AC: 29.06.2024
Item No.: 3.4

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

Sr. No.	Heading	Particulars
1	Title of the course	B. Sc.(Data Science)
2	Eligibility for admission	Shall have passed XII standard examination of the Maharashtra Board of Higher Secondary Education or its equivalent with Mathematics and/or Statistics as one of the subjects
3	Minimum Percentage for admission	50%
4	Passing Marks	40%
5	Semesters	I
6	Level	UG
7	Pattern	3-4 years & 6-8 semesters Choice Based Grading System
8	Status	New
9	To be implemented from	From Academic year 2024-25 in a progressive manner

Date: 29th June, 2024.
Signature:

Dr. Koel Roychoudhury
AC Chairperson

Dr.Meghna Bhatia
Head of the Department

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

Sri Chandrasekarendra Saraswati Vidyapuram, Plot I-C, Sector V,
Nerul, Navi Mumbai – 400706 India
Tel No: 61196409, 61196410, 61196402, 61196413, 61196414, 61196415, 27708371
Fax No: 022-27713356, **Email:** ascnsies@sies.edu.in / siesascn@yahoo.in **Website:** www.siesascn.edu.in

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
B.Sc (Data Science)

(WITH EFFECT FROM THE ACADEMIC YEAR 2024-2025)

OBJECTIVES OF THE PROGRAMME

- To strengthen the fundamentals of data science and to develop relevant programming abilities.
- To develop the proficiency with statistical analysis of data.
- To develop and exhibit expertise in data management.
- To demonstrate skill and apply tools and techniques for transformation of data and statistical data analysis for multidisciplinary approach.
- To enhance employability skills and provide scope for higher education and research in the field of data science.
- It provides learners with an understanding of the fundamentals and core concepts of data science, which are essential for the industry.

PREAMBLE

Data is the most important asset in this era of digital revolution. The technological innovations are seen in all walks of life and therefore we are flooded with massive data. Every business relies on data to deliver better products as well as services. The study of data science has become essential to meet the growing demand for data scientists and data analysts.

The application of numerous tools and techniques in the fields of computer science, mathematics, and statistics gave rise to the field of data science. The need to gather and evaluate the massive amounts of data found in various application domains is growing.

This course focuses on educating the students about the fundamentals of computer science, applied mathematics, and applied statistics with respect to the data science applications.

Programme Outcomes

PO1: To utilize your understanding of computers to examine practical applications.

PO2: Capacity to deal with the ever-changing technical environment, recognizes and analyzes large amounts of data, and modify and adapt in order to support the expansion of the IT industry.

PO3: Create models and programs to address the different domain-specific issues.

PO4: Understand the many forms and types of data to be able to solve the intricate difficulties in the field of data science.

B.Sc. Data Science Programme Semester 1

(To be implemented from Academic Year- 2024-25)

Semester I			
Course Code	**Course Type**	**Course Title**	**Credit**
U24DS1MJ01	Major	Python Programming	3
U24DS1MJP01		Python Programming Practical	1
U24DS1MJ02	Major	Descriptive Statistics	1
U24DS1MJP02		Descriptive Statistics Practical	1
U24DS1VSC01	VSC	Fundamentals of Data Science	2
U24MMC1E01	OE1	Media Literacy	2
U24MMC1E02	OE2	Content Writing	2
U24DS1SEC01	SEC	Web Technologies -I	1
U24DS1SECP01		Web Technologies -I Practical	1
U24DS1AEC01	AEC	Effective Communication Skills-1	2
U24DS1VEC01	VEC	Green IT	2
U24DS1IKS01	IKS	Indian Knowledge System	2
Co-Curricular(Any one to be selected)			
U24CC1DLLE01	CC	Introduction to DLLE	2
U24CC1NSS01		NSS Paper-I	
U24CC1TW01		Technical Writing Basics	
Total Credit			22

Semester I
Major (Credit 3+1)
Python Programming

COURSE CODE: U24DS1MJ01 **COURSE CREDIT: 03**

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

Course Objectives:

The course will enable learners to understand Python programming concepts

- The course is designed to provide Basic knowledge of Python.
- Express proficiency in the handling of basic data structures and functions.
- Be able to program using more advanced features of Python.

Course Outcome:

Upon completion of the course, learners will be able to:

- Implement the variables, expressions, looping, and conditions used in Python programming.
- Apply the knowledge of lists, sets, strings, and functions.
- Create data structures, exceptions, and file handling.

Unit	Syllabus	Lecture Count
1	**Algorithms**: Building Blocks of Algorithms (Statements, Control Flow, Functions), Flow Chart, Algorithmic Problem Solving. **Introduction:** Introduction to Python, Unique Features of python , Entering Expressions into The Interactive Shell, Getting User Input, Python Data Types, Python Identifiers, Keywords, Variables, Storing Values in Variables, First Python Program, And Indentation, Comment **Control statements:** Boolean Values, Comparison Operators, Boolean Operators, Conditional (if), alternative (if-else), chained conditional (if-elif-else), Iteration: state, while, for, break, continue, pass.	15

2	**FUNCTIONS AND DATA STRUCTURES** **Functions:** Introduction, inbuilt functions, user-defined functions, passing parameters, return values, recursion, lambda function. **Arrays:** Creating an Array, Adding Elements to an Array, Removing Elements from the Array, Slicing of an Array, Searching Element in an Array, Updating Elements in a Array, Different Operations on Python Arrays **Strings:** Creating Strings, Functions of Strings, Working with Strings, Useful String Methods. **Lists:** The List Data Type, Working with Lists, list operations, list methods, mutability, aliasing, cloning lists, list and strings, list and functions; list processing: list comprehension, searching and sorting, **Sets:** creating sets, set operations	**15**
3	**DATA STRUCTURES (TUPLES, DICTIONARIES), EXCEPTION HANDLING AND FILE HANDLING** **Tuples:** Introduction, Creating Tuple, Tuple assignment, Operations on Tuples, Tuples as return values, Built-in Tuple Functions **Dictionaries:** Python Dictionaries, creating a Dictionary, operations, and methods, Nested Dictionaries. **Exceptions Handling:** Exception, Handling an exception, try….except…else, try-finally clause, Argument of an Exception, Python Standard Exceptions, Raising an exception, User-Defined Exceptions. **Files:** Text files, reading and writing files	**15**

References:

1. Murach's Python Programming, Michael Urban, Joel Murach, Mike Murach & Associates, Inc.2016.
2. Think Python ,Allen Downey,O'Reilly Publication,1st Edition,2012.
3. An Introduction to Computer Science using Python 3,Jason Montojo,Jennifer Campbell,Paul Gries,SPD Publication,1st Edition ,2014.
4. Introduction to Problem solving with Python,E.Balagurusamy,Tata Mcgraw Hill Publication,1st Edition ,2015.
5. Object-Oriented Programming in Python,Michael h.Goldwasser,David Letscher,Pearson Prentice Hall,1st Edition,2008.
6. Exploring Python,Budd,Tata Mcgraw Hill Publication,1st Edition ,2016.

Python Programming Practical

COURSE CODE: U24DS1MJP01 **COURSE CREDIT: 01**

1 credit - 15 lectures **1 lecture is 120 minutes**

Course Objectives:

The main objective of this laboratory is to put into practice computational thinking. The students will be expected to write, compile, run, and debug Python programs to demonstrate different programming and advanced programming concepts.

Course Outcome:
After completing the course the students can implement basic Python programming concepts.

Sr. No	Question
1	a. Write a python code to calculate compound interest. b Write a python code to find area of a circle. c. Write a python code to display largest number among three numbers.
2	a. Write a python code to check whether a entered number is even or odd. b. Write a python code to print all prime numbers in an interval. c. Write a python code to print n^{th} Fibonacci number.
3	a. Write a python code to print ASCII value of a character. b. Write a python code for sum of squares of first n natural numbers. c. Write a python code to calculate factorial of entered number.
4.	Write a python code to print below pattern.

	* * * * * * * * * * * * * * *	1 2 2 3 3 3 4 4 4 4 5 5 5 5 5	* *
5.	a. Write a Python program that accepts a word from the user and reverses it. b. Write a Python program that prints all the numbers from 0 to 6 except 3 and 6. c. Write a Python program that accepts a string and calculates the number of digits and letters.		
6	a. Write a python code to find the median of three values b. Write a python code to create simple calculator using functions. c. Write a python code to demonstrate lambda function.		
7	a. Write a python code to find sum of array. b. Write a python code to find largest element in an array c. Write a python code to check if given array is Monotonic.		
8	a. Write a python code to check if a string is palindrome or not. b. Write a python code to count words in a sentence. c. Write a python code to check validity of password.		
9	a. Write a python code to swap two elements in a list. b. Write a python code to find smallest number in a list c. Write a python code to find Intersection of two lists.		

10	a. Write a python code to find the size of a set. b. Write a python code to find max and min in a set. c. Write a python code to demonstrate different Set operation.
11	a. Write a python code to find the size of a Tuple. b. Write a python code to demonstrate various Tuple operations.
12	a. Write a Python script to check whether a given key already exists in a dictionary. b. Write a python code to iterate over dictionaries using for loops. c. Write a Python script to generate and print a dictionary that contains a number (between 1 and n) in the form (x, x*x).
13	a. Write a Python script to demonstrate exception handling. b. Write a Python script to create user defined Exception.
14	a. Write a Python script to read character by character from file. b. Write a Python script to count number of characters, words, spaces and lines in a file. c. Write a Python Program to merge two files into a third file
15	Mini project

Major (1+1)
Descriptive Statistics

COURSE CODE: U24DS1MJ02 **COURSE CREDIT: 01**

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

Course Objective:

- To tabulate statistical information given in descriptive form and to use graphical techniques to interpret
- To understand various measures of central tendency, dispersion, skewness and kurtosis. Moments and its properties.

Course Outcome:

- Understand concepts of sample vs. population and get acquainted with different types of data /scales. Distinguish between primary and secondary data. Tabulate and plot frequency distribution. Deals with numerical and graphical ways to describe and display data using histograms, stem and leaf plot and box plots.
- Calculate measures of central locations like mean, median and mode and explain their properties
- Calculate measures of the spread: variance, standard deviation, range and inter-quartile range and explain their properties.

Unit No	SYLLABUS	No of Lectures
1	Measures of Central Tendency: Concept of average/central tendency, characteristics of good measure of central tendency. Arithmetic Mean (A.M.), Median, Mode - Definition, examples. Measures of Dispersion: range, quartile deviation, standard deviation, coefficient of variation, graphical representation of various measures of location and dispersion (Ogives, Histograms, Box Plot) Moments: Raw moments, Central moments, skewness and kurtosis Correlation: Concept of correlation, Types and interpretation, Measure of Correlation: Scatter diagram and interpretation; Karl Pearson's coefficient of correlation (r): Definition, examples for ungrouped and grouped data, effect of shift of origin and change of scale, properties; Spearman's rank correlation coefficient: Definition, examples of with and without repetition.	15

References:

Text Books:

1. Goon, A. M., Gupta, M. K. and Dasgupta, B. (1983). Fundamentals of Statistics, Vol. I, Sixth Revised Edition, The World Press Pvt. Ltd., Calcutta.

2. Gupta, S.C. and Kapoor, V.K. (1987): Fundamentals of Mathematical Statistics, S. Chand

and Sons, New Delhi.

Additional References:

1. Sarma, K. V. S. (2001). Statistics Made it Simple: Do it yourself on PC. Prentice Hall of India, New Delhi.

2. Agarwal, B. L. (2003). Programmed Statistics, Second Edition, New Age International Publishers, New Delhi.

3. Purohit, S. G., Gore S. D., Deshmukh S. R. (2008). Statistics Using R, Narosa Publishing House, New Delhi.

4. Schaum's Outline Of Theory And Problems Of Beginning Statistics, Larry J. Stephens, Schaum's Outline Series McGraw-Hill. 2009

Descriptive Statistics Practical's

COURSE CODE: U24DS1MJP02 **COURSE CREDIT: 01**

1 credit - 15 lectures **1 lecture is 120 minutes**

Note: Practicals to be performed using R programming

Sr. No	List of practicals
1	Basics of R- • Data input, Arithmetic Operators • Vector Operations, Matrix Operations • Data Frames, Built-in Functions
2	• Frequency Distribution, Grouped Frequency Distribution • Diagrams and Graphs
3	Graphical representation of data- frequency polygon and histogram
4	Graph representation of data – ogive and Stem leaf
5	Practical based on arithmetic mean and to find missing frequencies given arithmetic mean.1
6	Practical based on median and partition vales using formulae and to find them graphically also
7	Practical based on mode by using formula, graphically, method of grouping
8	Practical based on combined mean and combined variance
9	Practical based on quartile deviation using formula and graphically
10	Practical based on mean deviation and standard deviation
11	Practical based on coefficient of variation
12	Practical based on moments about origin and moments about any arbitrary point.
13	Practical on skewness based on mean, median, mode and standard deviation.
14	Practical based on raw and central moments.
15	Practical based on skewness and kurtosis.

Vocational Skill Course (Credit 2)

Fundamentals of Data Science

COURSE CODE: U24DS1VSC01 **COURSE CREDIT: 02**

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

Course Objectives:

- To understand the basics of data science.
- To understand Data Scientist's Role in the Analysis Process.
- To explore model planning and Building.
- To explore various machine learning algorithms.

Course Outcome

- Learner is analyzing a problem and solving it by implementing suitable techniques.
- Understand the fundamental concepts of data science.
- Interpret multiple techniques for solving Data science applications.

Unit	Topic	Hrs
I	A brief introduction to data – structured, unstructured, semi-structured, data sets & patterns, Brief history of Data Science, Introduction to Data Science, Importance of Data Science, Differences between AI, ML, DL, Data Science & Data Analytics, Real world applications of data science, Steps in data science process Simple case study based on real life applications such as - Market research case, business predictions etc., Ethical and privacy implications of Data Science. Tools and Skills Needed – brief introduction of platforms, tools, frameworks, languages, databases and libraries, Current trends & major research challenges in data science.	15
II	Statistics and Probability-Data types, Variable Types, Statistics, Sampling Techniques and Probability, Information gain and entropy. Probability theory, Probability types. Data Preparation-Modeling-Applications-Objectives of Data Exploration-Datasets- Descriptive statistics- Data Visualization: Introduction- Types of Data visualization.	15

Text Books

1. Sanjeev J. Wagh, Manisha S. Bhende, Anuradha D. Thakare, Fundamentals of Data Science, 1st Edition, 2022.

2. Daimi, Kevin, Ed. Hamid R. Arabnia, Principles of Data Science, Springer, 2020.

3. Vijay Kotu, Bala Deshpande, Data Science: Concepts and Practices, Morgan Kaufmann Publishers, Second edition, 2019.

4. D J Patil, Hilary Mason, Mike Loukides, Ethics and Data Science, O' Reilly, 1st edition, 2018. 5. Sinan Ozdemir, Principles of Data Science, Packt Publishing, December 2016.

Reference Books:

1. Jure Leskovek, Anand Rajaraman and Jeffrey Ullman, Mining of Massive Datasets. v2.1, Cambridge University Press, 2014.

2. Cielen, Davy, Arno DB Meysman, Mohamed Ali, Introducing Data Science: Big Data, Machine Learning, and more, using Python Tools, Manning Publications Co.,

Open Elective (2+2 credit)
Media Literacy

COURSE CODE: U24MMC1E01 **COURSE CREDIT: 02**

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

Course Objectives:

1. To equip students with resources for successful knowledge of mass media.
2. To introduce students to forms, roles and importance of mass media.

Course Outcomes

1. The learner will get a clear understanding of all media platforms.
2. The learner will understand various aspects of media and its uses.
3. The learner will be able to identify types of media, its importance and uses.

UNIT	Topic	HRS
I	Introduction and overview, Meaning and importance of Mass Media ,Impact of Mass Media on Society A. I. Social Impact (With social reformers who have successfully used mass communication) II. Political Impact (With political leaders who have successfully used mass communication) III Economic Impact (With how economic changes were brought about by mass communication) IV. Developmental Impact (With how the government has successfully used mass communication), B. Impact of mass media on -1 Education, 2. Children, 3. Women, 4. Culture, 5. Youth, 6. Development.	15
II	Major forms of mass media: Role and function 1. Traditional & Folk Media 2. Print: Books, Newspapers, Magazines 3. Broadcast: Television, Radio 4. Films 5. Internet	15

References:

1. Mass Communication in India: Keval J Kumar
2. Mass Communication Journalism in India: D S Mehta
3. The Story of Mass Communication: Gurmeet Singh
4. Communication Technology & Development: I P Tiwari
5. The Process of Communication: David K Berlo
6. Cinema & Television: Jacques Hermabon& amp; Kumar Shahan.
7. Mass Media Today: Subir Ghosh
8. Mass Culture, Language & arts in India: Mahadev L Apte
9. Communication Facts & Ideas in Business: L. Brown (Prentice Hall).
10. India's Communication Revolution: ArvindSinghal and Everett Rogers.
11. The Myth of Mass Culture: Alan Swing wood
12. Lectures on Mass Communication: S Ganesh.

Content Writing

COURSE CODE: U24MMC1E02 **COURSE CREDIT: 02**

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

Course Objectives:

1. To equip students with resources for successful communication.
2. Recognizing clear writing as a communication skill
3. To introduce students to basic writing, editing and publishing techniques

Course Outcome:

1. Basic understanding of writing for various platforms.
2. Tools for researching, writing and editing effectively
3. Think creatively and express it through writing

UNIT	Topic	HRS
I	The concept of content writing and its applicability, Importance of contentPrint and web content writers' roles and responsibilities. Types of Content writing and its scope, Editing redundant words/ phases and replacing wrong words/punctuation/grammatical errors. Understanding the basics of social media, Understanding social media content writing.	15
II	Getting the brief, ideating, researching, organizing. Editing and proofreading Non-fiction (essays, reports), advertising, and newspaper writing styles Writing blogs, Corporate Communications: Focus on language, vocabulary, writing style, target audience, formal and casual language while writing for business-to-business (B2B), business-to-consumer (B2C), press releases, and newsletters. How to do a plagiarism check, and Paraphrasing.	15

References:

1. Technical writing process, Kieran Morgan
2. Bailey, Tom. On Writing Short Stories. USA: OUP, 2010. Print. Morley, David. The Cambridge
3. Companion to Creative Writing. Pune: Cambridge University Press India Ltd., 2012.Print.
4. Clark, Peter Roy. Writing Tools. USA: Hachette Book Group, 2008.Print.
5. Davidson, Chad. Writing Poetry: Creative and Critical Approaches. USA: Palgrave Macmillan,2009. Print.
6. Earnshaw, Steven (Ed). The Handbook of Creative Writing. Edinburgh: EUP, 2007
7. Field, Syd. The Screen Writer's Problem Solver. New York: Random House Publishing, 1998. Print.
8. Kundera, Milan. The Art of the Novel. London: Harper Perennial Modern Classics, 2003.
9. Spiro, Jane. Creative Writing Poetry. USA: Oxford University Press, 2004. Print.

Skill Enhancement Course (Credit 1+1)
Web Technologies - I

COURSE CODE: U24DS1SEC01 **COURSE CREDIT: 01**

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

Course Objectives:

- To introduce the fundamentals of Internet and web design to learners.
- Providing brief knowledge about HTML5 and CSS Fundamentals
- To understand the need and be able to develop HTML and CSS pages with valid structure as well as content.
- Introduction basics of JavaScript for Interactivity

Course Outcome:

Learners will be able to:

- History and development of the World Wide Web and associated technologies.
- The client-server architecture of the World Wide Web and its communication protocol HTTP/HTTPS.
- Learn basics of Styling using CSS.
- Learn Good design, universal design using basics of HTML and JavaScript

Unit	Details	Lectures
I	**Introduction and Web Design**: Introduction to Internet, WWW Web Protocols and Web servers, Web Site Structure. **Basics of HTML:** HTML Tags and Attributes, Hyperlink, Lists, Tables, Images, Frames: Introduction To frames, using frames & frameset tags, named frames. Forms and Basic Controls, Basics of CSS. Forms and Form controls **JavaScript**: Basics of JavaScript and Client-side Scripting language, JavaScript syntaxes for variables, Data Types, Comments, Operators, Statements. Functions, JavaScript Alert, Prompt and Confirm.	15

References:

1. Achyut Godbole,Atul Kahate"Web Technologies:TCP/IP,Web/Java Programming, and Cloud Computing",Third Edition,McGraw Hill Education.
2. Deitel, Deitel, Goldberg, "Internet & World Wide Web How to Program", Third Edition, Pearson Education, 2006.
3. Raj Kamal, "Internet and Web Technologies", Tata McGraw-Hill.
4. Internet and Web Technologies: Raj Kamal, McGrawHill.

Web Technologies -I Practical

COURSE CODE: U24DS1SECP01 **COURSE CREDIT: 01**

1 credit - 15 lectures **1 lecture is 120 minutes**

Sr.No.	List of Practical's
1.	Basic HTML Tags and Formatting Tags
a.	Design a page having suitable background color and text color with title "My First Web Page" using all the attributes of the Font tag.
b.	Create a page to show different character formatting (B, I, U, SUB, SUP) tags.
c.	Demonstrate use of Font styling like italics, underline and also use header tags. Create a HTML document giving details of your Name, Age, Address, Phone and Number, Class aligned in proper order using alignment attributes of Paragraph tag.
2.	**Image and Links**
a.	Write HTML code to create a Web Page that contains an Image at its center.
b.	Create web Pages using Anchor tag with its attributes for external links.
3.	**List Tag**
a	Create a HTML document containing a nested list showing a content page of any book.
4.	**Tables**
a.	Create a table to show your class time table.
5.	Create the following table in HTML with Dummy Data like Registration No, Name, Year and Date of Admission.
6.	**CSS**
a.	Write an HTML code to demonstrate the usage of inline CSS.
b.	Write an HTML code to demonstrate the usage of internal CSS.
c	Write an HTML code to demonstrate the usage of external CSS.
7.	**Form Tag**
a.	Create a web page using Form tag. (Hint: make use of text field, password field, e-mail, lists, radio buttons, checkboxes, submit button)

8.	**Frames**
a.	Create a web page using the Frameset tag.
	JavaScript
9.	Write a JavaScript program to display the largest integer among two integers. Take input from the user.
10.	Using JavaScript, create a web page to display the even and odd numbers between ranges. Take input from the user.
11.	Write a JavaScript program to display all the prime numbers between 1 and 100.
12.	Design a web page demonstrating different conditional statements.
13.	Design a web page demonstrating different looping statements.
14.	Design a web page demonstrating alert box and Prompt Box.
15.	Design a web page demonstrating all concepts HTML, CSS and JavaScript.

Ability Enhancement Course (Credit 2)
Effective Communication Skills-1

COURSE CODE: U24DS1AEC01 **COURSE CREDIT: 02**

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

Course Objectives:

1. To develop an awareness among learners about the complexity of communication process.
2. To develop effective letter writing skills among students with reference to prescribed layouts and formats.
3. To demonstrate the effective use of communication skills applicable for employability in the present situation.

Course Outcomes:

1. Learner will be aware about the general nature of the Communication process.
2. Learner will be able to write business letters in prescribed layouts and formats.
3. Learner will be able to use different types of oral and written skills to face employability conditions.

Sr.No	Syllabus	No. of lectures
01	**Module-1 .Theory of Communication** Introduction and Process of Communication, Channels of Communication: Formal /Informal, Vertical, Downward, Upward, Horizontal, Grapevine, Methods of Communication: Verbal/Nonverbal, Barriers in Communication: Physical, Linguistic, Psychological, Sociocultural, Mechanical, Modern Modes of Communication	10
02	**Module-2.Business Correspondence -1** Theory of Business Letter Writing,7 Cs of Writing, Format of Letter Writing, Full Block Format, Modified Block Format, Parts of Letter : Major Parts/Minor Parts, Personnel Correspondence: Job Application Letter, Resume, Job Acceptance Letter, Resignation Letter, Recommendation Letter, Goodwill Letter . Professional E-mail Writing: Format, Principles of E-mail writing	10
03	**Module-3.Language and Writing Skills** Paragraph Writing: Developing an idea, Use of appropriate linking devices, Interpretation of Data, Composition on given situation Listening Comprehension, Public Speaking Skills, ICT Enabled Communication, Appropriate use of Non-Verbal Communication, Multilingual Competency.	10

References:

1. A Handbook of Commercial Correspondence by Ashley, A, Oxford University Press, 1992.
2. Basic Business Communication: Skills for Empowering the Internet Generation by RaymondLesikar and Marie Flatley,9th Edition, Tata McGraw Hill, New Delhi,2002.
3. Business Communication by D Chaturvedi and Mukesh Chaturvedi, Third Edition, PearsonPublications Ltd,2013.
4. Business Communication by Meenakshi Raman and Prakash Singh ,Oxford UniversityPress,2007.
5. Business Communication Strategies by Monippally, Matthukutty, M,Tata McGraw Hill NewDelhi,2001.
6. Effective Business Communication by Herta Murphy, Herbert Hildebrandt,,Jane Thomas,McGraw Hill Education,2009.
7. Effective Communication by Balan K.R. and Rayadu C.S., Beacon Publication, New Delhi, 1996.8.Effective Technical Communication by M.Ashraf, Rizvi,Mc Graw Hill Publications,2006.

SCHEME OF EXAMINATION

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

Description	Marks
* Continuous Evaluation	10
Project/ Activity Report /Assignments	5
Attendance and Class behavior	5
Total	20

**Application oriented activities will be conducted*

B) Semester end examination 30 marks

Question no.1	A) Descriptive Question OR B) Short Notes -2 out of 3 (5 Marks each) Module no.1	10 Marks
Question no.2	A) Descriptive Question OR B) Short Notes-2 out of 3 (5 Marks each) Module no.2	10 Marks

Question no.3	A) Descriptive Question OR B) Short Notes-2 out of 3 (5 Marks each) Module no.3	10 Marks

Passing criteria: Minimum 40% in Internal (8 out of 20) and 40% (12 out of 30) in semester end examination.

Vocational Skill Course (Credit 2)

Green IT

COURSE CODE: U24DS1VEC01 **COURSE CREDIT: 02**

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

Course Objectives:

- To understand the concept of Green Technology.
- To learn Green IT regulating Green IT and different standards.
- To understand the concept of minimizing power utilization in technology.
- To know about Green PCs, Green notebooks and servers and Green data centers.
- To know the concept of Recycling

Course Outcome

Learners will be able to

- Understand the concept of Green IT and problems related to it.
- Know different standards for Green IT.
- Understand the how power usage can be minimized in Technology.
- Understand the concept of recycling.

UNIT	Topic	No of Lectures
I	Overview to Green IT: Problems: Toxins, Power Consumption, Equipment Disposal, Company's Carbon Footprint: Measuring, Details, reasons to bother, Plan for the Future, Cost Savings: Hardware, Power. Regulating Green IT: Laws, Standards and Protocols Introduction, The Regulatory Environment and IT Manufacturers RoHS, REACh, WEEE, Legislating for GHG Emissions and Energy Use of IT Equipment. Non regulatory Government Initiatives, Industry Associations and Standards Bodies, Green Building Standards, Green Data Centers , Social Movements and Greenpeace. Minimizing Power Usage: Power Problems, Monitoring Power Usage, Servers, Low-Cost Options, Reducing Power Use, Data De-Duplication, Virtualization, Management, Bigger Drives, Involving the Utility Company, Low Power Computers, PCs, Linux, Components, Servers, Computer Settings, Storage, Monitors, Power Supplies, Wireless Devices, Software.	15

II	Cooling: Cooling Costs, Power Cost, Causes of Cost, Calculating Cooling Needs, Reducing Cooling Costs, Economizers, On-Demand Cooling, HP's Solution, Optimizing Airflow, Hot Aisle/Cold Aisle, Raised, Floors, Cable Management, Vapour Seal, Prevent Recirculation of Equipment Exhaust, Supply Air Directly to Heat Sources, Fans, Humidity, Adding Cooling, Fluid Considerations, System Design, Data center Design, Centralized Control. Greening IT: Green PCs, Notebooks and Servers, Green Data Centers , Green Cloud Computing, Green Data Storage , Green Software, Green Networking and Communications. Recycling: Means of Disposal, Recycling, Refurbishing, Make the Decision, Life Cycle, from beginning to end, Green Design, Recycling Companies, Certifications, Hard Drive Recycling.	**15**

References-

1. Toby Velte, Anthony Velte, Robert Elsenpeter, Green IT, McGraw Hill, 2008.

2. Alvin Galea, Michael Schaefer, Mike Ebbers, Green Data Center: Steps for the Journey, Shroff Publishers and Distributers, 2011.

3. Deepak Shikarpur, Green IT, Vishwkarma Publications, 2014.

4. Bud E. Smith, Green Computing Tools and Techniques for Saving Energy, Money and Resources, CRC Press, 2014.

Indian Knowledge System (Credit 2)

Indian Knowledge System

COURSE CODE: U24DS1IKS01 **COURSE CREDIT: 02**

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

Course Objectives:

- To make students aware about the contribution of India to Mathematics.
- To make students aware about the several methods of ancient mathematics that will enhance their speed and accuracy in various competitive and placement exams.

Learning Outcome:

- Learners will be able to know about the contribution of Indian mathematicians and they will be able to apply several tricks and techniques of Vedic mathematics.

Unit	Details	Lectures
I	**The Non-zero Indian Contribution to Mathematics** The Indian Number System, The Baudhayana-Pythagoras Theorem, The Mathematics of Language, The Sine Function in Trigonometry, Negative Number, Solution to Quadratic Equations, The Virahanka-Fibonacci Sequence, Binomial Distribution, First Exact Formula for Pie, Geometric Construction with Compass and unmarked Straightedge. **Indian Mathematician and their Contribution** Aryabhata, Brahamagupta, Mahavira, Bhaskara, Ramanujan, Madhava.	15
II	**Sutras** Ekadhikena Purvena, Urdhva – tiryagbhyam, Nikhilam navatascaramam Dasatah, Paravartya Yojayet, Sunyam Samya Samuccaye, Anurupye Sunyamanyat, Sankalana Vyavakalanbhyam, Ekanyunena Purvena, Yavadunam Tamadun Kartya Varganca Yojayet. **Vedic Computation** Beejank, Vinculum Numbers, Simultaneous Linear Equations, Magic Squares, Dates and Calendars	15

References:

1. Vedic Mathematics Made Easy by *Dhaval Bhatiya*, Jaico Publishing House.rtfgh
2. Vedic Mathematics by *Bharathi Krishna Tripathi*, Motilal Banarsidass Publisher.
3. Cultures and History of Mathematics, by C. S. Seshadri, Hindustan Book Agency.
4. Contributions to the History of Indian Mathematics by *Gerard G. Emch, R. Sridharan and M. D. Srinivas*.

Co-Curricular Course (Credit 2)
DLLE - Introduction to DLLE

COURSE CODE: U24CC1DLLE01 **COURSE CREDIT: 02**

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

Course Outcome

1. Students will acquire knowledge on the structure of DLLE.
2. It will enable students to connect and understand the social realities and work for social welfare. It would help students to enhance leadership skills and apply them in their careers.
3. Students will be more aware of the practicality of real life and can face challenges in a better way and will be able to connect to the unreached section of society and help them

Learning outcome:

1. Learners will understand the structure and working of DLLE.
2. Students will connect to the people in society and work for social welfare.
3. Students will gain experience to work in society on various social aspects.

Unit No	Topic	No of Lectures
Unit – 1	• Introduction to DLLE • Aim & Objectives of DLLE • The Extension Dimension (Reach to Unreached) • Importance of Extension and Community work services in NGOs and the society • Role of Extension Teacher, Student Manager and Volunteers • Understanding community-related issues around the region and developing a sensitive approach towards society • Engage in community partnership practices and provide leadership in promoting changes to improve community well-being, Community engagement, and leadership	15
Unit - 2	Participation in community-based activities for the following Campaign Anna Poorna Yojna /Population Education/Career Guidance / Consumer Guidance/ Environmental Education/ Civic Education in the form of Street play/ Seminar/ Poster	15

	competition/ Essay writing/ Creative Writing competition/ Elocution, Discussion/ Rally/ Start-up business ideas & Presentations/ Interviews/ survey/ Waste collection drive/ Social & environmental awareness campaign/ Cleanliness drive/. Literacy Awareness/ Beach Cleaning/ Tree plantation/ Forest conservation/ Mental Health and Hygiene/ Yoga Meditation. Nutrition and Diet/ Field- Visit to different NGO's and Industries	

Evaluation Pattern of 50 marks: Continuous evaluation pattern.

Evaluation Criteria	Marks
Participation in social activity	10
Field visit/ community visit and report	10
Essay/ assignment /poster and report	10
Test/discussion/presentation and viva	10
Attendance in seminar /workshop & Training session	10
Total	**50**

References :

- https://www.mudlle.ac.in

Co-Curricular Course
National Service Scheme (NSS) Studies Paper-I

Course Code: U24CC1NSS01 **Credits: 2**
Total Lectures per week:2

Course Objectives:
The syllabus is aimed to achieve the following objectives:

1. To understand the Working, Framework and Contribution of NSS.
2. To Concept of Social Justice and its Importance
3. To understand themselves in relation to their community.
4. To identify the needs and problems of the community and involve them in problem-solving
5. To develop among themselves a sense of social and civic responsibility.
6. To utilize their knowledge in finding practical solutions to individual and community problems.

Learning Outcome:
The learners will be able to:

1. To understand Structural framework of NSS from National Level to College Level
2. Define Social Justice and how it helps the community
3. Enabling the students to contribute towards development of Community
4. Get involved in community betterment and active problem solving
5. Better Sense of social and civic responsibility. Have a better sense of Reduce, Recycle and Reuse
6. Collaborate and Work towards Solving Individua and Community Problems.

Unit No.	Topic	No. of Lectures required
Unit-I	**Introduction to National Service Scheme (NSS)** • Formation and development of NSS in India • Structural framework of NSS from National Level to College Level • Objectives of NSS • Symbol and Moto of NSS and its meaning • Basic Social Issues in India (Family System, Division of labour, Cast System in India, Gender Issues, Regional Imbalance) **Introduction to Social justice** Social Justice – the Concept and its features, Contribution for Social Justice – Mahatma Jyotiba Phule, Dr. Babasaheb Ambedkar, Shahu Maharaj, Chhatrapati Shivaji Maharaj, Savitribai Phule.	15
Unit-II	**Suggested Projects:** • Environment awareness – Waste management & segregation, Reduce, Reuse & Recycle,	15

	• Organic waste management by composting (maintenance of compost project) • Volunteering at study centers managed by Stree Mukti Sanghatana	
	Total Lectures	**30**

	Semester – I
Course Name: National Service Scheme (NSS)	**Course Code:**
Course Type	**Co-curricular**
Focuses on	**Skill Development**
Caters to	**Local, National, Global**
Total Lectures per week (1 Period is 60 minutes)	**2 (TBD)**
Credits	**2**

COURSE OUTCOME

Unit	Topics	CO	LO
Unit 1	Introduction to National Service Scheme (NSS)	CO1, CO2	LO1, LO2
Unit 2	Introduction to Social justice	CO3, CO4	LO3, LO3
Unit 3	Community Welfare	CO5, CO6	LO5, LO6

The scheme of Examination shall be divided as follows.

- **Continuous Evaluation Pattern**

Description	Marks
30 hours activity related work such as • Attending lectures/ training sessions (10 Marks) • Field work & Maintenance of work record (25)	35
Project Report	5
Viva-voce by faculty in charge and attendance	10
Total	**50**

References:

1. National Service Scheme Manual (Revised) Government of India, Ministry of Youth Affairs and Sports, New Delhi

2. National Service Scheme Manual University of Mumbai
3. National Service Scheme Manual for NSS District Coordinators National Service Scheme Cell, Dept. of Higher and Technical Education, Mantralaya
4. Rashtriya Seva Yojana Sankalpana Prof. Dr. Sankey Chakane, Dr. Pramod Diamond Publication, Pune
5. Annual Report of National Service Scheme (NSS) Dept. of Higher and Technical Education Mantralaya. Dept. of Higher and Technical Education Mantralaya.
6. Training Programme on National Programme scheme, TISS.
7. Orientation Courses for N.S.S. Programme officers, TISS.
8. Social Problems in India, Ram Ahuja.
9. National Service Scheme in India : A Case Study of Karnataka, M. B. Dishad, Trust Publications,2001
10. http://www.thebetterindia.com/140/national-service-scheme-nss/
11. http://en.wikipedia.org/wiki/national-service-scheme
12. http://nss.nic.in/adminstruct
13. http://nss.nic.in/propexpan
14. http://nss.nic.in
15. http://socialworkness.org/about.html

Co-Curricular Course
Technical Writing Basics

COURSE CODE: U24DS1CC01 **COURSE CREDIT: 02**
1 Credit - 15 lectures **1 Lecture - 60 minutes**

Course Objectives:

- Students will learn how to use critical reading skills to summarize various technical documents, understand and evaluate these texts, and explain how technical writing techniques work to create clear, professional documents.
- Students learn and use a process approach to continue the development of your writing style.

Course Outcome:

- Develop an understanding of the rules of academic writing
- Apply knowledge of sentence grammar to produce effective, correct, and rhetorically appropriate sentence constructions.

Sr. No.	Syllabus	Lectures
	Module - I: WRITING SKILLS	15
	Introduction to Technical Writing-Basic Principles ,Words-Phrases-Sentences ,Construction of Cohesive Paragraphs, Elements of Style	
	Principles of Summarizing , Abstract , Summary, Synopsis ,Technical Reports and Salient Features ,Types of Reports , Structure of Reports , Data Collection ,Use of Graphic Aids Drafting and Writing	10
	Module -II: WRITING ARTICLE/ REPORT/	
	Basic Guidelines and Documentation	05
Total Lectures		30

SCHEME OF EXAMINATION

Total Marks: 50

Continuous Evaluation Pattern.

Evaluation Criteria	Marks
Selection and Planning Article / Report Writing	20
Article / Report Evaluation	10
Presentation / Viva	15
Attendance and Class Participation	05
Total	50

Passing criteria: Minimum 40%

Revised Scheme of Examination
Faculty of Science
(Undergraduate Programme)
SCHEME OF EXAMINATION (for 100 marks 3 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	20
Presentation/Case Studies/Assignments	15
Attendance and Class Participation	5
Total	40

B) Semester End examination 60 marks

PAPER PATTERN

Duration: 2 hours	
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-attempt any 3 out of 6 (from Unit 1, Unit 2, Unit 3)	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	10
Presentation/Case Studies/Assignments	05
Attendance and Class Participation	05
Total	20

OR

A) Internal Assessment 20 marks(Practical)

Description	**Marks**
Practical Question	10
Journal	05
Viva	05
Total	20

B) Semester End examination 30 marks

PAPER PATTERN

Duration: 1 hour	
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

OR

PAPER PATTERN (1 credit Theory)

Duration: 1 hour	
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 1	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 , 1 credit)

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)

Description	Marks
Practical Internal Assessment	10
Viva	05
Journal	05
Total	20

B) Semester end examination (30 marks)

PAPER PATTERN

Duration: 1.5 hours	
Total Marks:30	
Q.1 Practical Q1	15
Q.2 Practical Q2	15
Total	30

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.

AC: 29·06·2024.
Item No.: 3.4

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

Sr. No.	Heading	Particulars
1	Title of the course	B. Sc.(Data Science)
2	Eligibility for admission	Shall have passed XII standard examination of the Maharashtra Board of Higher Secondary Education or its equivalent with Mathematics and/or Statistics as one of the subjects
3	Minimum Percentage for admission	50%
4	Passing Marks	40%
5	Semesters	II
6	Level	UG
7	Pattern	3-4 years & 6-8 semesters Choice Based Grading System
8	Status	New
9	To be implemented from	From Academic year 2024-25 in a progressive manner

Date: 29th June 2024.
Signature:

Dr. Koel Roychoudhury
AC Chairperson

Dr.Meghna Bhatia
Head of the Department

Sri Chandrasekarendra Saraswati Vidyapuram, Plot I-C, Sector V,
Nerul, Navi Mumbai – 400706 India
Tel No: 61196409, 61196410, 61196402, 61196413, 61196414, 61196415, 27708371
Fax No: 022-27713356, **Email:** ascnsies@sies.edu.in / siesascn@yahoo.in **Website:** www.siesascn.edu.in

B.Sc. Data Science

Semester II

(To be implemented from the Academic Year 2024-25)

Course Code	Course Type	Course Title	Credit
U24DS2MJ01	Major	Python Libraries for Data Science	3
U24DS2MJP01		Python Libraries for Data Science Practical	1
U24DS2MJ02	Major	Probability Theory and Distribution	1
U24DS2MJP02		Probability Theory and Distribution Practical	1
U24DS2MI01	Minor	Concept of Matrices	1
U24DS2MIP01		R Programming Practical	1
U24ICE2E01	OE (any 2)	Fundamental Aspects of Education	2
U24BI2E01		Basics of Banking	2
U24MS2E01		Personality Skill Development	2
U24MMC2E01		Film Appreciation	2
U24DS2VSC01	VSC	Database Concepts	1
U24DS2VSCP01		Database Concepts Practical	1
U24DS2SEC01	SEC	Web Technologies-II	1
U24DS2SECP01		Web Technologies -II Practical	1
U24DS2AEC01	AEC	Effective Communication Skills -2	2
U24DS2VEC01	VEC	Social Media Ethics	2
U24CC2NSS02	CC (any 1)	NSS Paper-II	2
U24CC2DLLE02		NGO Collaboration	
U24CC2CA01		Co-Curricular Course in Cultural Activities	
Total			**22**

Major(3+1)

Python Libraries for Data Science

COURSE CODE: U24DS2MJ01 **COURSE CREDIT: 03**

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

Course Objectives:

- Gain proficiency in using NumPy, Pandas, SciPy, and various visualization libraries to handle and analyze data efficiently.
- Learn to create, manipulate, and analyze multidimensional arrays and dataframes for complex data tasks.
- Understand how to create and customize visualizations using libraries such as matplotlib, Seaborn, Plotly, and Bokeh.
- Utilize NumPy and SciPy for advanced mathematical computations and statistical analysis.
- Gain foundational knowledge of machine learning concepts and practice implementing models using scikit-learn.

Course Outcomes

- Students will be able to install, import, and effectively utilize NumPy, Pandas, and SciPy for a variety of data science tasks.
- Students will demonstrate the ability to manipulate and analyze data using advanced functions and techniques in Pandas and NumPy, including array operations, DataFrame manipulations, and handling large datasets.
- Students will be capable of creating insightful and informative visualizations, customizing plots, and choosing appropriate graph types to represent different data sets.
- Students will be able to perform complex statistical analyses and linear algebra operations using SciPy and NumPy, and apply these techniques to real-world data.
- Students will be able to implement machine learning models using scikit-learn, including data preprocessing, model training, evaluation, and making predictions on new data.

Unit	Topic	Hours
I	**NumPy** Installing and Importing NumPy, Creating Arrays, Indexing and Slicing, Element-by-Element Operations, Filtering Values, Views Versus Copies, Some Array Methods, Broadcasting, NumPy Math NumPy Basics: Arrays And Vectorized Computation, The NumPy	15

	ndarray: A Multidimensional Array Object, Pseudorandom Number Generation, Universal Functions: Fast Element-Wise Array Functions, Array-Oriented Programming with Arrays, File Input and Output with Arrays, Linear Algebra, Example: Random Walks	
II	**Pandas** About DataFrames, Creating DataFrames, Interacting with DataFrame Data Manipulating , DataFrames, Manipulating Data, Interactive Display, Introduction to pandas Data Structures, Essential Functionality, Reindexing, Dropping Entries from an Axis, Indexing, Selection, and Filtering, Arithmetic and Data Alignment, Function Application and Mapping, Sorting and Ranking, Axis Indexes with Duplicate Labels, Summarizing and Computing Descriptive Statistics, Correlation and Covariance, Unique Values, Value Counts, and Membership	15
III	**SciPy** SciPy Overview, The scipy.misc Submodule, The scipy.special Submodule, The scipy.stats Submodule **Visualization Libraries** Starting with a Graph, Setting the Axis, Ticks, and Grids, Defining the Line Appearance, Using Labels, Annotations, and Legends, Choosing the Right Graph, Creating Advanced Scatterplots, Plotting Time Series, Plotting Geographical Data, Visualizing Graphs, Visualization Libraries : matplotlib ,Seaborn, Plotly, Bokeh **Machine Learning Libraries : scikit-learn** Popular Machine Learning Libraries, Learning More About Scikit-learn, Installing scikit-learn, Obtaining a Sample Dataset, Loading the Sample Dataset into a pandas DataFrame, Splitting the Sample Dataset into a Training Set and a Test Set, Transforming Text into Numerical Feature Vectors, Training and Evaluating the Model,Making Predictions on New Data	15

Books and References:

1. Python for Data Analysis, 3rd Edition, Wes McKinney, O'Reilly Media, Inc.
2. Foundational Python for Data Science, Kennedy Behrman, Addison-Wesley Professional
3. Python for Data Science, June 2022, Yuli Vasiliev, No Starch Press
4. Python for Data Science For Dummies, 3rd Edition, John Paul Mueller, Luca Massaron, For Dummies

Python Libraries for Data Science Practical

COURSE CODE: U24DS2MJP01 **COURSE CREDIT: 01**

1 credit - 15 lectures **1 lecture is 120 minutes**

Course Objectives

- Develop hands-on proficiency in using NumPy, Pandas, and SciPy for data manipulation, analysis, and visualization.
- Practice creating, slicing, filtering, and transforming multidimensional arrays and dataframes to manage and analyze complex data sets.
- Gain practical skills in generating and customizing visualizations using libraries such as matplotlib, Seaborn, Plotly, and Bokeh.
- Apply advanced mathematical computations and statistical analysis in real-world scenarios using NumPy and SciPy.
- Engage in practical machine learning tasks using scikit-learn, including data preprocessing, model training, evaluation, and prediction.

Course Outcomes

- Students will be able to install, import, and utilize NumPy, Pandas, and SciPy for practical data science tasks, including data manipulation and computational analysis.
- Students will demonstrate the ability to perform complex data manipulation and analysis using practical functions and techniques in Pandas and NumPy on real-world datasets.
- Students will be able to create, customize, and interpret visualizations using matplotlib, Seaborn, Plotly, and Bokeh to effectively communicate data insights.
- Students will be able to perform and apply advanced statistical and mathematical operations using SciPy and NumPy to analyze and interpret real-world data.
- Students will be able to implement and evaluate machine learning models using scikit-learn, including performing data preprocessing, training models, and making predictions on new data, demonstrating practical machine learning skills.

List Of Practicals

1	Create arrays from lists and use built-in functions to generate arrays of zeros, ones, and random values. Perform indexing, slicing, and reshaping on arrays. Use boolean indexing to filter and extract elements from an array. Generate summary statistics for DataFrame data.
2	Demonstrate the difference between views and copies using array manipulation. Generate random numbers and create random data distributions using NumPy.
3	Read from and write to CSV files using NumPy arrays. Explore and use array methods such as `reshape`, `flatten`, and `concatenate`.

	Implement broadcasting to perform operations on arrays of different shapes.
4	Perform advanced mathematical operations such as matrix multiplication and solving linear equations. Utilize universal functions for fast, element-wise computations. Create DataFrames from dictionaries, lists, and CSV files.Perform data manipulation tasks such as reshaping, cleaning, and transforming data in DataFrames.
5	Use advanced indexing techniques to access and modify DataFrame data.Filter DataFrame rows based on conditions. Reindex DataFrames and drop entries from an axis. Sort DataFrames by values and index, and rank data within DataFrames. Apply functions across DataFrame rows and columns using `apply`, `map`, and `applymap`.
6	Read from and write to various file formats such as CSV, Excel, and JSON using pandas. Write a Pandas program to demonstrate joining and merging 2 dataframes. Write a Pandas program to demonstrate working with Time Series Data.
7	Write a program to demonstrate Pandas and String. Write a program to demonstrate filters in Pandas. Write a program to demonstrate how Pandas deals with missing value.
8	Write a program to demonstrate Indexing in Pandas. Write a program to demonstrate Pandas and Data Series Write a program to demonstrate Pandas and DataFrame
9	Explore SciPy submodules `misc`, `special`, and `stats` by performing basic operations. Conduct hypothesis testing and compute descriptive statistics using `scipy.stats`.
10	Use the scipy.stats submodule to model a Normal distribution with a mean of 15.
11	Generate advanced scatterplots and line plots using Seaborn. a. Correlation Heatmap: Visualizing the correlation between variables in a dataset using a color-coded heatmap. b. Joint Plot: Creating a scatter plot with additional marginal distributions for two numerical variables. c. Pair Plot: Creating scatter plots and histograms for multiple numerical variables in a dataset. d. Dist Plot: Visualizing the distribution of a single numerical variable using a histogram or kernel density estimation.
12	Generate advanced scatterplots and line plots using Seaborn. Count Plot: Creating a bar plot to display the count of categorical variables. Bar Plot: Creating a bar plot to compare categorical variables with additional options for grouping and stacking. Box Plot: Visualizing the distribution of numerical variables and detecting outliers using quartiles and whiskers.

	Violin Plot: Combining a box plot and kernel density estimation for visualizing distributional information.
13	Write a program to create various plots using matplotlib a. Bar b. Pie c. Scatter
14	Write a program to create 3D plots using Plotly.
15	Write a program to create an interactive graph using Bokeh.

Major (1+1)

Probability Theory and Distribution

COURSE CODE:U24DS2MJ02 **COURSE CREDIT: 01**

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

Course Objective:

- To make learners aware about basic probability axioms and rules and its application.
- To understand the concept of conditional probability and Independence of events.
- To make learners familiar with discrete and continuous random variables as well as standard discrete and continuous distributions.

Course Outcome:

Calculate probability, conditional probability and independence. Apply the given discrete and continuous distributions whenever necessary.

Sr. No.	Topics	Hrs
I	**Probability:** Random experiment, sample space, events types and operations of events, Probability definition: classical, axiomatic, Elementary Theorems of probability (without proof). Conditional probability, Bayes theorem (without proof), independence, Examples on Probability. **Random variables** (Discrete and Continuous) - Probability mass function, Probability density function and cumulative distribution function of discrete and continuous random variable, Properties of cumulative distribution function. **Mathematical Expectations and Variance**: Mathematical Expectations of a function, Variance and S.D of a random variable, properties. **Probability Distribution** - Binomial, Poisson, Normal - definition, properties, uses, and illustrations - Chebyshev's inequality and Central Limit Theorem.	15

REFERENCES:

Textbooks:

1. Gupta, S.C. and Kapoor, V.K. (1987): Fundamentals of Mathematical Statistics, S. Chand and
Sons, New Delhi
2. Goon, A. M., Gupta, M. K. and Dasgupta, B. (1983). Fundamentals of Statistics, Vol. 1, Sixth Revised Edition, The World Press Pvt. Ltd., Calcutta.

Additional References:

1. Mood, A. M. and Graybill, F. A. and Boes D.C. (1974). Introduction to the Theory of Statistics, Ed. 3, McGraw Hill Book Company.
2. Hoel P. G. (1971). Introduction to Mathematical Statistics, John Wiley and Sons, New York.
3. Hogg, R.V. and Craig R.G. (1989). Introduction to Mathematical Statistics, Ed. MacMillan Publishing Co., New York.
4. Walpole R. E., Myers R. H. and Myers S. L. (1985), Probability and Statistics for Engineers and Scientists
5. Agarwal, B. L. (2003). Programmed Statistics, Second Edition, New Age International Publishers, New Delhi.

Probability Theory and Distribution Practical

COURSE CODE: U24DS2MJP02 **COURSE CREDIT: 01**

1 credit - 15 lectures **1 lecture is 120 minutes**

Sr. No.	List of Practicals
1	Implement examples based on Probability definition: classical, axiomatic
2	Implement examples based on elementary Theorems of probability
3	Implement examples based on Conditional probability
4	Implement examples based on „Bayes" theorem
5	Implement examples based on independence
6	Implement examples based on Probability distribution of discrete random variables.
7	Implement examples based on Probability mass function
8	Implement examples based on Probability distribution of continuous random variables.
9	Implement examples based on Probability density function
10	Implement examples on Mean of discrete and continuous Probability distribution
11	Implement examples on standard deviation and variance of discrete and continuous probability distribution
12	Implement examples on calculation of probability, mean and variance based on Binomial distribution

13	Implement examples on calculation of probability based on Normal distribution
14	Implement examples on calculation of probability based on Poisson distribution
15	Implement Examples on Chebyshev's inequality

Minor (1+1)

Concept of Matrices

COURSE CODE: U24DS2MI01 **COURSE CREDIT: 01**

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

Course Objectives:

- To offer basic concepts of vectors, matrices, system of linear equations, Eigen value Eigen vector and linear transformation.
- Understand the basic R-Language and its advantage over other tools
- Explore and understand how to write the R Script.

Course Outcome:

Learners will be able to:

- Express clear understanding of the concept of a solution to a system of equations.
- Find eigenvalues and corresponding eigenvectors for a square matrix.
- Have an overview of the arithmetic, relational and logical operators.
- Work with in-built and user-defined functions.

Unit	Details	Lectures
I	**Matrices** Matrices, Algebra of matrices, Elementary Transformation, Rank of Matrix, Echelon or Normal Matrix, Singularity of matrix, Inverse of matrix, Linear dependence and linear independence of vectors, System of Linear equation, Gaussian Elimination method. **Eigenvalues and Eigenvectors** Characteristic Polynomials of degree 2 and 3, Eigenvalues and eigenvectors, Properties of eigenvalues and eigenvectors, Cayley–Hamilton Theorem.	15

References:

1. Coding the Matrix Linear Algebra through Applications to Computer Science, First Edition, Philip N. Klein, Newtonian Press 2013.
2. 2. Schaum's Outline of Linear Algebra, Sixth Edition by Seymour Lipschutz, Marc Lipson, McGraw Hill 2017.
3. Linear Algebra and Its Applications, David C Lay, Pearson Education India; 3rd Edition, 2002.

R Programming Practical

COURSE CODE: U24DS2MIP01 **COURSE CREDIT: 01**

1 credit - 15 lectures **1 lecture is 120 minutes**

Sr.No.	List of Practical's
1.	Write an R program to take input from the user (name and age) and display the values. Also print the version of R installation.
2.	Write a R program demonstrating various data type
3.	Write an R program to get the details of the objects in memory.
4.	Write an R program to demonstrate variable assignment
5.	Write an R program to implement basic operations (Basic Arithmetic).
6.	Write a R program to create a sequence of numbers from 20 to 50 and find the mean of numbers from 20 to 60 and sum of numbers from 51 to 91
7.	Write a R program a. To find whether a number is positive or not using simple if. b. To find whether a number is positive or negative using if-else.
8.	Write an R program to print text 10 times using while, for loop, repeat.
9.	Write an R program multiplying two vectors of integer data type .
10.	Write a R program to create an empty data frame.
11.	Write an R program to create and combine arrays.
12.	Write an R program to get the unique elements of a given string and unique numbers of vectors.
13.	Write an R program to create three vectors a,b,c with 3 integers. Combine the three vectors to become a 3×3 matrix where each column represents a vector. Print the content of the matrix.
14.	Add and delete a column or row in a matrix. Finding the Determinant of a matrix.
15.	Write an R program to create a simple bar plot.

Open Elective – I
Fundamental Aspects of Education

Course Code: U24ICE2E01 **Course Credit: 02**

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

Course Objectives:

1. To develop understanding into the epistemological basis of education
2. To develop an understanding of the various educational policies
3. To understand various philosophies of education and its relevance in the present times
4. To develop an understanding of the principles of growth and development
5. To develop an understanding of the meaning and nature of Commerce Education
6. To develop an understanding of the aims and objectives in the teaching of Commerce
7. To integrate values in the teaching of Commerce
8. To develop an insight about role and challenges of a Commerce teacher

Unit 1: Pedagogy, Andragogy, Heterogogy and policies

a. Meaning of Education, Pedagogy, Andragogy, Heterogogy and its characteristics (3 hours)
b. Policies: Pre Independence, Kothari Commission, RTE, SSA (2 hours)
c. NEP (2020), NCF (2 hours)

Unit 2: Growth and development – Stages of development and achievement of developmental milestones.

a. Meaning, principles of growth and development, difference between growth and development (2 hours)
b. Heredity and Environment, Maturation and Learning (2 hours)
c. Stages of development (Meaning, Characteristics, Role of Adult (3 hours)
d. Aspects of Development (Meaning, Factors, Role of Adult) (3 hours)

Unit 3: Theoretical orientation to Education – Understanding of cognitive, behavioral, social theories, Value-based education. (8 hours)

a. Jean Piaget's theory of cognitive development
b. Kohlberg's theory of moral development

c. Erikson's theory of psycho-social development

Unit 4: Understanding Commerce in Education.

a. Meaning and Nature of Commerce in Education, Aims and Objectives of teaching commerce (2 hour)
b. Values of Teaching Commerce – Global citizenship, practical, social, cultural and Vocational (1 hour)
c. Role and challenges faced by a Commerce teacher (2 hour)

Examination:

Total marks: 50 marks

External examination: 30 marks

Internal examination: 20 marks (MCQ test – 5 marks; Assignment – 5 marks; Attendance- 5 marks; Visit to a school report/Presentation – 5 marks)

Open Elective - II

Basics of Banking

Course Code: U24BI2E01 **Course Credit :02**

1 Credit-15 Lectures **1 Lecture is 60 Minutes**

Course Objectives:

1. To describe the types of banks in India & their features.
2. To interpret various types of Bank accounts & the services attached to them including NRI accounts.
3. To assess the importance of digital banking in India.
4. To evaluate the role of RBI in India.

Course Outcomes:

On successful completion of this course, the learners will be able:

1. To identify, recall and describe various types of Banks in India.
2. To understand and differentiate services provided by banking sector in India.
3. To differentiate NRI products & other privileged services.
4. To analyse various online payment systems practiced in India
5. To evaluate the contribution of RBI towards the economic development of India.

Sr.No. Modules Number of lectures

1 Unit I – a)Introduction to Banking - Meaning, Definitions, Features, Types of Banks b) Role of RBI in Banking Sector – Introduction to RBI, Services & Facilities, Role of RBI in the economy of India & Nation Development 15

2 Unit II – a) Products & Services by Banks – Types of Bank accounts, services & Facilities for each accounts, NRI accounts, Fee based & Fund based services of Banks, Non Performing Assets b) Digital Banking – Services, Cards, e banking, Payment system, 15

References

- Essentials of Business Finance - RH. Srivastava,
- Management of Financial Institution - R. .N. Srivastava, Himalaya publication
- Modern Banking- R.S. Sayers
- Banking In India. S.G. Panandikar, Worli, Mumbai.
- Indian Financial System (Vol. I & II) B.D. Ghonasgi & Maloti Anagol
- Indian Financial System M.Y. Khan, Tata Mcgrow Hill.
- Financial Institutions in India - Vadilal Dagli, Mumbai.
- Financial Institutions in Indian Markets - L. M. Bhole,Tata Mcgrow Hill

Structure of Financial Institutions - V,V. Bhatt, Varadeo

Open Elective – III

Personality Development – Achieving Personal and Professional Success

Course Code: U24MS2E01 **Course Credit: 02**

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

Course Objectives:

- The course aims to train students on the importance of self-awareness, personal growth, soft skills, and life skills.
- The course facilitates the participants to understand the skill of influencing, being an effective team member and understanding self-motivation.
- The course aims to foster talent and facilitate employability, empowering the participant to thrive in the fiercely competitive corporate world.

Sr. No	Syllabus	No. of lectures
01	Concept of Self Introduction to Personality Development: Personality traits and theories, MBTI, Self-Image and Self-Concept, Locus of Control, Managing Oneself. Concept, Emotional Intelligence , Importance of Emotional Intelligence and Role of Emotional Intelligence in developing effective personality , Positive Attitude, Self-esteem, Self- confidence	15
02	Understanding Self in Relation with others Concept of Influencing , Art of Influencing , Johari Window , FIRO – B , Interpersonal Relations, Communication in organizations, Personal Branding, Leadership Skills, Presentation Skills, Personal skills- Stress Management, Negotiation skills, Conflict Management, Time Management and Anger Management.	15

References:

- Organizational Behavior by Fred Luthans
- Organization Behavior by Neharika Vohra Stephen P. Robbins, Timothy A. Judge
- The 7 Habits of Highly Effective People by Stephen Covey
- The Art and Science of Personality Development Dan P. McAdams

SCHEME OF EXAMINATION

The scheme of examination shall be divided as follows:

- **Comprehensive Internal assessment 100% i.e. 50 marks**

Description	Marks
Case Study/ Case-let/ Situation Analysis – (Group Activity or Individual Activity)/ Group Discussion/ Role Play/ Story Telling/ Presentation/ Practical Assignment/ Written Home Assignment/ Industry Analysis – (Group Activity or Individual Activity)/ Literature Review/ Book Review/ In-depth Viva/ Student Driven Activities/ Newspaper reading/ Report Writing/Precis Writing. (Any one of these)	15
Project	20
Class Test/ Open Book Test/ Quiz	10
Class Participation	5
Total	50

Passing criteria: Minimum 40% (20 out of 50) in Comprehensive Internal Assessment.

Open Elective - IV
Film Appreciation

Course Code: U24MMC2E01 **Course Credit: 02**

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

Course Objectives:

- **To introduce students to the basic concepts of cinema.**
- **To help students identify different genres and aspects of films.**
- **To help students understand technical aspects regarding making of films.**

Unit	Details	Lectures
I	Introduction to Film as an Art Form, History of films, Evolution of Cinema - Silent Era to Talkies, Golden Age of Hollywood, Commercial films, History and evolution of the Indian film industry, Silent era, golden era of Bollywood.	10
II	Basic Elements of Film - Shot, Scene, Sequence, and Frame Composition. Understanding Film Genres - Comedy, Drama, Action, and Documentary. Cinematography - Camera Angles, Movement, and Lighting. Sound Design and Music in Film. Editing Techniques and Their Impact on Storytelling.	10
III	Themes and Symbolism in Film. Stages in filmmaking: pre production, production and post production. , Impact of Technological Advances on Film. Cultural influence of films. Introduction to regional cinema; Marathi, Bengali, Tamil, Malyali, Telugu, Kannada.	10

References:

- Bordwell, D., & Thompson, K. (2016). Film Art: An Introduction. McGraw Hill
- Giannetti, L. . Understanding Movies. Pearson; 13th edition (26 June 2013)
- Nowell-Smith, G. (Ed.). The Oxford History of World Cinema. Oxford University Press.
- Sharff, S. (1982). The Elements of Cinema.
- Ganti, T. (2004). Bollywood: A Guidebook to Popular Hindi Cinema. Psychology Press, 2004
- Rajadhyaksha, A., & Willemen, P. (2022). A Short History of Indian Cinema. Routledge.

Scheme of Examination (for 50 marks 2 credits Theory)

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

Description	Marks
Internal test of 10 marks Q.1. Attempt 2 questions out of 4 questions (5 marks each)- 10 Marks	10
One Project and Viva voce/Presentation/Case studies/Assignments	10
Total	20

B) Semester end examination 30 marks

PAPER PATTERN

Duration : 1 hour	
Total Marks: 30	
Q.1 Attempt Q1 a) or b)- 10 marks Attempt Q2 a) or b)- 10 marks Attempt Q3 a) or b)- 10 marks	10 10 10
Total	30
Note: 1. Q.1, 2, 3 - 10 marks questions may be divided into sub questions if required.	

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

VSC (Credit 1+1)
Database Concepts

COURSE CODE: U24DS2VSC01 **COURSE CREDIT: 01**

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

Course Objectives:

- To make students aware fundamentals of database system and experience the students working with database using SQL

Course Outcomes:

- To appreciate the importance of database design and write simple queries using SQL

Unit	Syllabus	No. of lectures
1.	Introduction: Database-System Applications, Purpose of Database Systems, View of Data, Database Languages, Database Design, Database Engine, Database and Application Architecture, Database Users and Administrators, History of Database Systems: From file system to NOSQL Introduction to the Relational Model: Structure of Relational Databases, Database Schema, Keys, Schema Diagrams. Relational Query Languages. The Relational Algebra	15

References:

1. "Database System Concepts", Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw Hill, 2017
2. "Database Management Systems", Raghu Ramakrishnan and Johannes Gehrke, 3rd Edition, 2014

Additional References:

1. "Fundamentals of Database System", Elmasri Ramez, Navathe Shamkant, Pearson Education, Seventh edition, 2017
2. "Murach's MySQL", Joel Murach, 3rd Edition, 3rd Edition, 2019

Database Concepts - Practical

COURSE CODE: U24DS2VSCP01 **COURSE CREDIT: 01**

1 credit - 15 lectures **1 lecture is 120 minutes**

Sr. No.	List of Practical
1	Perform the Following: - Installing MySQL on your machine
2	Perform the Following: - Creating a Database - Creating tables in the database
3	Perform the following: - Inserting the records in table - Updating the records in table - Deleting the records in table
4	Perform the following: - Basic SELECT queries - Conditional SELECT Queries - String matching using SELECT
5	Perform the following - Queries using Aggregate function - Queries using SET Operations
6	Perform the Following: - Nested Subqueries
7	Perform the following: - Date Functions - String Functions
8	Perform the following: - Math Functions - Advanced Functions
9	Perform the Following: - Inner Join - Outer Join
10	Perform the following: - Creating Views - Dropping views - Selecting from a view
11	Perform the following - Creating index on table
12	Perform the following: - Creating roles - Grant Statement - Revoke Statement
13	Perform the following - Implementing transactions
14	Perform the following: - Create functions and procedures on tables
15	Perform the following: - Creating and implementing Triggers

SEC(1+1)

WEB TECHNOLOGIES-II

COURSE CODE: U24DS2SEC01 **COURSE CREDIT: 01**

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

Course Objectives:

- To analyze and evaluate the working of XML.
- To apply how server-side programming works on the web.
- To develop web applications using MySQL database

Course Outcome:

- After completing this course learners will be able to:
- Design a structured approach to identify a website's needs, interests, and functionality.
- Develop server-side scripting
- Design and develop a full-fledged website using PHP with MySQL database.

Unit	Topic	Hours
1	**XML**: Introduction to XML, Comparing XML with HTML, Advantages and Disadvantages of XML, Anatomy of an XML document, Creating and Defining XML tags, their attributes and values, Document Type Definition (DTD), XML Schemas, Document Object Model (DOM), Parsing XML Data – DOM, XHTML, XML Entity References, XSLT **Introduction to PHP**: What is PHP? Why use PHP? Setting up a development environment, PHP syntax: Basic structure, variables, data types, Operators, conditional statements, looping constructs, switch statements, Functions, Arrays, Superglobals (GET, POST, REQUEST) and forms, String manipulation functions, regular expressions for pattern matching. **Advanced PHP:** Working with files and directories, File handling, Date and time manipulation functions, Introduction to Databases, Connecting to a database, executing queries.	15

References:

1. XML in a Nutshell, 3rd Edition, Elliotte Rusty Harold, W. Scott Means, O'Reilly Media, Inc.
2. Web Programming and Interactive Technologies, scriptDemics, StarEdu Solutions India.
3. PHP: A Beginners Guide, Vikram Vaswani, TMH
4. PHP 5.1 for Beginners Ivan Bayross Sharanam Shah, SPD 2013
5. PHP Project for Beginners SharanamShah, Vaishali Shah SPD 2015
6. PHP 6 and MySQL Bible Steve Suehring, Tim Converse, Joyce Park Wiley 2009

PRACTICAL OF WEB TECHNOLOGIES-II

COURSE CODE:U24DS2SECP01 **COURSE CREDIT: 01**

1 credit - 15 lectures **1 lecture is 120 minutes**

Course Objectives:

The student should understand XML and PHP technologies.

Course Outcome:

The students are able to implement XML and PHP technologies.

Sr. No	Topic
1	Design a simple XML document
2	Create XML file to display breakfast menu.
3	Design a DTD, corresponding XML document and display it in a browser using CSS.
4	Design an XML document and display it in a browser using XSLT.
5	Design XML Schema and corresponding XML document.
6	Design a program to implement XML DOM.
7	Design a program to implement XML parser.
8	a. Write a PHP Program to accept a number from the user and print it factorial. b. Write a PHP code to state whether the entered year is a leap year or not. Accept the year from the user.

9	Write a PHP program to display the following Pyramid.
10	a.Write a PHP program to demonstrate function call by value and call by reference. b.Write a PHP program to display first 10 natural numbers using recursive functions.
11	Write a PHP program to demonstrate GET and POST request.
12	Write a PHP program to demonstrate different string functions.
13	Write a PHP program to create a one-dimensional array.
14	Write a PHP program to demonstrate working with Files (Reading / Writing).
15	Write a PHP program to demonstrate database connectivity.

AEC(Credit 2)

Effective Communication Skills-2

COURSE CODE: U24DS2AEC01 **COURSE CREDIT: 02**

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

Course Objectives:

1. To develop effective interpersonal skills among learners for corporate employability.
2. To develop effective business letter writing skills among students applicable in corporate world.
3. To develop professional skills among learners for better personality development.

Course Outcomes:

1. Learner will be able to apply interpersonal skills for better employability.
2. Learner will be able to utilize effective business letter writing skills required in corporate world.
3. Learner will be able to use specified oral and written skills for the professional development.

Sr.No	Syllabus	No. of lectures
01	**Module-1.Group Communication** Interview Skills: Preparing for Interview, Types of Interviews, Group Discussion: Nature and Ingredients, Process and Preparation, Corporate Meetings: Theory, Group Dynamics, Process of Conducting Meeting, Notice, Agenda and Minutes of Meeting, Conference: Types, Organization, Advanced Methods of conducting conferences	10
02	**Module-2.Business Correspondence -2** Trade Letters: Inquiry Letter, Complaint Letter, Adjustment Letter, Sales Letter, RTI and Consumer Grievance Letter ,Report Writing: Types of Report, Format of Report, Investigative Report, Feasibility Report	10
03	**Module-3. Language and Writing Skills:** Presentation Skills: Principles of Effective Presentation, Use of PPT Summarization: Identification of main points and sub points, Presenting in cohesive manner, Paraphrasing and summarizing,	10

Reference Books:

1. A Handbook of Commercial Correspondence by Ashley, A, Oxford University Press, 1992.
2. Basic Business Communication: Skills for Empowering the Internet Generation by Raymond Lesikar and Marie Flatley,9th Edition, Tata McGraw Hill, New Delhi,2002.

3. Business Communication by D Chaturvedi and MukeshChaturvedi,Third Edition, Pearson Publications Ltd,2013.
4. Business Communication by Meenakshi Raman and Prakash Singh ,Oxford University Press,2007.
5. Business Communication Strategies by Monippally, Matthukutty, M,Tata McGraw Hill New Delhi,2001.
6. Effective Business Communication by Herta Murphy, Herbert Hildebrandt, JaneThomas,McGraw Hill Education,2009.
7. Effective Communication by Balan K.R. and Rayadu C.S., Beacon Publication, New Delhi, 1996.
8. Effective Technical Communication by M.Ashraf, Rizvi,McGraw Hill Publications,2006.

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SCHEMEOFEXAMINATION

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

Description	Marks
* Continuous Evaluation	10
Project/ Activity Report /Assignments	5
Attendance and Class behavior	5
Total	20

**Application oriented activities will be conducted*

B)Semester end examination 30 marks

Question no.1	A) Descriptive Question OR B) Short Notes -2 out of 3 (5 Marks each) Module no.1	10 Marks
Question no.2	A) Descriptive Question OR B) Short Notes-2 out of 3 (5 Marks each) Module no.2	10 Marks
Question no.3	A) Descriptive Question OR B) Short Notes-2 out of 3 (5 Marks each) Module no.3	10 Marks

Passing criteria: Minimum 40% in Internal (8 out of 20) and 40% (12 out of 30) in semester-end examination.

VEC(Credit 2)
Social Media Ethics

COURSE CODE:U24DS2VEC01 **COURSE CREDIT: 02**

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

Course Objectives:

- To make students aware about social media fundamentals.

Course Outcomes:

- To appreciate the importance of social media ethics

Unit	Syllabus	No. of lectures
1.	**Social Media Concepts:** Social media sites and monetization; 4 Zones of social media introduced; 5th P of marketing (participation) **Zones of social media:** Social Community: Participation in social networks, Diffusion of digital innovation, Roger's diffusion theory of innovation, Characteristics of social media sites, Audience engagement, Brand Fans, Marketing applications of social publishing zone. Social Publishing: Types of content, Channels of content distribution,	15
2	**New Media Ethics:** Introduction, Definition, Rights and Ethical responsibilities of Content Creators, Content Curation and Limits to Sharing, Rights and Ethics of Online Readers, **Social media and privacy/ethics:** Introduction to Social Media Ethics, Defamation on Social media platforms, Cyberbullying, forms of Cyberbullying, Cyberstalking	15

References:

1. Tuten, T. & Solomon, M. (2013). Social Media Marketing. Boston, MA: Pearson

Additional References:

1. Van Dijck, J. (2013). The Culture of Connectivity. New York, NY: Oxford University Press.

SIES (Nerul) College of Arts, Science and Commerce (Autonomous)
CC- National Service Scheme

Sr. No.	Heading	Particulars
1	Title of the course	National Service Scheme (NSS)
2	Semesters	II
3	Level	UG
4	Pattern	03 years & 06 semesters CBGS
5	To be implemented from	From Academic year 2024-25 in a progressive manner

National Service Scheme (NSS) Studies Paper-II

Course Code: U24CC2NSS02
Course Type: Co-curricular
Total Lectures per week (1 Period is 60 minutes) :2 **Credits: 2**

Unit No.	Topic	No. of Lectures required
Unit-I	Social Integration: • Social Integration Meaning of value and types • Human values and social responsibilities Concept of NGOS: • Definition, Formation, objective, functions, types • Government Organizations Vs NGO's • Case studies	15
Unit-II	Community Welfare in Association with NGO - • Environment awareness • Water Management • Energy conservation • Gender sensitization, • Healthy society	15
	Total Lectures	30

Course Outcomes (CO):

- Upon successful completion of this course, students will be able to:
    - CO1: Define and analyze the concept of social integration and its value in a community.
    - CO2: Explain the various types of NGOs and their function in promoting social integration and community development.
    - CO3: Evaluate the impact of NGO initiatives on specific areas of community well-being (environment, water management, energy conservation, gender equality, health).
    - CO4: Develop strategies for collaborating with NGOs to address community needs in the aforementioned areas.

Learning Outcomes (LO):

Unit 1: Social Integration

- LO 1.1: Define social integration and explain its importance in a diverse society.
- LO 1.2: Analyze the different types and values of social integration.
- LO 1.3: Explain how human values and social responsibilities contribute to a more integrated society.
- LO 1.4: Discuss the potential challenges to social integration and their impact on communities.

Unit 2: Concept of NGOs

- LO 2.1: Define NGOs and differentiate between various types (e.g., charitable organizations, advocacy groups, service providers).
- LO 2.2: Explain the core objectives and functions of NGOs in promoting social good.
- LO 2.3: Analyze a case study to understand the practical work of an NGO.
- LO 2.4: Evaluate the strengths and limitations of NGOs as agents of social change.

Unit 3: Community Welfare in Association with NGOs

- LO 3.1: Identify the specific areas of community development addressed by NGOs (environment, water management, energy conservation, gender equality, health).
- LO 3.2: Analyze strategies employed by NGOs to promote community participation and empowerment in these areas.
- LO 3.3: Critically evaluate the effectiveness of specific NGO interventions related to environment, water management, energy conservation, gender sensitization, or healthy society initiatives.
- LO 3.4: Develop strategies for building and maintaining successful partnerships between NGOs and communities to address these specific needs.

Unit	Topics
Unit 1	Social Integration
Unit 2	Concept of NGOS
Unit 3	Community Welfare in Association with NGO

		Semester – II	
Course Name: National Service Scheme (NSS)		**Course Code:**	
Course Type		**Co-curricular**	
Focuses on		**Skill Development**	
Caters to		**Local, National, Global**	
Total Lectures per week (1 Period is 60 minutes)		**2**	
Credits		**2**	
Evaluation System		**Hours**	**Marks**
	Continuous Evaluation	**30**	**50**
Total Marks			**50**

*For the Unit III – Students will be assigned Community Activity as per availability. They will be divided in a group of 20 and will be engaged for 20 hrs.
The scheme of Examination shall be divided as follows.

- Continuous Evaluation Pattern

Description	**Marks**
30 hours activity related work such as • Attending lectures/ training sessions (10 Marks) • Field work & Maintenance of work record (25)	35
Project Report/Poster	5
Viva-voce by faculty in charge/ Internal Test	10
Total	50

References:

1. National Service Scheme Manual (Revised) Government of India, Ministry of Youth Affairs and Sports, New Delhi
2. National Service Scheme Manual University of Mumbai
3. National Service Scheme Manual for NSS District Coordinators National Service Scheme Cell, Dept. of Higher and Technical Education, Mantralaya
4. Rashtriya Seva Yojana Sankalpana Prof. Dr. Sankey Chakane, Dr. Pramod Diamond Publication, Pune
5. Annual Report of National Service Scheme (NSS) Dept. of Higher and Technical Education Mantralaya. Dept. of Higher and Technical Education Mantralaya.
6. Training Programme on National Programme scheme, TISS.
7. Orientation Courses for N.S.S. Programme officers, TISS.
8. Social Problems in India, Ram Ahuja.
9. National Service Scheme in India : A Case Study of Karnataka, M. B. Dishad, Trust Publications, 2001
10. http://www.thebetterindia.com/140/national-service-scheme-nss/
11. http://en.wikipedia.org/wiki/national-service-scheme
12. http://nss.nic.in/adminstruct
13. http://nss.nic.in/propexpan
14. http://nss.nic.in
15. http://socialworkness.org/about.html

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

Co- curricular Course (CC)Department of Lifelong Learning and Extension

Sr. No.	Heading	Particulars
1	Title of the course	NGO Collaboration
2	Semesters	II
3	Level	UG
4	Pattern	03 years & 06 semesters CBGS
5	To be implemented from	From Academic year 2024-25 in a progressive manner

DLLE - NGO Collaboration

COURSE CODE: U24CC2DLLE02 **COURSE CREDIT: 02**
1 credit - 15 lectures **1 lecture is 60 minutes.**

Course Objectives:

1. Students will have a thorough understanding working of NGOs, their contributions to society, and the skills needed to work effectively within or alongside these organizations.

2. Interns would develop skills in project management, communication, research, and advocacy while working on impactful projects addressing poverty, education, healthcare, and human rights. The experience fosters professional growth, facilitates networking, and would help to promote and develop social responsibilities towards society.

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Learning Outcome:

1. It will enable learners to contribute their best skills to society through social work.
2. Internship will give hands-on training to work along with various social groups through NGOs

Sr. No.	Syllabus	No of Hrs.
1	Module - I: Introduction to NGO Concept of NGO, Role, and formation of NGO in India, Contribution of NGO in services in India i.e. Social Services, Advocacy, and Human Rights, Economic Development and Skill Enhancement, Environmental Conservation, Disaster Relief and Rehabilitation, Community Development, Gender Equality, Research, and Innovation. Contribution to weaker sections of the community i.e. Old age homes, Orphanages, children's homes, and Rehabilitation centres. Examples of Local, State, National, and International Level NGOs. Scope of Social Entrepreneurship	15
2	Module II: Social Internship Collaboration with any NGO or any other organization at an individual level or in a group of 5-8 volunteers. Students can work on Community Development, Environmental Conservation, Healthcare Services, Human Rights and Advocacy, Education, and Youth Programs Students are expected to work at least for 15-20 hrs with an NGO. The interns are expected to work on projects like community surveys, educational workshops, or program implementation. With the training on the organization's mission and procedures paired with mentors for guidance. Engagement in fieldwork with communities and participation in research, data collection, and report preparation.	15
.Total Lectures		30

SCHEME OF EXAMINATION
Total Marks: 50
Continuous evaluation pattern.

Evaluation Criteria	Marks
MCQ/ Class test	10
Skit/ Short film/ content development in the form of posters, leaflets or any other form on NGO worked with collaboration	10
Collaboration with NGO for any of the project from 20-30 hrs. per semester and detail report based on social internship and Viva	30
Total	50

References :

- Brager, G., & Specht, H. (1973). Community organizing. New York: Columbia University Press
- Chambers, R. (1992). Rural Appraisal: Rapid, Relaxed and Participatory. Sussex: Institute of Development Studies 9
- Chatterjee, P. (1975). Towards a typological paradigm of community organization The Indian Journal of Social Work, XXXVI (1),1-14
- Dunham, A. (1958). Community Welfare Organization. Principles and practice. New York: Thomas Y. Crowell.
- Meenai, Z. (2007). Participatory Community work. New Delhi : Concept publications
- Ross, M G. (1967). Community Organization; Theory, Principles, and Practice. New York: Harper & Row.
- Siddiqui, H.Y. (1997). Working with Communities: An Introduction to Community Work. New Delhi: Hira Publications.
- York, A. S. (1984). Towards a conceptual model of community social Work. The British Journal of Social Work, 14(3), 241-255.
- Wilson, G., & Ryland, G. (1949). Social group work practice: The creative use of the social process. Boston: Houghton Mifflin.
- Konopka, G. (1983). Social Group Work: A Helping Process (3rd Edition). New Jersey: Prentice Hall InternationalPathak, S. H. (1981).
- https://www.mudlle.ac.in

Co –Curricular Course in Cultural Activities

Course Code: U24CC2CA01
Course Type: Co-curricular **Credits: 2**

Course Objectives:
The syllabus is aimed to achieve the following objectives:
1. To train students in skills to plan, manage and implement various types of events and to enable them to effectively undertake any activity in the real world.
2. To develop a sense of discipline and commitment as an educated individual towards the society.
3. To develop social values respecting differences among individuals, respecting diverse value and cultures.

Learning Outcome:
The learners will be able to:
1. Learner will be able to solve problems utilizing various concepts, solutions etc.
2. Learner will be able to understand the power of expressions listening to others, public speaking.
3. Learner will be able to take initiatives and responsibilities, influencing others in working for a good purpose, taking accountability.

Unit No.	Topic	No. of Lectures required
Unit-I	Lectures: 1. Event Communication & Presentation Skills. 2. Special Events, Research & Planning 3. Advance Event Accounting & Costing 4. Event Marketing, Advertising & PR 5. Event Production & Logistics	5
Unit-II	Practical Sessions: 1. Event Communication & Presentation Skills. 2. Special Events, Research & Planning 3. Advance Event Accounting & Costing 4. Event Marketing, Advertising & PR 5. Event Production & Logistics	5
	Department level Cultural activities/Performances	15
	Report Writing / Operations and Marketing	05
	TOTAL (HOURS)	**30**

	Semester – II
Course Name: CC in Cultural Activities	**Course Code:** U24CA2CC01
Course Type	**Co-curricular**
Focuses on	**Skill Development**
Caters to	**Local**
Total Lectures per week (1 Period is 60 minutes)	**1**
Credits	**2**

The scheme of Examination shall be divided as follows.

- **Continuous Evaluation Pattern**

Description	**Marks**
Activity related work such as • Attending lectures • Practical sessions • Seminars, Conference	10 10 10
Maintenance of work records and submission of activity report	10
Test/ Discussion/ Presentations /Viva-voce by faculty in charge	10
Total	**50**

References:

1. S.N. Maheshwari, Cost Accounting
2. B.M. Lal, Cost Accounting
3. Senge, Peter : The Learning Organization
4. Successful Event Management By Anton Shone & Bryn Parry
5. Event management, a professional approach By Ashutosh Chaturvedi

Revised Scheme of Examination

Faculty of Science

(Undergraduate Programme)

SCHEME OF EXAMINATION (for 100 marks 3 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

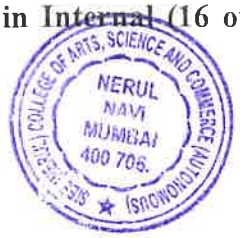
Description	**Marks**
An internal test of 20 marks Q.1 a. Multiple choice Questions - 05 Marks b. True/False - 05 Marks Q.2. Attempt 2 questions out of 3 questions (5 marks each) - 10 Marks	20
Presentation/Case Studies/Assignments	15
Attendance and Class Participation	5
Total	40

B) Semester End examination 60 marks

PAPER PATTERN

Duration: 2 hours	
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-attempt any 3 out of 6 (from Unit 1, Unit 2, Unit 3)	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	10
Presentation/Case Studies/Assignments	05
Attendance and Class Participation	05
Total	20

OR

(A)Internal Assessment 20 marks(Practical)

Description	**Marks**
Practical Question	10
Journal	05
Viva	05
Total	20

B) Semester End examination 30 marks

PAPER PATTERN

Duration: 1 hour	
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

OR

PAPER PATTERN(1 credit Theory)

Duration: 1 hour	
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 1	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 , 1 credit)

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)

Description	Marks
Practical Internal Assessment	10
Viva	05
Journal	05
Total	20

B) Semester end examination(30 marks)

PAPER PATTERN

Duration: 1.5 hours	
Total Marks:30	
Q.1 Practical Q1	15
Q.2 Practical Q2	15
Total	30

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.