AC No: 29/6/24
Item No: 1.1.8

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

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 (COMPUTER SCIENCE)
(WITH EFFECT FROM THE ACADEMIC YEAR 2024-2025)

Sr. No.	Heading	Particulars
1	Title of the Programme	B Sc Computer Science
2	Year	Second Year
3	Semesters	III and IV
4	Level	UG
5	Pattern	3-4 years & 6-8 semesters Choice Based Grading System
6	Status	New
7	To be implemented from	From Academic year 2024-25 in a progressive manner

Date: 29th June, 2024.

Signature:

Dr. Koel Roychoudhury
AC Chairperson

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

Dr. Sheeja Ravi
Head of the Department

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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 (COMPUTER SCIENCE) (WITH EFFECT FROM THE ACADEMIC YEAR 2024-2025)

OBJECTIVES OF THE PROGRAMME

1. To develop an understanding and knowledge of the basic theory of Computer Science with good foundation on theory, systems, and applications.
2. To foster necessary skills and analytical abilities for developing computer-based solutions of real- life problems.
3. To provide training in emergent computing technologies which lead to innovative solutions for industry and academia.
4. To develop the necessary study skills and knowledge to pursue further post-graduate study in computer science or other related fields.
5. To develop the professional skillset required for a career in an information technology-oriented business or industry.
6. To enable students to work independently and collaboratively, communicate effectively, and become responsible, competent, confident, insightful, and creative users of computing technology.

PROGRAMME OUTCOMES:

1. At the end of the program, students will develop technical, computational, and soft skills required for secure and reliable software and communications networks.
2. Students will develop the ability to design, test and implement sustainable computer-based systems to meet industry requirements.
3. Ability to develop an understanding of professional, ethical, legal, security and social issues as well as responsibilities while developing and using computer software.
4. Ability to pursue higher education or become self-employed by applying the knowledge of computer science to solve real world problems.
5. Ability to develop technical projects addressing the needs of diverse domains.

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

Department of Computer Science

NEP Credit Structure for 2024 - 25

Semester	Major	Minor	OE(Any one)	VSC, SEC (VSEC)	AEC, VEC, IKS	OJT, FP, CEP, CC, RP	Cum Cr/ Sem.
III	Operating Systems Principles (4 credits) Adv.Data Structure (4 Credits)	1. Calculus (02 Credits) 2.Theory Of Computation (2 Credits)	1. Basics of Insurance 2.Introduction to Indian Economy 3.Social Media Marketing (2 credits)	VSC-Fundamentals of Java Programing (2 credits)	1. AEC-Understanding Basic Forms of English Literature-1 2. HINDI 3.MARATHI (02 Credits)	Co-Curricular (4 Credits) 1.Tech Community Development 2. DLLE 3. NSS 4. SPORTS 5. NCC	22
Total	10	2	2	2	2	4	22

SCHEME OF MODULES

Semester III			
Serial No.	Course Code	Credits	Course Name
I	Major Department Specific Course (DSC)		
1	U24CS3MJ01	03	Operating Systems Principles
2	U24CS3MJP01	01	Practical of Operating Systems Principles
3	U24CS3MJ02	03	Advanced Data Structure
4	U24CS3MJP02	01	Advanced Data Structures Practical
II	Minor Department Specific Course		
1	U24CS3MI01	01	Calculus
2	U24CS3MIP01	01	Calculus Practical
3	U25CS3MI02	01	Theory Of Computation
4	U25CS3MIP02	01	Theory of Computation Practical
III	Open Electives (OE)/ Generic Electives (Any One)		
1	U24BI3OE01	02	Basics of Insurance
2	U24MMC3E01	02	Social Media Marketing
3	U24BE3E01	02	Introduction to Indian Economy
IV	VOCATIONAL COURSE (VC) & SKILL ENHANCEMENT COURSE (SEC)		
1	U24CS3VSC01	01	Fundamentals of Java Programming
2	U24CS3VSCP01	01	Fundamentals of Java Programming Practical
V	ABILITY ENHANCEMENT COURSE(AEC)/VALUE EDUCATION COURSE(VEC) / INDIAN KNOWLEDGE SYSTEM (IKS)		
1	U24ENG3AEC01 (Rev.25-26)	02	Understanding Basic Forms of English Literature-1
2	U25HIN3AEC01	02	Hindi
3	U26MAR3AEC01	02	Marathi
VI	ON JOB TRAINING/ FIELD PROJECT/RESEARCH PROJECT/COMMUNITY EXTENSION PROGRAMME/CO-CURRICULAR		
2	U25CS3CCD01 U25CC3NSS01 U25CC3DLLE02 U25CC3SP03 SIUEXCC211	04	Tech Community Development I NSS DLLE SPORTS NCC
TOTAL CREDITS		22	

MAJOR- Operating Systems Principles

COURSE CODE: U24CS3MJ01 **COURSE CREDIT: 03**

1 credit - 15 lectures

Course Objectives:

- To learn basic concepts and structure of operating systems
- To learn about process and synchronization in operating system level
- To learn CPU scheduling algorithms and Memory and File system

management Course Outcomes:

- Work with any type of operating system
- Handle threads, processes, process synchronization
- Implement CPU scheduling algorithms
- Understand the background role of memory management and Design file system

UNIT No	Syllabus	No. of lectures
01	Introduction to Operating-Systems: Definition of Operating System, Operating System's role, Operating-System Operations, Functions of Operating System, Computing Environments Operating-System Structures: Operating-System Services, User and Operating-System Interface, System Calls, Types of System Calls, Operating-System Structure Processes: Process Concept, Process Scheduling, Operations on Processes, Inter process Communication Threads: Overview, Multicore Programming, Multithreading Models	15
02	Process Synchronization: General structure of a typical process, race condition, The Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic Problems of Synchronization, Monitors CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling	15
	Algorithms (FCFS, SJF, SRTF, Priority, RR, Multilevel Queue Scheduling, Multilevel Feedback Queue Scheduling), Thread Scheduling Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock	

	Main Memory: Background, Logical address space, Physical address space, MMU, Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of the Page Table Virtual Memory: Background, Demand Paging, Copy-on-Write, Page	
03	Replacement, Allocation of Frames, Thrashing Mass-Storage Structure: Overview, Disk Structure, Disk Scheduling, Disk Management File-System Interface and Implementation: File Concept, Access Methods, Directory and Disk Structure, File-System Mounting, File Sharing, File-System Structure, File-System Implementation, Directory Implementation, Allocation Methods, Free-Space Management	15

REFERENCES:

Textbook(s):

1. Abraham Silberschatz, Peter Galvin, Greg Gagne, Operating System Concepts, Wiley, 2021

Additional Reference(s):

1. Achyut S. Godbole, Atul Kahate, Operating Systems, Tata McGraw Hill, 2017
2. Naresh Chauhan, Principles of Operating Systems, Oxford Press, 2014
3. Andrew S Tanenbaum, Herbert Bos, Modern Operating Systems, 4e Fourth Edition, Pearson Education, 2016

Practical of Operating Systems Principles

COURSE CODE : U24CS3MJP01 **COURSE CREDIT: 01**

1 credit - 2 lectures **1 lecture is 60 minutes**

Note: Practicals 1 to 8 by using Python/ JAVA or any programming language.

Practicals 9 onwards by using Linux Operating System.

Sr. No.	List of Practicals
1	Process Communication: a. Write a program to give a solution to the producer–consumer problem using shared memory. b. Write a program to give a solution to the producer–consumer problem using message passing.
2	Synchronization: a. Write a program to give a solution to the Bounded buffer problem. b. Write a program to give a solution to the readers–writers problem.
3	Write a program that implements FCFS scheduling algorithm.
4	Write a program that implements (with no premption) scheduling algorithm.
5	Write a program that implements RR scheduling algorithm.
6	Write a program that implements the banker's algorithm
7	Write a program that implements the FIFO page-replacement algorithm.
8	Write a program that implements the LRU page-replacement algorithm
9	Installation of Ubuntu Linux operating system. a) Booting and Installing from (USB/DVD)

	b) Using Ubuntu Software center / Using Synaptic c) Explore useful software packages.
10	File System Commands: touch, help, man, more, less, pwd, cd, mkdir, rmdir, ls, find, ls, etc File handling Commands: cat, cp, rm, mv, more, file, wc, od, cmp, diff, comm, chmod, chown, chgrp, gzip and gunzip, zip and unzip, tar, ln, umask,, chmod, chgrp, chown, etc
11	General purpose utility Commands:cal, date, echo, man, printf, passwd, script, who, uname, tty, stty, etc Simple Filters and I/O redirection: head, tail, cut paste, sort, grep family, tee, uniq, tr, etc. Networking Commands: who, whoami, ping, telnet, ftp, ssh, etc Editors: vi, sed, awk
12	Working and Managing with processes- sh, ps, kill, nice, at and batch etc.
13	Shell scripting : Defining variables, reading user input, exit and exit status commands, , expr, test, [], if conditional, logical operators Conditions (for loop, until loop and while loop) arithmetic operations, examples, Redirecting Input / Output in scripts, creating your own Redirection

MAJOR- ADVANCED DATA STRUCTURE

COURSE CODE : U24CS3MJ02 **COURSE CREDIT: 03**

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

COURSE OBJECTIVE:

- To introduce data abstraction and data representation in memory
- To describe, design and use of elementary data structures such as stack, queue, linked list, tree and graph
- How and why different data structures are used for different types of problems.

COURSE OUTCOMES:

Upon successful completion of the course,

- Students will be able to Understand the basic principles and operations of data structures.
- Apply Hashing, Disjoint sets and String Matching techniques for solving problems effectively.
- Apply the concepts of advanced Trees and Graphs for solving problems effectively.
- Analyze the given scenario and choose appropriate Data Structure for solving problems.

Unit No.	SYLLABUS	No of Lectures
I	Threaded Binary Tree - Types of threaded binary tree, advantages and disadvantages. applications. B- Tree - Traversal, operations, applications. B+ tree - Structure, Operations - Insertion Deletion, Searching records, Features of B+ tree, Difference between B+ tree and B tree. Applications of B+ tree. Trees – AVL: Introduction to AVL. Balancing Factor, Insertion, deletion in AVL Trees, Single Rotation, Double Rotation, LL RR Rotation. Applications of Tree like Huffman Coding, Kruskals minimum spanning tree algorithm.	15
II	Priority Queues and Heap: Introduction, Advantages and Disadvantages, Applications, Heaps, Types of heaps, Heapifying the element, Examples	15
	Graph - Breadth First Search or BFS for a graph, Working of BFS Algorithm, Implementation, Complexity analysis, applications. Cycle exists in graph – Undirected Graph Connectivity, Advantages and Disadvantages. Problems on BFS. Depth First Search or DFS for graph - How DFS work, Complexity analysis of DFS. Shortest Path Algorithm - Properties, Algorithms - Bellman - ford, Floyed Warshall algorithm. Single Source Shortest Path Algorithms: Dijkstra's, Advantages & applications.	

	Hashing: Hash Table ADT, Advantages & Disadvantages, Concept of hashing, hash table, hash functions, collision, collision avoidance techniques, Applications of hashing Disjoint Sets – Equivalence relation, Basic Data Structure, Simple	
III	Union and Find algorithms, Smart Union and Path compression algorithm. Managing a partition: a set into disjoint subsets with Quick Union, Find operations, Applications of Disjoint sets with examples.	15

REFERENCES:

Textbooks:

Introduction to Algorithm, Thomas H Cormen, PHI

Data Structures And Algorithms Made Easy, Narasimha Karumanchi, 2021 Additional References:

Fundamentals of Computer Algorithms, SartajSahni and SanguthevarRajasekaran Ellis Horowitz, Universities Press, 2018

Data Structures and Algorithms in Python, Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser, Wiley, 2016.

ADVANCED DATA STRUCTURES PRACTICAL

COURSE CODE: U24CS3MJP02 **COURSE CREDIT: 01**

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

Sr No	List Of Practicals
01	Write a program for Implementation of the Threaded Node.
02	Write a code for Traversal and Searching an element in a B- tree.
03	Write a program for Implementation of the B+ tree. Perform operations like insertion, deletion.
04	Write a program to insert and delete a node in AVL tree.
05	Write a code for implementation of the BFS for graph using Adjacency List.
06	Write a code for implementation of the DFS for graph using Adjacency List.
07	Write a program for Bellman - ford Shortest path algorithm.
08	Write a program for Floyed Warshall Shortest path algorithm.
09	Write a program to implement a Single Source Shortest Path.
10	Write code to Printing Paths in Dijkstra's Shortest Path Algorithm
11	Write a program to create basic Hash Table for insertion, deletion, traversal operations(assume that there are no collisions)
12	Write a program to illustrate the unordered multiset hash function () function And the unordered multiset end() function
13	Write a program to create hash table to handle collisions using overflow chaining

Note: Practical can be implemented using c ++ / Java / Python .

MINOR- Calculus

COURSE CODE: U24CS3MI01 **COURSE CREDIT: 01**

1 credit - 15 lectures

1 lecture is 60 minutes

Course Objective:

- The primary objective of this course is to introduce the basic tools of Calculus which are helpful in understanding their applications to the real world problems. The course is designed to have a grasp of important concepts of Calculus in a scientific way. It covers topics from as basic as definition of functions to partial derivatives of functions in a gradual and logical way. The learner is expected to solve as many examples as possible to a get compete clarity and understanding of the topics covered.

Course Outcome:

- Develop mathematical skills and enhance thinking power of learners.
- Understand mathematical concepts like limit, continuity, derivative, integration of functions, partial derivatives.
- Appreciate real world applications which use the learned concepts. Skill to formulate a problem through Mathematical modelling and simulation.

UNIT NO	SYLLABUS	NO OF Lectures
1	DERIVATIVES AND ITS APPLICATIONS: Review of Basic Concepts: Functions, limit of a function, continuity of a function, derivative function. Derivative In Graphing And Applications: Increase, Decrease, Concavity, Relative Extreme; Graphing Polynomials, Absolute Maxima and Minima, Newton's Method. PARTIAL DERIVATIVES AND ITS APPLICATIONS: Functions of Several Variables: Functions of two or more variables, Limits and Continuity of functions of two or three variables. Partial Derivatives: Partial Derivatives, Differentiability, Differentials, and Local Linearity, Chain Rule, Implicit Differentiation.	15

REFERENCES:

Textbooks:

1. Calculus: Early transcendental (10th Edition): Howard Anton, IrlBivens, Stephen Davis, John Wiley & sons, 2012.

Additional References:

1. Calculus and analytic geometry (9th edition): George B Thomas, Ross L Finney, Addison Wesley, 1995
2. Calculus: Early Transcendentals (8th Edition): James Stewart, Brooks Cole, 2015.
3. Calculus (10th Edition): Ron Larson, Bruce H. Edwards, Cengage Learning, 2013.
4. Thomas' Calculus (13th Edition): George B. Thomas, Maurice D. Weir, Joel R. Hass, Pearson, 2014.

Calculus Practical

COURSE CODE: U24CS3MIP01 **COURSE CREDIT: 01**

1 credit - 15 lectures

1 lecture is 60 minutes

Sr. NO	List of Practical
1	Practical based on Functions of one variable, its domain and range
2	Practical based on Operations on functions.
3	Practical based on Limits of functions of one variable
4	Practical based on Continuity of functions of one variable
5	Practical based on Derivatives of functions of one variable
6	Practical based on Increasing and Decreasing functions
7	Practical based on Concavity and inflection points
8	Practical based on Relative Extrema, Absolute Extrema
9	Practical based on Newton's method to find approximate solution of an equation
10	Practical based on Partial derivatives of functions, First and Second order partial
11	Practical based on Differential for functions of two or three variables
12	Practical based on Chain rule for functions of two or three variables
13	Practical based on Implicit differentiation

MINOR- Theory of Computation

COURSE CODE: U25CS3MI02 **COURSE CREDIT: 01**

1 credit - 15 lectures

1 lecture is 60 minutes

Course Objective:

To give an overview of the theoretical foundations of computer science from the perspective of formal languages

To illustrate finite state machines to solve problems in computing

To explain the hierarchy of problems arising in the computer sciences.

To familiarize Regular grammars

Course Outcome:

After successful completion of this course, students would be able to

Understand Grammar and Languages

Learn about Automata theory and its application in Language Design

UNIT No	SYLLABUS	NO OF LECTURES
1	Automata Theory: Defining Automaton, Finite Automaton, Transitions and Its properties, Acceptability by Finite Automaton, Nondeterministic Finite State Machines, DFA and NDFA equivalence, Mealy and Moore Machines. Regular Sets and Regular Grammar: Regular Grammar, Regular Expressions, Finite automata and Regular Expressions, Pumping Lemma and its Applications. Context Free Languages: Context-free Languages, Derivation Tree, Ambiguity of Grammar, CFG simplification, Normal Forms, Pushdown Automata: Definitions, Acceptance by PDA Turing Machines: Turing Machine Definition, Representations, Acceptability by Turing Machines.	15

REFERENCES:

Textbooks:

1. Theory of Computer Science, K. L. P Mishra, Chandrasekharan, PHI,3rd Edition 2019
2. Introduction to Computer Theory, Daniel Cohen, Wiley, 2nd Edition, 2007

3. Introductory Theory of Computer Science, E.V. Krishnamurthy, Affiliated East-West Press, 2009.

Additional References:

1. Theory of Computation, Kavi Mahesh, Wiley India, 2018
2. Elements of The Theory of Computation, Lewis, Papadimitriou, PHI, 2015
3. Introduction to Languages and the Theory of Computation, John E Martin, McGraw- Hill Education, 2010
4. Introduction to Theory of Computation, Michel Sipser, Thomson
5. Introduction to Automata Theory, Languages and Computation, John E. Hopcroft, Pearson Education, 2014.

Theory of Computation Practical

COURSE CODE: U25CS3MIP02 **COURSE CREDIT: 01**

1 credit - 15 lectures

1 lecture is 60 minutes

Sr. NO	List of Practical
1	Write a program for tokenization of given input
2	Write a program for generating regular expressions for regular grammar
3	Write a program for generating derivation sequence / language for the given sequence of productions.
4	Design a Program for creating machine that accepts three consecutive one.
5	Design a Program for creating machine that accepts the string always ending with 101.
6	Design a program for accepting decimal number divisible by 2.
7	Design a program for accepting decimal number divisible by 3.
8	Design a program for creating a machine which accepts string having equal no. of 1's and 0's.
9	Design a program for creating a machine which count number of 1's and 0's in a given string.
10	Write a program to convert NDFA to DFA
11	Design a program which will increment the given binary number by 1
12	Design a program for the language starting and ending with a and having any combination of b's in between
13	Design a program for the language starting with a but not having consecutive b's

VOCATIONAL SKILL COURSE (VSC) - Fundamentals of Java Programming

COURSE CODE: U24CS3VSC01 **COURSE CREDIT: 01**

~~1 credit - 15 lectures~~

1 lecture is 60 minutes

Course Objectives:

- To provide insight into java based applications using OOP concepts

UNIT No	Syllabus	No. of lectures
01	Module I Introduction: History, Features of Java, Java Development Kit, Java Application Programming Interface, Java Virtual Machine Java Program Structure, Java Tokens. OOPS: Introduction, Class, Object, Static Keywords, Constructors, this keyword, Inheritance, Inner class, Anonymous Inner class, super keyword, Polymorphism (overloading and overriding), Abstraction, Encapsulation, Abstract Classes, Interfaces Packages: Introduction to predefined packages, User Defined Packages, Access specifiers Exception Handling: Introduction, Pre-Defined Exceptions, try-catch-finally, throws, throw, User Defined Exceptions Multithreading: Thread Creations, Thread Life Cycle, Life Cycle Methods, Synchronization, wait() notify() notify all() methods Collection Framework: Introduction, java.util Package interfaces, List, Set, Map, List interface & its classes, Set interface & its classes, Map interface & its classes.	15

Textbook:

1. Herbert Schildt, Java The Complete Reference, Eleventh Edition, McGraw-Hill Education, 2020.

References:

1. E. Balagurusamy, Programming with Java- A Primer, Tata McGraw-Hill Education India, 2014
2. Programming in JAVA, 2nd Ed, Sachin Malhotra & Saurabh Choudhary, Oxford Press, 2018

Fundamentals of Java Programming Practical

COURSE CODE: U24CS3VSCP01 **COURSE CREDIT: 01**

1 credit – 15 Lecture

1 lecture 60 minutes

Sr.No	List of Practicals
1	Accept integer values for a, b and c which are coefficients of quadratic equations. Find the solution of the quadratic equation.
2	Accept two n x m matrices. Write a Java program to find addition of these matrices.
3	Accept n strings. Sort names in ascending order.
4	Create a package: Animals. In the package animals create an interface Animal with suitable behaviors. Implement the interface Animal in the same package animals.
5	Demonstrate Java inheritance using extended keywords.
6	Demonstrate method overloading and method overriding in Java
7	Demonstrate creating your own exception in Java
8	a. Write a program to create a class and implement the concepts of Constructor Overloading, Method Overloading, Static methods b. Write a program to implement the concept of Inheritance and Method Overriding
9	a. Write a program to implement the concepts of Abstract classes and methods b. Write a program to implement the concept of interfaces
10	Write a program to define user defined exceptions and raise them as per the requirements
11	Write a program to demonstrate the methods of: a. List interface b. Set interface c. Map interface
12	Write a program for creating threads using Runnable interface Thread class
13	Write a program for creating multiple threads

OPEN ELECTIVE- Basics of Insurance

COURSE CODE: U24BI3OE01 **COURSE CREDIT: 02**

1 Credit-15 Lectures 1 Lecture is 60 Minutes

Course Objectives:

1. To understand the basics of Insurance and related provisions
2. To understand the principles of Insurance and the role of IRDAI for the development of insurance sector
3. To analyse the different types of insurance & the risk involved in each product.
4. To study the role of intermediaries in the insurance sector

Course Outcomes:

1. On successful completion of this course, the learner will be able to understand the basic concepts of Insurance and it's evolution in Indian context
2. The learner will be able to assess the principles of Insurance and the role of IRDAI in the development of insurance sector
3. The learner will be able to understand the kinds of insurance and risk management in insurance products
4. The learner will be able to understand the concept of reinsurance and bancasurance

Sr.No.	Modules	Number of hours/ lectures
Unit I	Introduction to Insurance – Definition of Insurance, Cost & Benefits of Insurance, Elements of an Insurable risk, Overview of Insurance sector in India, History of Insurance, Life Insurance Business, Human Life Value.Principles of Insurance – Related concepts – Utmost Good Faith, Subrogation, Insurable Interest, Proximate Cause, ContributionRole of IRDAI in the evolution of Insurance Sector	**15**
Unit II	Kinds of Insurance – Life, Health & General,Risk Management in Insurance –Definition of Risk, Nature of Risk, Types of Risk, Measurement of Risk.Insurance sector intermediaries – Actuary, Underwriters, Third Party Administrators, Surveyors (Loss Assessors) , Agents, BrokersRe-insurance, Double Insurance, Bancassurance	**15**
	Total Lectures	**30**

References:

1) Fundamentals of insurance, Hargovind Dayal, Bookscape
2) Insurance Principles and practices, M.N.Mishra, S.B.Mishra, S.Chand publications
3) Fundamentals of insurance, Dr.P.Pirakatheeshwari, Bookscape
4) Insurance made easy, Tony Steuer
5) IRDA Act, Professional Book publishers
6) Fundamentals of Risk & insurance. Emmett Vaughan, Therese Vaughan, Wiley Student edition

SCHEME OF EXAMINATION

The scheme of examination shall be continuous evaluation divided into four parts:

Description	Marks
Practical tests of 20 marks each	20
2 Assignments of 5 marks each	10
One Presentation/Project and Viva voce	15
Class Participation and behaviour	5
Total	50

SOCIAL MEDIA MARKETING

COURSE CODE: U24MMC3E01 **COURSE CREDIT: 02**
1 credit - 15 lectures **1 lecture is 60 minutes**

Course Objectives:

Learn to communicate and tell stories through the web.

1. Students learn real-world skills from leading designers, artists, and entrepreneurs.
2. The primary goal is to create problem solvers who strike a balance between traditional art and technology, and between individual vision and teamwork.
3. With a fundamental understanding of digital tools and their creative applications, graduates meet the demands of a diverse and expanding job market in visual story telling.
4. Identify and apply strategies to improve and succeed no matter what their initial skills.
5. Solve problems and learn from creative risks by using people skills, design principles, and processes.
6. Build a strong foundation in all aspects of design and production for storytelling in motion.
7. Use inspiration in fields outside of digital media such as poetry, science, music, astronomy, history, dance, and more.
8. Develop a professional commitment to their field, their work, and themselves; preparing them to be members and leaders in their profession, as well as learning how to act both as individuals and as team members to support the whole.

Syllabus			
Sr. No.	**Module**	**Details**	**Lectures**
1.	**Introduction to Digital Marketing**	**1.1** Understanding Digital Media Marketing **1.2** Advantages of Digital Media **1.3** Principles of Digital Media Marketing **1.4** Key Concepts in Digital Media **1.5** Traditional vs. Digital Media	*06*
2.	**Types of Digital Marketing**	**2.1** Types E- mail marketing **2.2** Types Internet marketing **2.3** Types of Mobile marketing **2.4** Digital Marketing and AI	*06*
3.	**Introduction to Social Media Marketing**	**3.1** Meaning and Importance **3.2** Myths about Social media marketing **3.3** Brief History Characteristics of Social Media Marketer **3.4** Careers in Social media marketing	*06*
4.	**Content Strategy For Social Media Marketing**	**4.1** 10- step framework for creating successful SMM strategy **4.2** Building content for sharing **4.3** Generating Ideas and Creating content for Multiple platforms	*06*

5.	**Ethics and Careers**	**5.1** Code of ethics **5.2** 9 Rules of engagement for Social Media Marketing **5.3** Careers in Social media marketing 5.4 Codc of Ethics in AI	*06*
Total Lectures			**30**

References:

1. **Digital marketing by Vandana Ahuja**
2. **Social Media Marketing: a strategic approach by Barker and Barker.**

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: **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.

Introduction to Indian Economy

COURSE CODE: U24BF3E01 **COURSE CREDIT: 02**
1 credit - 15 lectures **1 lecture is 60 minutes**

Course Objectives:

- To familiarize students with an overview of the Indian Economy.
- To orient students with the basic sectors of the Indian Economy and their contributions.

Course Outcomes:

- Learners will be able to discuss the basic concepts of Indian Economy.
- Learners will be able to analyze the importance and contributions of different sectors of the Indian Economy.

Sr. No	Syllabus	No. of lectures
01	**MODULE I: Macro Economic Overview of India** • Overview of New Economic Policy-1991, - Role of Social Infrastructure with reference to education, health and family welfare. • Sustainable Development Goals and Policy measures: Make in India and other Skill Development and Training Programmes. • Foreign Investment Policy Measures in India – FDI- MNCs and their role. Relevant case studies	**15**
02	**MODULE II: Sectoral Analysis of Indian Economy** • Agricultural Sector- National Agricultural Policy 2000: Objectives, Features, Agricultural pricing and agricultural finance, Agricultural Marketing Development • Industry & Service Sector- Competition Act 2003, Micro, Small and Medium Enterprises [MSME sector]- Classification and Role, Recent trends in Industrial Sector.	**15**
	• Service Sector: Recent trends, role and growth. Banking and Financial Market (Money Market and Capital Market)- Structure, recent trends, limitations Relevant case studies	

References:

- Indian Economic Survey Reports (Annual), Ministry of Finance, Government of India
- Indian Economy by Misra and Puri, Himalaya Publishing House – Delhi
- Gaurav Dutt & Ashwini Mahajan, (2016) Indian Economy, S.Chand & company PVT LTD New Delhi
- A.N. Agarwal – Indian Economy problems of Development and Planning New Age International Publisher
- Ruddar Datt K.P.M Sundharam – Indian Economy S. Chand E-co LTD. Delhi

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
Internal tests of 10 marks each (Online/Offline) Q.1. Multiple choice Questions/True or False - 10 Marks OR Q.1. Multiple choice Questions/True or False - 5 Marks Q.2. Attempt 1 question out of 3 questions (5 marks each)- 5 Marks	10
One Project and Viva voce/Presentation/Case studies/Assignments	5
Attendance and Class behavior	5
Total	20

(B) Semester end examination 30 marks

PAPER PATTERN

Duration : 1 hour	
Total Marks: 30	
Q.1 10 marks OR 10 marks	10
Q.2 10 marks OR 10 marks	10
Q.3 10 marks Two short notes out of four for 5 marks each or case study	10
Total	30

Note:
Q.1, 2 - 10 marks question may be divided into sub questions if required.
Q.3 May include theory (short notes) /Case study in one of the options.

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

Understanding Basic Forms of English Literature-1

COURSE CODE: U24ENG3AEC01(Rev.25-26) **COURSE CREDIT: 02**

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

*** Course Objectives:**

1. To develop analytical skills and critical thinking through close reading of literary texts

2. To cultivate appreciation of language as an artistic medium and to help students to understand the importance o forms, elements and style that shape literary works

*** Course Outcomes**:

1. Learner will be able to recognize the culture and context of the work of literature

2. Learner will be able to imbibe the underlying philosophy and values reflected in literature

Module-1 Study of Poetry (Total 15 Lectures)

1. William Wordsworth: *The Solitary Reaper*

2. Edgar Albert Guest:*Don't Quit*

3. Nissim Ezekiel : *Island*

4.Kamala Das:*An Introduction*

5.Arun Kolatkar :*The Breakfast Time at Kala Ghoda*

Module-2 Study of Novel (Total 15 Lectures)

Lord of The Flies by William Golding

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: Total 20 Marks**

1	*** Continuous Evaluation**	**10 Marks**
2	**Poetry Recitation /Presentation**	**05 Marks**

3	Attendance	05 Marks

**Application oriented activities will be conducted*

B) Semester end examination 30 marks

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

Passing Criteria: 40% in Internal as well as in External(i.e.8 Marks in Internal exam of 20 marks and 12 marks in External exam of 30 marks respectively)

Co –Curricular Course in Computer Science

Course Name: Tech Community Development I **Course Code:** U25CS3CCD01

Course Type: Co-curricular **Credits: 4**

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. What is Coder and Developer club 2. Objectives behind Coders and Developer club 3. Events to be organized. 4. Event Marketing, Advertising & PR 5. Event Production & Logistics	05
Unit-II	Activities to be carried out: (Each activity to be carried out twice) 1. Tech Talks 2. Bootcamps 3. Coding Challenges 4. Demo Days 5. Meetups	15
Unit III	Sessions: 1. Resume Building. 2. Interview Preparation 3. Career Counselling 4. Expert Talks	10
IV	Introduction to Emerging Technologies: 1. Cloud Computing Basics, 2. Artificial Intelligence & Machine Learning: Applications in daily life,	15

	3. Basics of Cybersecurity and Digital Safcty, **4.** Internet of Things (IoT) – Smart Devices Around Us **5.** Organizing Awareness Sessions or Tech Demos	
V	1. Peer-led Panel Discussions: 2. Tech Networking Events	15
	3. Introduction to LinkedIn networking 4. Showcasing small projects or tech interests 5. Sharing learning journeys to motivate peers	
	TOTAL (HOURS)	**60**

The scheme of Examination shall be divided as follows.

- **Continuous Evaluation Pattern**

Description	**Marks**
Activity related work such as • Attending lectures • Performance in activities • Participation in sessions	10 30 20
Maintenance of work records and submission of activity report	20
Test/ Discussion/ Presentations /Viva-voce by faculty in charge	20
Total	**100**

References:

1. Senge, Peter : The Learning Organization
2. Successful Event Management By Anton Shone & Bryn Parry
3. Event management, a professional approach By Ashutosh ChaturvediReferences:

Semester	Major	Minor	O E	VSC, SEC (VSEC)	AEC, VE C, IKS	OJT, FP, CEP, CC, RP	Cum Cr/ Sem.
IV	DataBase Management t System (4 credits) Data Communica tions and Networking (4 Credits)	Linear Algebra (4 Credits)	Introduction to International Economics / Photography / Financial Literacy / Advertising and Brand Management II (2 credits)	SEC- Basics of Software Development & Testing (2 credits)	AEC- Understanding Basic Forms of English Literature- II (02 Credits)	CC (4 Credits)	22
Total	8	4	2	2	2	4	22

SEMESTER IV

Semester IV			
Serial No.	Course Code	Credits	Course Name
I	Major Department Specific Course (DSC)		
1	U24CS4MJ01	03	DataBase Management System
2	U24CS4MJP01	01	Practical of DataBase Management System
3	U24CS4MJ02	03	Data Communications and Networking
4	U24CS4MJP02	01	Practical of Data Communications and Networking
II	Minor Department Specific Course		
1	U24CS4MI01	03	Linear Algebra
2	U24CS4MIP01	01	Practical of Linear Algebra
III	Open Electives (OE)/ Generic Electives (Any Two)		
1	U24BE4OE01	02	Introduction to International Economics
2	U24MMC4OE01	02	Photography
3	U24BI4OE01	02	Financial Literacy
4	U24COM4E01	02	Advertising and Brand Management II
IV	VOCATIONAL COURSE (VC) & SKILL ENHANCEMENT COURSE (SEC)		
1	U24CS4SEC01	01	Basics of Software Development & Testing
2	U24CS4SECP01	01	Practical of Basics of Software Development & Testing
V	ABILITY ENHANCEMENT COURSE(AEC)/VALUE EDUCATION COURSE(VEC) / INDIAN KNOWLEDGE SYSTEM (IKS)		
1	U24ENG4AEC01 (Rev. 25-26	02	Understanding Basic Forms of English Literature- II
2	U25HIN4AEC01	02	Hindi
3	U26MAR4AEC01	02	Marathi
VI	ON JOB TRAINING/ FIELD PROJECT/RESEARCH PROJECT/COMMUNITY EXTENSION PROGRAMME		
1		04	Community Engagement Project
TOTAL CREDITS		**22**	

MAJOR- Database Management System

COURSE CODE : U24CS4MJ01 **COURSE CREDIT: 03**

1 credit - 15 lectures

~~1 lecture is 60 minutes~~

Course Objectives:

- To make students aware fundamentals of database system
- To give idea how ERD components helpful in database design and implementation
- To make students aware about Transaction and concurrency

control Course Outcomes:

- To appreciate the importance of database design
- Analyze database requirements and determine the entities involved in the system and their relationship to one another
- To appreciate the importance of advanced concepts such as deadlock handling.

Unit No.	Syllabus	No. of lecture
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 **Introduction to the Relational Model**: Structure of Relational Databases, Database Schema, Keys, Schema Diagrams. Relational Query Languages. The Relational Algebra	15
2.	**Database Design Using the E-R Model**: Overview of the Design Process, The Entity-Relationship Model, Complex Attributes, Mapping Cardinalities, Primary Key, Removing Redundant Attributes in Entity Sets, Reducing E-R Diagrams to Relational Schemas **Relational Database Design**: Features of Good Relational Designs, Decomposition Using Functional Dependencies, Normal Forms, Functional-Dependency Theory, Algorithms for Decomposition Using Functional Dependencies, Decomposition Using Multivalued Dependencies, More Normal Forms, Atomic Domains and First Normal Form, Database-Design Process, Modeling Temporal Data	15
3.	**Transactions:** Transaction Concept, A Simple Transaction Model, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Transaction Isolation and Atomicity,	15
	Transaction Isolation Levels, Implementation of Isolation Levels, Transactions as SQL Statements **Concurrency Control:** Lock-Based Protocols, Deadlock Handling	

References:

Text Books:

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

Practical of Database Management Systems

COURSE CODE: U24CS4MJP01 **COURSE CREDIT: 01**

1 credit - 30 lectures **1 lecture is 60 minutes**

Sr. No.	List of Practical
1	Perform the Following: Installing MySQL on your machine Creating a Database Creating tables in the database
2	Perform the following: Inserting the records in table Updating the records in table Deleting the records in table
3	Perform the following: Basic SELECT queries Conditional SELECT Queries String matching using SELECT
4	Perform the following Queries using Aggregate function Queries using SET Operations
5	Perform the Following: Nested Subqueries
6	Perform the following: Date Functions String Functions Math Functions
7	Perform the Following:
	Inner Join Outer Join

8	Perform the following: Creating Views Dropping views Selecting from a view
9	Perform the following Creating index on table
10	Perform the following: Creating roles Grant Statement Revoke Statement
11	Perform the following Implementing transactions
12	Perform the following: Create functions and procedures on tables
13	Perform the following: Creating and implementing Triggers

MAJOR- Data Communications and Networking

COURSE CODE: U24CS4MJ02 **COURSE CREDIT: 03**

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

Course Objectives:

- To Understand Basic Concepts of Networking.
- To Understand Working of Network Layer Architecture.
- To Learn Practical Implementation of Basic Routing Algorithms and to Learn Different Networking Protocols.

Course Outcomes:

- Learn communication system, network models and components.
- Learn basic networking concepts and layered architecture.
- Understand the concepts of networking, which are important for them to be known as a 'networking professionals'.

UNIT No	Syllabus	No. of lectures
01	Introduction: Networking standards and Administrations, networks, network types – LAN, MAN, WAN. Network Models: The OSI model, TCP/IP protocol suite, Introduction to Physical layer: Data and signals, periodic analog signals, digital signals, transmission impairment, data rate limits, performance. Modulation Techniques Digital transmissions: Digital-to-digital conversion, analog-to-digital conversion, transmission modes Analog transmissions: digital-to-analog conversion, analog-to-analog conversion. Bandwidth Utilization – Multiplexing and Spectrum spreading: Multiplexing, Spread Spectrum Transmission media: Guided Media, Unguided Media Switching: Introduction, Circuit Switched Network, Packet Switching.	15
02	Introduction to Data Link Layer: Link layer addressing, Data Link Layer , Design Issues. Error detection and correction: -Block coding, cyclic codes, checksum, forward error correction, error correcting codes, error detecting codes. Data Link Control: DLC services, data link layer protocols, HDLC, Point-to-point protocol. Media Access Control: Random access, controlled access, channelization, Wired LANs – Ethernet: Ethernet Protocol, standard Ethernet, fast Ethernet, gigabit Ethernet, 10 gigabit Ethernet Wired Network: Telephone Network, Cable Network, SONET, ATM	15

	Wireless LANs: Introduction, IEEE 802.11 project, Bluetooth, WiMAX, Cellular telephony, Satellite networks. Introduction to Network Layer: Network layer services, packet switching, network layer performance, IPv4 addressing, forwarding of IP packets,	
	Network Layer Protocols : Internet Protocol, ICMPv4, Mobile IP	
03	Unicast Routing: Introduction, routing algorithms, unicast routing protocols. Next generation IP: IPv6 addressing, IPv6 protocol, ICMPv6 protocol, transition from IPv4 to IPv6. Introduction to the Transport Layer: Transport Layer Protocol, User Datagram Protocol, Transmission Control Protocol, SCTP. Introduction to Application Layer: Client Server Programming, Iterative Programming. Standard Client-Server Protocols: WWW, HTTP, FTP, Electronic Mail, TELNET, Secure Cell, DNS, SNMP	15

References:

Textbooks:

1. Data Communications and Networking, Behrouz A. Forouzan, Fifth Edition, TMH, 2018.
1. Computer Network, Andrew S. Tanenbaum, David J. Wetherall, Fifth Edition, Pearson Education, 2018.

Additional References:

1. Computer Network, Bhushan Trivedi, Oxford University Press, 2016
2. Data and Computer Communication, William Stallings, PHI, 2017

Practical of Data Communications and Networking

COURSE CODE: U24CS4MJP02 **COURSE CREDIT: 01**

1 credit - 2 lectures **1 lecture is 60 minutes**

Sr. No	List of Practicals
1	Using, linux-terminal or Windows-cmd, execute following networking commands and note the output: ping, traceroute, netstat, arp, ipconfig, Getmac, hostname, NSLookUp, pathping, SystemInfo.
2	Using Packet Tracer, create a basic network of two computers using appropriate network wire. Use Static IP address allocation and show connectivity
3	Using Packet Tracer, create a basic network of One server and two computers using appropriate network wire. Use Dynamic IP address allocation and show connectivity
4	Using Packet Tracer, create a basic network of One server and two computers and two mobile / movable devices using appropriate network wire. Show connectivity
5	Using Packet Tracer, create a network with three routers with RIPv1 and each router associated network will have minimum three PC. Show Connectivity
6	Using Packet Tracer, create a network with three routers with RIPv2 and each router associated network will have minimum three PC. Show Connectivity
7	Using Packet Tracer, create a network with three routers with OSPF and each router associated network will have minimum three PC. Show Connectivity
8	Using Packet Tracer, create a network with three routers with BGP and each router associated network will have minimum three PC. Show Connectivity
9	Using Packet Tracer, create a wireless network of multiple PCs using appropriate access point.
10	Understanding, Reading and Analyzing Routing Table of a network.
11	Implement a sensor network simulation.
12	Create MAC protocol simulation implementation.
13	Simulate Mobile Adhoc Network with Directional Antenna.

MINOR- Linear Algebra

COURSE CODE: U24CS4MI01 **COURSE CREDIT: 03**

1 credit - 15 lectures

1 lecture is 60 minutes

Course Objective:

- To offer the learner the relevant Linear Algebra concepts through Computer Science applications.
- To interpret existence and analyze the solution set of a system of linear equations.
- To formulate, solve, apply, and interpret properties of linear systems.
- To learn about the concept of linear independence of vectors over a field, and the dimension of a vector space.
- To interpret basic concepts of linear transformations, dimension, matrix representation of a linear transformation, and the change of coordinate matrix.

Course Outcome:

After successful completion of this course, students would be able to

- Appreciate the relevance and applications of Linear Algebra in the field of Computer Science.
- Understand the concepts through program implementation. Instil a computational thinking while learning linear algebra.
- Express clear understanding of the concept of a solution to a system of equations. Find eigenvalues and corresponding eigenvectors for a square matrix.

Unit	Syllabus	No. of Lectures
1	Field: Introduction to complex numbers, complex numbers in Python, abstracting over fields, Playing with GF (2). Vectors: Vectors are functions, Vector addition, Scalar-vector multiplication, combining vector addition and scalar multiplication, Dictionary-based representations of vectors, Dot-product, Solving a triangular system of linear equations. The Vector Space: Linear combination, Span, The geometry of sets of vectors, Vector spaces, Linear systems, homogeneous and otherwise	15
2	Matrix: Matrices as vectors, Column space and row space, Matrix-vector and vector-matrix multiplication in terms of linear combinations, Matrix-vector multiplication in terms of dot-products, Null space, Computing sparse matrix-vector product, Linear functions, Matrix-matrix	15

	multiplication, Inner product and outer product, From function inverse to matrix inverse. Basis: Coordinate systems, two greedy algorithms for finding a set of generators, Linear dependence, Basis, Unique representation, Change of basis, first look, Computational problems involving finding a basis Gaussian elimination: Echelon form, Gaussian elimination over GF(2), Solving a matrix-vector equation using Gaussian elimination.	
3	Inner Product: The inner product for vectors over the reals, Orthogonality. Orthogonalization: Projection orthogonal to multiple vectors, projecting orthogonal to mutually orthogonal vectors, Building an orthogonal set of generators, orthogonal complement. Eigenvalues and Eigenvectors: Characteristic Polynomials of degree 2 and 3, Eigenvalues and eigenvectors, Properties of eigenvalues and eigenvectors, Cayley–Hamilton Theorem, Minimal Polynomial. Coordinate representation in terms of eigenvectors.	15

REFERENCES:

Textbooks:

1. Coding the Matrix Linear Algebra through Applications to Computer Science, First Edition, Philip N. Klein, Newtonian Press 2013
2. Schaum's Outline of Linear Algebra, Sixth Edition by Seymour Lipschutz, Marc Lipson, McGraw Hill 2017

Additional References:

1. Linear Algebra and Probability for Computer Science Applications, First Edition, Ernest Davis, A K Peters/CRC Press, 2012.
2. Linear Algebra and Its Applications, Gilbert Strang, Cengage Learning, 4th Edition, 2007
3. Linear Algebra and Its Applications, David C Lay, Pearson Education India; 3rd Edition, 2002
4. Introduction to Information Retrieval, Christopher D. Manning, Prabhakar Raghavan and Hinrich Schütze, Cambridge University Press, 2008.
5. Computer Networking with Internet Protocols and Technology, William Stallings, Pearson Education India, 2013.

Practical of Linear Algebra

COURSE CODE: U24CS4MIP01 **COURSE CREDIT: 01**

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

Sr. No.	List of Practical
1	Write a program which demonstrates the following: Addition of two complex numbers Displaying the conjugate of a complex number Plotting a set of complex numbers
2	Write a program which demonstrates the following Creating a new plot by rotating the given number by a degree 90, 180, 270 degrees and also by scaling by a number a = 1/2, a = 1/3, a = 2 etc.
3	Write a program to do the following: Enter a vector u as a n-list Enter another vector v as a n-list Find the vector au + bv for different values of a and b
4	Write a program to find the dot product of u and v
5	Vector Applications: Classify given data using support vector machines (SVM)
6	Basic Matrix Operations: Matrix Addition, Subtraction, Multiplication Check if matrix is invertible. If yes then find Inverse
7	Write a program to convert a matrix into its row echelon form. (Order 2). Write a program to find rank of a matrix.
8	Write a program to do the following: • Find the vector –matrix multiplication of a r by c matrix M with an c-vector u. • Find the matrix-matrix product of M with a c by p matrix N.

9	Basic Matrix Application – I Representation of Image in Matrix Format and Image Transformations
10	Basic Matrix Application – II
	Perform Image addition and subtraction
11	Write a program to enter a vector b and find the projection of b orthogonal to a given vector u.
12	Write a program to convert a matrix into its row echelon form.
13	Write a program to calculate eigenvalue and eigenvector (Order 2 and 3)

Open Elective-Financial Literacy

COURSE CODE: U24BI4E01 **COURSE CREDIT 02**

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

Course Objectives:

1. To ensure that learners understand the concept of finance and financial literacy to achieve the financial goals in life
2. To update the learners with current trends of investment and stock markets

Course Outcomes:

On completion of course, the learners will be able to-

1. understand the fundamentals of finance literacy
2. determine effective financial strategies for financial well beings

Sr.No.	Modules	Number of hours/ lectures
Unit I	INTRODUCTION TO FINANCE AND FINANCIAL LITERACY 1.1 Concept of Finance 1.2 Understanding the need of financial literacy 1.3 Historical background of financial structure in India 1.4 Different Investment Avenues 1.5 Current Trends of Investment	10
Unit II	INTRODUCTION TO FINANCIAL BEHAVIOUR 2.1 Understanding investors psychology 2.2 Classification of investors 2.3 Risk and Investment Decision 2.4 Understanding Saving investment and fulfillment of objectives 2.5 Start up with small investments	10
Unit II	INTRODUCTION TO TAX SAVING SCHEMES AND STOCK MARKET 3.1Tax saving investment avenues 3.2 Understanding the Stock Market 3.3 Virtual stock tracking and Mock Trading 3.4 One field Visit to BSE or NISM	10
	Total Lectures	30

SCHEME OF EXAMINATION

The scheme of examination shall be continuous evaluation

divided into four parts:

Description	Marks
Practical tests of 20 marks each	20
2 Assignments of 5 marks each	10
One Presentation/Project and Viva voce	15
Class Participation and behavoiur	5
Total	50

References:

1. https://jmcschoolgn.edu.in/images/pdf/Financial-Literacy_Handbook.pdf
2. From The Rat Race to Financial Freedom by **Manoj Arora**
3. https://www.rbi.org.in/financialeducation/financialliteracyguide.aspx RBI websites on financial literacy
4. The intelligent investors by Benjamin Graham
5. https://www.oecd.org/finance/financial-education/44919948.pdf

Open Elective- Introduction to International Economics

COURSE CODE:U24BE4OE01 **COURSE CREDIT: 02**

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

Course Objectives:

1. To familiarize students with an overview of International Economics.
2. To orient students with the concepts related to Balance of Payment and Foreign Exchange Markets.

Course Outcomes:

1. Learners will be able to discuss the basic theories and policies of International Economics.
2. Learners will be able to examine the concepts of Balance of Payments and Foreign Exchange Market.

Sr. No	Syllabus	No. of lectures
01	MODULE I: Introduction to International Trade Theories of International Trade – Ricardo's Theory of Comparative Costs and the Heckscher- Ohlin Theory. Commercial Trade Policy –Free Trade and Protection – Pros and Cons. Tariff And Non-Tariff Barriers: Meaning, Types Relevant case studies	15
02	MODULE II: Balance of Payments and Foreign Exchange Market Balance of Payment: Meaning, Structure, Balance of Payment Disequilibrium- Types, Measures to control Disequilibrium: Depreciation, Devaluation. Foreign Exchange Market: Meaning, Functions, Determination of Equilibrium Rate of Exchange, Spot and Forward Exchange Rates, Arbitrage. Role of Central Bank in foreign exchange rate management, Managed flexible exchange rate system of India. Relevant case studies	15

References:

- Kindleberger, C.P. (1973) International Economics, Homewood
- Kenan, P.B. (1994), The International Economy, Cambridge University Press, London
- Krugman, P.R. and M. Obstgold (1994), International Economics: Theory and Policy, Glenview, Foreman
- Dwivedi D N (2013) International Economics: Theory and Policy, Vikas publishing House New Delhi
- M.L. Jhingan – International Economics – Vrinda publication Pvt. Ltd – Delhi
- Francis Cheunilam International Economics Tata McGraw – Hill Publishing co.Ltd.New Delhi.
- Dominick Salvatore – International Economics – John Wiley & sons, Inc Singapore.

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
Internal tests of 10 marks each Multiple choice Questions/True or False - 10 Marks OR Multiple choice Questions/True or False - 5 Marks Attempt 1 question out of 3 questions (5 marks each)- 5 Marks	10
One Project and Viva voce/Presentation/Case studies/Assignments	5
Attendance and Class behavior	5
Total	20

(B) Semester end examination 30 marks PAPER PATTERN

Duration : 1 hour	
Total Marks: 30	
Q.1 10 marks OR 10 marks	10
Q.2 10 marks OR 10 marks	10
Q.3 10 marks Two short notes out of four for 5 marks each or case study	10
Total	30
Note: Q.1, 2 - 10 marks question may be divided into sub questions if required. Q.3 May include theory (short notes) /Case study in one of the options.	
Passing criteria: Minimum 40% in Internal **(8 out of 20) and 40% (12 out of 30) in** **semester**	

Open Elective - Advertising & Branding - II

COURSE CODE: U24COM4E01 **COURSE CREDIT: 02**

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

Course Objectives:

1. To understand the Understand the fundamentals of advertising and branding.
2. To learn and explore the creative processes in advertising.

Course Outcomes:

1. Students will learn the basic fundamentals of advertising and branding.
2. Learners will be able to explore the creative processes in advertising & branding in the real scenario

Sr. No	Syllabus	No. of lectures
01	Module - It Advertising Advertising agencies and their functions, Roles and responsibilities within an agency, The relationship between advertisers and agencies, Understanding target audiences, Developing a unique selling proposition (USP), Creating an advertising strategy, Isthical issues in advertising. Emerging technologies and their impact.	15
02	Module II: Branding Global Branding, challenges in global branding, Cultural considerations in branding, role of IMC is branding, Impact of digital media on branding, role of social media in branding, strategies for social branding, Design principles for brand logos and symbols, crafting brand taglines and slogans. Careers in Branding.	15
	TOTAL LECTURES	30

Reference Books:

1. Advertising and Promotion: An Integrated Marketing Communications perspective" by George E. Belch and Michael A. Belch

2. "Building Strong Brands" by David A. Aaker

SCHEME OF EXAMINATION

- The performance of the learners shall be evaluated into two components. The learner's Performance shall be assessed by Internal Assessment with 40% marks in the first component by conducting the Semester End Examinations with 60% marks in the second component. The allocation of marks for the Internal Assessment and Semester End Examinations are as shown below:

(A) Internal Assessment 40% **20 marks**

Sr. No.	Particulars	Marks
01	One periodical class test / online examination to be conducted in the given semester	10
02	One case study / project with presentation based on curriculum to be assessed by the teacher concerned/Write up on selected topics of the subject/ test based on practical's/Open Book test	5
03	Active participation in routine class instructional deliveries and overall conduct as a responsible learner, mannerism and articulation and exhibit of leadership qualities in organizing related academic activities	5
	Total	20

Periodical class test Question paper pattern

Sr. No.	Particulars	Marks
Q1	Match the column/Fill in the blanks/ MCQ's/ Answer in one or two lines concept based question (1 Mark / 2 Mark each)	05
Q2	Answer in Brief/ Practical question (Attempt any two out of four 5 marks each)	05

(B) Semester end examination 60% **30 marks**

Duration: The examination shall be of 1 hour duration.

Question Paper Pattern

Duration : 1 hour	
Total Marks: 30	
Q.1 10 marks OR 05 / 05 marks	10
Q.2 10 marks OR 05 / 05 marks	10

Q.3 10 marks OR 05 / 05 marks Two short notes of 05 marks each or Case study	10
Total	30
Note: 1. Q.1, 2, 3 10 marks question may be divided into sub questions if required.	
2. Q.3 May include theory (short notes) /Case Study in one of the options.	

Passing criteria:

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

Open Elective - INTRODUCTION TO PHOTOGRAPHY

COURSE CODE: U24MMC4E01 **COURSE CREDIT: 02**
1 credit - 15 lectures
1 lecture is 60 minutes

Course Objectives:
The content and learning activities in this course are designed to help students achieve the following objectives:

- Apply practical skills for professionally handling a camera and making a picture that can be used for commercial purpose
- Analyze the quality and difference between multiple photographs to suit their need / purpose of photography
- Obtain a sense of understanding about the different applications of photography as per the assignment / requirement
- Identify best practices for the delivery of successful photography assignment in any type of event a per the purpose and requirement set by the external agency.

Course Outcomes:

- Students will demonstrate the ability to operate professional cameras effectively, ensuring proper use o settings like ISO, aperture, and shutter speed.
- Students will develop critical analysis skills to assess the quality, composition, lighting, and technical aspects of photographs.
- Students will gain insight into diverse photography applications

		Syllabus	
Sr. No.	Module	Details	Lectures
1.	Camera: Functioning and types	1.1 What is photography 1.2 Camera and its parts 1.3 Different types of camera - Current and Old	05
2.	Lens: Types and uses	2.1 Understanding the lens as an important part with its function 2.2 Types of lens - Depth of field and Focus 2.3 Using different lenses with their capacity and delivery	05
3.	Light: The essential raw material	3.1 Understanding light for photography, consideration for exposure 3.2 Understanding natural light and artificial light, 3.3 Introduction to basic studio lighting Understanding the quality of	06

				light and using light modifiers	
4.		Composition: Way of portraying a subject	4.1 4.2 4.3	Introduction to composition Types of composition Creativity of composition	06
5.		Digital Imaging: Electronic format	5.1 5.2	Understanding digital imaging Digital file formats and their application	05
6.		Care and Maintenance of the camera & equipment	6.1	Protection of the camera and equipment against different situations	03
			Total Lectures		30

References:

Collins Books series: Pentax Inc.

1. Taking successful pictures,
2. Making most of colour,
3. Expanding SLR system,
4. Lighting techniques

Minolta Photographer's handbook

5. Indoor Photography,
6. Outdoor photography: Life Book series: Colour, Camera, Light & Portrait

Photography course:

Volume 1: Understanding Camera

Volume 2: Secrets behind successful pictures

Volume 3: Practicing Photography

Volume 4: Handling Professional assignments

Me and My Camera

Portrait photography, Glamour photography, Do it in Dark (Darkroom Techniques), Pro-technique (Pro-photo), Night Photography, Beauty and Glamour , Product Photography

SCHEME OF EXAMINATION (for 50 marks 2 credits Theory)

The scheme of examination shall be divided as follows:

SCHEME OF EXAMINATION (for 50 marks 2 credits Theory)

The scheme of examination shall be divided as follows:

- **Comprehensive Internal assessment 100% i.e. 50 marks (BREAKUP TO BE INCLUDED)**

Description	Marks
Photography analysis assignment	15
Compositions album	20
Presentation	15
Total	**50**

Skill Enhancement (SEC)- Basics of Software Development & Testing

COURSE CODE: U24CS4SEC01 **COURSE CREDIT: 01**

1 credit - 15 lectures

1 lecture is 60 minutes

Course Objectives

- Different Process Models used in software Engineering
- Learning of SRS & UML in software Engineering
- Study fundamental concepts in software testing.
- Understand different levels and types of software

testing. Course Outcomes

- Students will be able to decompose the given project in various phases of a lifecycle.
- Students will be able to choose appropriate process model depending on the user requirements.
- Students will be able perform various life cycle activities like Analysis, Design, Implementation, Testing and Maintenance.

UNIT	Syllabus	No. of lecture
01	Requirement Analysis and System Modeling: Requirements Engineering, Eliciting Requirements, SRS Validation, Components of SRS, Characteristics of SRS, Software Development Life Cycle. Software Project Management: Estimation in Project Planning Process –Software Scope And Feasibility, Resource Estimation, Empirical Estimation Models – COCOMO II, Estimation for Agile Development Software Testing: Verification and Validation, Introduction to Testing, Testing Principles, Testing Objectives, Test Oracles, Levels of Testing, White-Box Testing/Structural Testing, Functional/Black-Box Testing, Test Plan, Test-Case Design	15

References:

Textbooks:

1. Software Engineering, A Practitioner's Approach, Roger S, Pressman

Additional References:

1. Software Engineering, Ian Somerville, Pearson Education
2. Software Engineering: Principles and Practices", Deepak Jain, OXFORD University Press,
3. Fundamentals of Software Engineering, Fourth Edition, Rajib Mall, PHI

Practical of Basics of Software Development & Testing

COURSE CODE: U24CS4SECP01 **COURSE CREDIT: 01**

1 credit - 30 lectures

1 lecture is 60 minutes

Sr. No	List of Practical
1	Development of DFD for the project.
2	To illustrate and use any web testing tools.
3	To illustrate the use of class diagrams.
4	To draw an activity diagram and use case diagram for ATM and Library Management System.
5	Draw Object Diagram for ATM System.
6	Development of State Transition Diagram.
7	Draw ER Diagram for Hospital Management System
8	Prepare a SRS for small project.
9	Functional testing Implementation
10	Study any open source testing tool.
11	Automatic testing Implementation
12	Prepare a Test Plan for grail.
13	Write a Test case for face book, twitter etc

Understanding Basic Forms of English Literature- II

COURSE CODE: U24ENG4AEC01(Rev. 25-26) **COURSE CREDIT: 02**

1 credit - 15 lectures 1 lecture is of 60 minutes

*** Course Objectives:**

1. To develop creative skills and narrative skills through close reading and appreciation of literary texts
2. To cultivate appreciation of language as an artistic medium and to help students to understand the performative aspect of the literary work.

*** Course Outcomes:**

1. Learner will be able to utilize the literary characteristics of the work of literature for professional development
2. Learner will be able to express effectively after understanding the performative aspect of the literary work

Module-1 Study of Short Stories (Total 15 Lectures)

1. O'Henry :*The Last Leaf*
2. Doris Lessing: *The Habit of Loving*
3. Ruskin Bond: *The Night Train at Deoli*
4. R.K.Narayan: *An Astrologer`s Day*
5. Jhumpa Lahiri: *A Temporary Matter*

Module-2 Study of Drama (Total 15 Lectures)

Oscar Wilde: The Importance of Being Earnest

Community Engagement & Social Responsibility(4 credits(2+2))

Course Type: Co-curricular **Course Credits: 02**
COURSE CODE: **1 credit : 15 lectures**
1 lecture : 60 minutes

Course Objectives:

The syllabus is aimed to achieve the following objectives:

1. To foster community involvement and holistic development of the student.
2. Teach students the importance and role of active citizenship in promoting a productive, harmonious and developed society/world
3. Educate students about the importance of concepts, skills and philosophy of community linkages in developing a sustainable society
4. Inculcate the impotence of community involvement for ensuring an improved, tolerant and generative society/world
5. Provide an opportunity to the students to develop their relationship with the community.

Learning Outcome:

The learners will be able to:

1. Analyze Community Needs & Issues – Assess societal challenges and problems.
2. Investigate & Implement Solutions – Research and apply practical solutions to community problems.
3. Raise Awareness – Educate and inform the public about important social issues.
4. Understand Society & Citizenship – Recognize societal structure, human rights, and the role of active citizenship.
5. Evaluate & Act on Social Issues – Critically assess social problems and take community-based action.

Name of MOOC: Community Engagement and Social Responsibility (10 weeks)
Host: Dayalbagh Educational Institute, Agra, Uttar Pradesh (UGC)
Coordinator: University Grants Commission
Platform: SWAYAM

Course layout **: As given by -** SWAYAM NPTEL

Unit No.	Topic	No. of Lectures
Unit-I	Module 1 - Concept, Ethics and Spectrum of Community engagement Module 2 – Local community, Rural culture and Practice of community engagement Module 3 – Stages, Components and Principles of community development, Utility of public resources. Module 4 – Contributions of self-help groups	10
Unit-II	Module 5 - Rural Development Programs and Rural institutions Module 6 - Local Administration and Community	10

	Involvement Module 7 – Social contribution of community networking, Various government schemes.	
Unit -III	Module 8 – Programmes of community engagement and their evaluation. Module 9 - Community Engaged Research and Ethics in Community Engaged Research	10
	Module 10 - Rural Distress, Rural Poverty, Impact of COVID-19 on Migrant Laborers, Mitigation of Disaster	
	TOTAL (HOURS)	**30**

Course Type: Co-curricular **Course Credits: 02**
1 credit :15 hours **1 hour : 60 minutes of community activity**

Learners will have to choose one among the following projects for CEP field work:

Sr. No	List of Projects
1.	OIOP(One India One People Organization)- A initiative by SIES Trust a. Environment Conservation Upcycling old to new clothes- for bag making etc. Empowering Women b. Value Education Teaching Life skills to generate handicrfats and sell. Undertaking informative and pressing issues campaigns/seminars c. Change Brigade Encouraging students towards development of sustainable ideas for societal benefit
2.	Projects with Kotak Education Foundation a. Child Education b. Support for under-priveleged sections in society c. Support for content creation and delivery
3.	Stree Mukti Sangathan a. Plastic Waste Management b. Tree Plantation c. Women Empowerment through skill–based projects d. Arranging workshops and seminars for children and women
4.	Unnat Bharat a. Upliftment of Student basic education in villages b. Providing regular health checkup and follow-up in villages. c. Introducing Agricultural information/ Activities for better representatio d. Adding the senior age group projects
5.	Mulund Cluster - School beautification projects, notes generation for kids, contribution to empowerment
6.	Adhata Project Fostering inter-generational bonding and participation Evening engagement programmes for senior citizens

7.	ConnectFor Offline/ Online CEP projects like- Volunteering programs for education, health care and community welfare
8.	INature: Focus on environmental conservation and biodiversity initiatives
9.	Akansha Foundations: School Projects near Chembur and related areas
10.	Multiple Opportunities obtained via nearby college
11.	Tamil Sangham Project Handle environment, senior citizens help group, School Connect
12.	Student chosen NGO for project completion Subject to prior preference submited and a letter ceccessfully completed with

CEP mentors: To enhance the learning experience and ensure the quality of the program, each student participating in the CEP will be assigned two mentors: a faculty mentor from the institution and a NGO -Contact person mentor from the organization where the student is interning.

Organizations Mentor Role: The NGO -Contact person mentor plays a crucial role in guiding the student during the internship. They ensure that the internee fulfils the requirements of the organization and successfully meets the demands of the assigned project. Through their expertise and experience, NGO -Contact person mentors provide valuable insights into real-world practices and NGO -Contact person expectations.

Faculty Mentor Role: The faculty mentor serves as the overall coordinator of the CEP program. They oversee the entire internship process and evaluate the quality of the CEP in a consistent manner across all students. The faculty mentor ensures that the CEP aligns with the program's objectives and provides valuable learning opportunities. They also facilitate communication between the institution, NGO -Contact person mentor, and student to ensure a fruitful CEP experience. By having both an NGO -Contact person mentor and a faculty mentor, students benefit from a comprehensive guidance system that combines NGO - Contact person expertise and academic support.

Submission of documentation for CEP

The student will make two documents as part of the CEP

1. Online diary: This ensures that the student updates daily activity, which could be accessed by both the mentors. Weekly entry can be of 3- 4 sentences giving a very brief account of the learning/activities/interaction taken place.

2. CEP report: A student is expected to make a report based on the CEP he or she has done in an organization. It should contain the following:

Title Page (includes)

- Project Title
- Student Name(s) & Roll Number(s)
- Course Name & Semester
- Organizations Name
- Supervisor/Guide Name

- Date of Submission

Declaration

- A statement by the student(s) confirming the originality of the report and adherence to ethical guidelines.

Acknowledgment

- Expression of gratitude to mentors, community members, and supporting organizations.

Table of Contents

- List of chapters with page numbers.

Chapter 1: Introduction

- Background of the Project
- Objectives of the Community Engagement Project
- Significance and Expected Impact

Chapter 2: Literature Review

- Overview of community engagement concepts and best practices
- Relevant policies, case studies, or previous research

Chapter 3: Methodology

- Selection of Community/Target Group
- Activities Undertaken
- Timeline and Work Plan

Chapter 4: Implementation & Execution

- Description of Activities Conducted
- Role of Students in the Project
- Challenges Faced and Solutions Adopted

Chapter 5: Outcomes & Impact Analysis

- Benefits to the Community
- Learning and Skills Gained by Students
- Measurable Outcomes (e.g., surveys, feedback, before-and-after comparisons)

Chapter 6: Conclusion

- Summary of Findings
- Overall Impact
- Final Thoughts

Appendices (if any)

- Photos of Activities
- Survey Questionnaires or Interview Transcripts
- Additional Supporting Documents
- Appendix –II(Cerificate Format) **(Required)**

Appendix-II

(Proforma for the certificate for internship in official letter head)

This is to certify that Mr./Ms..... from .....College has worked as an intern towards the partial fulfilment of _____degree in the academic year ____and has not been submitted for any other examination and does not form part of any other course undergone by the candidate.

The particulars of internship are given below:

Field Project starting date: _____

Field Project ending date: _____

Actual number of days worked: _____

Tentative number of hours worked: _____Hours

Broad area of work: _____

A small description of work done by the intern during the period:

Signature:

Seal of the organization

Designation:

Contact details:

Email:

Scheme of Examination

Community Engagement and Social Responsibility

(Undergraduate Programme)

SCHEME OF EXAMINATION (for 100 marks 4 credits)

The scheme of examination shall be divided into two parts:

Internal assessment 40% i.e.40 marks

External Assessment:

Semester end examination 30% i.e.30 marks

Field Project 30% i.e.30 marks

(A)Internal Assessment 40 marks

Description	**Marks**
NPTEL Assignments	30
Active Participation	10
Total	40

B) Semester End examination 30 marks

PAPER PATTERN

Duration: 1 hours	
Total Marks:30	
Q.1 Attempt any three out of five: (5 marks each) -Module 1 to 5	15
Q.2 Attempt any three out of five: (5 marks each) -Module 6-10	15
Total	30

Field Project 30 Marks

Field Visit Report	10
Viva	10
Activity related to field project	10
Total	30

Rubrics for Field Project Evaluation

Activity related % hours completion	Marks to be awarded
90 and above	10
80-89	9
70-79	8
60-69	7
50-59	6
40-49	5

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

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: Total 20 Marks**

1	*Continuous Evaluation	10 Marks
2	Role Plays / Group Discussion/Group Presentation	05 Marks
3	Attendance	05 Marks

**Application oriented activities will be conducted*

B) Semesterend examination30marks

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

Passing Criteria: 40% in Internal as well as in External (i.e.8 Marks in Internal exam of 20 marks and 12 marks in External exam of 30 marks respectively)

***

SCHEME OF EXAMINATION (OPEN ELECTIVE)

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 tests of 10 marks each (Online/Offline) Q.1 Multiple choice Questions/True or False - 5 Marks Q.2. Attempt 2 questions out of 3 questions (2.5 marks each)- 5 Marks	10
One Project and Viva voce/Presentation/Case studies/Assignments	5
Attendance and Class behavior	5
Total	20

B) Semester end examination 60 marks PAPER PATTERN

Duration : 1 hours	
Total Marks: 30	
Q.1 10 marks OR 10 marks	10
Q.2 12 marks OR 10 marks	10
Q.3 10 marks OR 10 marks	10
Total	30
Note: Q.1, 2, 3 - 10 marks question may be divided into sub questions if required. Q.3 May include theory (short notes) /Case Study in one of the options	

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

SCHEME OF THEORY & PRACTICALS EXAMINATION

MAJOR- (4 credit)

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
Internal test of 20 marks (Online/offline) Multiple choice Questions / True or False - 10 Marks Attempt 2 questions out of 3 questions (5 marks each)- 10 Marks	20
One Project and Viva voce / Presentation / Case studies / Assignments Poster Making / Quiz / Role Play / Subject Specific Activities	15
Attendance and Class behavior	05
Total	40

(B) Semester end examination 60 marks PAPER PATTERN

Duration: 2 hours			
Total Marks: 60			
All Questions are Compulsory			
Question	Based on	Options	Marks
Q. 1	Unit 1	A and B OR P and Q	15
Q. 2	Unit 2	A and B OR P and Q	15
Q. 3	Unit 3	A and B OR P and Q	15
Q. 4	Unit 1,2,3	A and B OR P and Q	15
Total			60

Note:

Q.1, 2, 3 and 4 may be divided into sub questions with internal choice if required.

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

SCHEME OF PRACTICAL EXAMINATION (4 credit)

The scheme of Practical examination shall be

Practical assessment carries 50Marks : 40 marks + 05marks (journal)+ 05 marks(viva)

Minimum 75 % practical are required to be completed and written in the journal. (Certified Journal is compulsory for appearing at the time of Practical Exam)

(A) **Practical Assessment 50 marks**

Description	Marks
Two questions of practical (20 marks each)	40
Journal	5
Viva	5
Total	50

Passing criteria: Minimum 40% in Practical (20 out of 50)

II. MAJOR & MINOR - (2 credit)

The scheme of examination shall be divided into two parts:

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

Practical Assessment 20 marks

Description	Marks
One question of 10 marks practical	10
Journal	5
Viva	5
Total	20

Semester end examination 30 marks PAPER PATTERN

Duration: 1 hours	
Total Marks: 30	
Description	**Marks**
Q.1 10 marks OR 10 marks	10
Q.2 10 marks OR 10 marks	10
Q.3 10 marks OR 10 marks	10
Note: 1. Q.1, 2, 3 may be divided into sub questions if required. 2. Q.3 May include theory (short notes) /Case Study in one of the options.	

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

VOCATIONAL COURSE (VSC) & SKILL ENHANCEMENT COURSE(SEC)

The scheme of examination shall be divided into two parts:

- Practical assessment 40% i.e. 20 marks

Semester end examination 60% i.e. 30 marks Practical Assessment 20 marks

Description	Marks
One question of 10 marks practical	10
Journal	5
Viva	5
Total	20

B) Semester end examination 30 marks PAPER PATTERN

Duration: 1 hours	
Total Marks: 30	
Description	Marks
Q.1 10 marks OR 10 marks	10
Q.2 10 marks OR 10 marks	10
Q.3 10 marks OR 10 marks	10
Total	30
Note: Q.1, 2, 3 may be divided into sub questions if required. Q.3 May include theory (short notes) /Case Study in one of the options.	

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