Intelligence Guidebook: From Data Integration to Analytics – Rick Sherman
4. Data Analytics and Business Intelligence – Computational Frameworks, Practices, and Applications" – Vincent Charles et al.

Elective (Credit 2+2)

Introduction to Cloud Computing

COURSE CODE: M26DS1E01 **COURSE CREDIT: 02**

1 Credit – 15 lectures **1 lecture is 60 minutes**

Course Objectives:

This course aims to:

1. To introduce fundamental cloud computing concepts, models, security basics, and major cloud platforms.
2. To explain virtualization technologies and cloud architectures supporting scalable and efficient cloud environments.

Course Outcome:

After completing this course, the student will be able to:

1. Explain core cloud computing concepts, models, basic security issues, and major cloud platforms.
2. Explain virtualization concepts and cloud architectures for scalable and reliable computing.

Unit	Topics	No of Lectures
I	**Introduction to Cloud Computing:** Basic Concepts and Terminology, Goals and Benefits, Risks and Challenges. **Fundamental Concepts and Models:** Roles and Boundaries, Cloud Characteristics, Cloud Delivery Models, Cloud Deployment Models. **Fundamental Cloud Security:** Basic Terms and Concepts, Threat Agents, Cloud Security Threats, Additional Considerations. **Industrial Platforms and New Developments:** Amazon Web Services, Google App Engine, Microsoft Azure.	15

II	**Virtualization Technology:** Hardware Independence, Server Consolidation, Resource Replication, Operating System-Based Virtualization, Hardware-Based Virtualization, Virtualization Management.	15
	Fundamental Cloud Architectures: Workload Distribution Architecture, Resource Pooling Architecture, Dynamic Scalability Architecture, Elastic Resource Capacity Architecture, Service Load Balancing Architecture, Cloud Bursting Architecture, Elastic Disk Provisioning Architecture, Redundant Storage Architecture. **Service Level Agreements (SLA):** Definition, Importance in Cloud Computing	

References:

1. Cloud Computing: Concepts, Technology & Architecture by Thomas Erl, Ricardo Puttini & Zaigham Mahmood
2. Mastering Cloud Computing by Rajkumar Buyya, Christian Vecchiola, and Thamarai Selvi

Introduction to Cloud Computing Practical

COURSE CODE:M26DS1EP01 **COURSE CREDIT: 02**

1 Credit – 15 lectures **1 lecture is 120 minutes**

Course Objectives:

- To provide hands-on experience with cloud computing technologies, virtualization, web services, and cloud service models (IaaS, PaaS, STaaS) through practical implementations.

Course Outcome:

- After completing the practicals, students will be able to implement client-server communication, web services, virtualization, and cloud services, and deploy applications using IaaS, PaaS, and Storage as a Service.

Sr. No.	List of Practical's
1.	Show the implementation of exchanging information between client and server using socket programming.
2.	Develop a simple calculator application using RMI.
3.	Show the implementation of web services.
4.	Implementing Web Service that connects to MySQL database.
5.	Implement Windows Hyper V virtualization.
6.	Creating VMs using VMWare workstation.
7.	Connecting VMs in a network.
8.	Study and Implementation of Infrastructure as a Service.
9.	Study and Implementation of Storage as a Service.
10.	Study of Platform as a Service.

Elective (Credit 2+2)

Analysis of Algorithms

COURSE CODE:M26DS1E02 **COURSE CREDIT: 02**

1 Credit – 15 lectures **1 lecture is 60 minutes**

Course Objectives:

This course aims to:

1. Introduce fundamental concepts of algorithm design and analysis, including performance evaluation, asymptotic notations, complexity classes, and mathematical tools required for algorithm analysis.
2. Develop problem-solving skills using standard algorithmic paradigms such as divide and conquer, greedy method, dynamic programming, and backtracking for solving optimization and combinatorial problems.

Course Outcome:

After completing this course, students will be able to:

1. Analyze and compare algorithms using time and space complexity, asymptotic notations, recurrence relations, and complexity class concepts.
2. Design and apply efficient algorithms using divide and conquer, greedy, dynamic programming, and backtracking techniques to solve optimization and combinatorial problems.

Unit	Topics	No of Lectures
I	**Introduction to Analysis of Algorithms:** What is Algorithm? , Properties of Algorithm, Performance analysis, space, and time complexity Growth of function, Big-Oh, Omega Theta notation Mathematical background for algorithm analysis. **Complexity class:** Definition of P, NP, NP-Hard, NP-Complete Analysis of selection sort, insertion sort. **Recurrences:** The substitution method, Recursion tree method, Master method **Divide and Conquer Approach:** General method, Merge sort, Quick sort, Finding minimum and maximum algorithms and their Analysis, Analysis of Binary search.	15
II	**Greedy Method Approach:** General Method, Single source shortest path: Dijkstra Algorithm Fractional Knapsack problem, Job sequencing with deadlines, Minimum cost spanning trees: Kruskal and Prim's algorithms **Dynamic Programming Approach:** General Method, Multistage graphs, Single source shortest path: Bellman Ford Algorithm All pair shortest path: Floyd Warshall Algorithm, 0/1 knapsack Problem, Travelling Salesperson problem, Longest common subsequence **Backtracking:** N-queen problem, Sum of subsets, Graph coloring.	15

References:

1. T. H. Cormen, C.E. Leiserson, R. L. Rivest, and C. Stein, "Introduction to algorithms".
2. Ellis Horowitz, Sartaj Sahni, S. Rajsekaran. "Fundamentals of computer algorithms".

Analysis of Algorithms Practical

COURSE CODE:M26DS1EP02 **COURSE CREDIT: 02**

1 Credit – 15 lectures **1 lecture is 120 minutes**

Course Objectives:

- To develop the ability to design, analyze, and implement efficient algorithms using various paradigms such as sorting, searching, greedy, dynamic programming, divide and conquer, and backtracking.

Course Outcome:

- Students will be able to analyze, design, and implement efficient algorithms for solving computational problems using various algorithmic paradigms and optimization techniques.

Sr. No.	List of Practical's
1.	Write an algorithm to find the sum of first *n* natural numbers.
2.	Implement Selection Sort.
3.	Implement Insertion Sort.
4.	Implement Merge Sort using the divide and conquer approach.
5.	Implement Binary search using recursion.
6.	Implement the Fractional Knapsack problem using a greedy approach.
7.	Implement the 0/1 Knapsack problem using dynamic programming.
8.	Implement the Travelling salesperson problem using dynamic programming.
9.	Implement the N-Queen problem using backtracking.
10.	Implement the Graph coloring using backtracking.

Research Methodology (Credit 4)

Research Methodology

COURSE CODE: M26DS1RM01 **COURSE CREDIT: 04**

1 credit - 15 lectures **1 lecture is 60 minutes**

Course Objectives:

This course aims to:

1. To understand the basics of research and literature review.
2. To learn different research types and research designs.
3. To acquire skills in sampling, data collection, and data analysis.
4. To develop abilities in research reporting, ethics, and research tools.

Course Outcome:
By the end of this course, students will be able to:

1. Explain research concepts and formulate research problems.
2. Select suitable research types and designs.
3. Apply sampling and statistical methods for data analysis.
4. Prepare ethical research reports using appropriate tools.

Unit	Topics	Lectures
I	Concept and meaning of research, characteristics of good research, applications of research, research problem – meaning and sources, characteristics of good research problem, research process and outcomes, types of research hypothesis, importance and organization of review of literature	15
II	Types of research: pure (basic/fundamental), applied, qualitative and quantitative research; Research design – meaning, need, types: exploratory, descriptive, causal; components and features of good research design; experimental design, survey research design, case study research design	15
III	Types and sources of data – primary and secondary, methods of data collection, concept of sampling, sampling frame and sample, characteristics of good sample, sampling methods: simple random, purposive, convenience, snowball; classification and tabulation of data; graphical representation: histograms, frequency polygon,	15

	frequency curves, bell-shaped curve and its properties; applications of statistics, measures of central tendency and dispersion	
IV	Research report and its structure, journal articles and components, abstract and keywords, thesis and dissertation components, referencing styles and bibliography; ethics in research – plagiarism (types, consequences, unintentional), copyright infringement, collaborative work, qualities of good researcher, citation and acknowledgement; research tools: LaTeX, BEAMER, Zotero, Mendeley	15

References:

- Research Methodology – Methods and Techniques C.R.Kothari ,Gaurav Garg New Age 4e
- Research Methodology – a step by step guide for beginners Ranjit Kumar Sage Publications 3e 2011
- Research Methodology Panneerselvam PHI Learning 2e 2014
- Business Research Methods William G.Zikmund, B.J Babin, J.C. Carr,Atanu Adhikari, M.Griffin Cengage 8e

Scheme of Examination

Faculty of Science

(Post graduate Programme)

SCHEME OF EXAMINATION (for 100 marks 4 credits)

The scheme of examination shall be divided into two parts:

- **Internal assessment 40% i.e.40 marks**
- **Semester end examination 60% i.e.60 marks**

(A)Internal Assessment 40 marks

Description	Marks
An internal test of 20 marks Q.1 a. Multiple choice Questions - 05 Marks b. True/False - 05 Marks Q.2. Attempt 2 questions out of 3 questions (5 marks each) - 10 Marks **OR** Online MCQ Test	20
Presentation/Case Studies/Assignments/Research Paper(Research Methodology)	15
Attendance and Class Participation	5
Total	40

B) Semester End examination 60 marks

PAPER PATTERN

Total Marks:60	
Q.1 15 marks OR 15 marks (7 and 8 marks)-Unit 1	15
Q.2 15 marks OR 15 marks (7 and 8 marks)-Unit 2	15
Q.3 15 marks OR 15 marks (7 and 8 marks)-Unit 3	15
Q.4 15 marks OR 15 marks (7 and 8 marks)-Unit 4	15
Total	60

Passing criteria: Minimum 40% in Internal (16 out of 40) and 40% (24 out of 60) in semester-end examination.

SCHEME OF EXAMINATION (for 50 marks, 2 credits)

The scheme of examination shall be divided into two parts:

- Internal assessment 40% i.e.20 marks
- Semester end examination 60% i.e.30 marks

(A)Internal Assessment 20 marks(Theory)

Description	**Marks**
An internal test of 10 marks Q.1 Multiple choice Questions/True or False - 05 Marks Q.2. Attempt 1 questions out of 2 questions (5 marks each) - 05 Marks **OR** Online MCQ Test	10
Presentation/Case Studies/Assignments	05
Attendance and Class Participation	05
Total	20

B) Semester End examination 30 marks

PAPER PATTERN

Total Marks:30	
Q.1 15 marks OR 15 marks (7 and 8 marks)-Unit 1	15
Q.2 15 marks OR 15 marks (7 and 8 marks)-Unit 2	15
Total	30

Passing criteria: Minimum 40% in Internal (08 out of 20) and 40% (12 out of 30) in semester-end examination.

SCHEME OF PRACTICAL EXAMINATION
(for 50 marks , 2 credit)

Description	Marks
Practical Question 1	20
Practical Question 2	20
Viva	05
Journal	05
Total	50

Passing Standards

The learners to pass a course shall have to obtain a minimum of 40% marks in each head of passing, consisting of Internal Assessment and Semester End Examination. The learners shall obtain a minimum of 40% marks (i.e. 16 out of 40 or 8 Out of 20) in the Internal Assessment and 40% marks in the Semester End Examination (i.e. 24 Out of 60 or 12 Out of 30) separately, to pass the course and a minimum of Grade D, wherever applicable, to pass a particular semester. A learner will be said to have passed the course if the learner passes the Internal Assessment and Semester End Examination together.