



Nagarjuna College of Engineering & Technology, Bengaluru

An Autonomous Institute, Affiliated to VTU Belagavi

Scheme & Syllabus of III Semester ISE

**As per the NEP 2020 Guidelines,
Choice-Based Credit System
&
Outcome-Based Education**

Information Science & Engineering

w.e.f.

Academic Year 2023-2024

VISION

To disseminate the IT knowledge among the students for achieving excellence in education and to irradiate budding engineers as leaders in information technology.

MISSION

M1: To maintain leadership and excellence in Information Technology.

M2: Achieving excellence in IT through analysis, design, development of software products

M3: Developing communication skills, leadership qualities and team work among students' community by providing opportunities to work on various projects through internship with industry partners

M4: To inculcate Ethics and Human values for solving societal problems and environmental protection.

M5: Promoting research, higher studies and entrepreneurship among the students through outside world interaction

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

The graduates of Information Science and Engineering are expected to fulfil the following PEOs after a few years of their graduation.

PEO1: Pursue a successful career in the field of Information Science & Engineering or a related field utilizing his/her education and contribute to the profession as an excellent employee, or as an entrepreneur.

PEO2: Be able to work effectively in multidisciplinary environments and be responsible members/leaders of their communities

PEO3: The graduates of Information Science and Engineering Program should be able to establish an understanding of professionalism, teamwork, ethics, public policy that allows them to become good professional Engineers

PEO4: The graduates of Information Science and Engineering Program should be able to provide novel engineering solutions and efficient software designs with legal and ethical responsibility.

PEO5: Continuously improve by pursuing advanced degrees in engineering, business, or other professional fields through formal means or through informal self-study.

PROGRAM OUTCOMES (POs)

Graduates of the Information Science and Engineering Programme will be able to achieve the following POs:

PO1: Engineering Knowledge

Apply the knowledge of mathematics, science, engineering fundamentals, and Information Science and Engineering principles to the solution of complex problems in Information Science and Engineering.

PO2: Problem Analysis

Identify, formulate, research literature, and analyze complex Information Science and Engineering problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.

PO3: Design/Development of Solutions

Design solutions for complex Information Science and Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of Complex problems

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions related to Information Science and Engineering problems.

PO5: Modern Tool Usage

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex Information Science and Engineering activities with an understanding of the limitations.

PO6: The Engineer and Society

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Information Science and Engineering practice.

PO7: Environment and Sustainability

Understand the impact of the professional **Information Science and Engineering** solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics

Apply ethical principles and commit to professional ethics and responsibilities and norms of the Information Science and Engineering practice.

PO9: Individual and Team work

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication

Communicate effectively on complex Information Science and Engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project Management and Finance

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage Information Science and Engineering projects and in multidisciplinary environments.

PO12: Life Long Learning

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

Program Specific Outcomes (PSOs) are what the graduates of a specific undergraduate engineering program should be able to do at the time of graduation.

PSO1: Professional Skills

The ability to understand, analyze and develop algorithms and write Information application programs in the areas related to information technology

PSO2: Problem-Solving Skills

Ability to understand the ethics, human values for solving societal problems and environmental protection

PSO3: Foundation of mathematical concepts

Ability to understand the software development skills and practical knowledge for promoting research, higher studies and entrepreneurship.

(Effective from the academic year 2022-23)

Sl. No.	Course and Course Code		Course Title	Teaching Department	Teaching Hours / Week				Duration in Hours	Examination			Credits
					Theory / Lecture	Tutorial	Practical / Drawing	Self-study Component		CIE Marks	SEE Marks	Total Marks	
1	PCC/ BSC	22MATS31	Mathematics for Computer Science	Maths Dept.	3	0	0	-	03	50	50	100	3
2	IPCC	22ISI32	Data Structures and Applications	CSEB	3	0	2	-	03	50	50	100	4
3	IPCC	22ISI33	Object Oriented Programming using Java	CSEB	3	0	2	-	03	50	50	100	4
4	PCC	22IST34	Logic Design and Computer Organization	CSEB	3	0	0	-	03	50	50	100	3
5	PCCL	22ISL35	Python Based Mini project	CSEB	0	0	2	-	03	50	50	100	1
6	ESC	22IST36X	ESC/ETC/PLC	CSEB	3	0	0	-	03	50	50	100	3
7	UHV	22UHV37	Social Connect and Responsibility	Any Dept.	0	0	2	-	01	100	---	100	1
8	AEC/ SEC	22ISL38X	Ability Enhancement Course/Skill Enhancement Course - III	CSEB	0	0	2	-	02	50	50	100	1
9	MC	22NSK39	National Service Scheme (NSS)	NSS coordinator	0	0	2			100	---	100	0
		22PEK39	Physical Education (PE) (Sports and Athletics)	PE Director									
		22YOK39	Yoga	Yoga Teacher									
TOTAL					15	0	12	-	21	550	350	900	20
Engineering Science Course (ESC/ETC/PLC)													
22IST36A	IT Infrastructure and Management			22IST36C	Supply Chain Management								
22IST36B	Business Process Fundamentals			22IST36D	Human Computer Interaction								
Ability Enhancement Course – III (All are Laboratory Courses 0-0-2-0)													
22ISL38A	Unified Modelling Language Tools-Star UML			22ISL38C	Introduction to Office Tools								
22ISL38B	Introduction to MATLAB / SCILAB			22ISL38D	Introduction to Linux/Unix Shell Programming								

PCC:	Professional Core Course	PCCL:	Professional Core Course laboratory
UHV:	Universal Human Value Course	MC:	Mandatory Course (Non-Credit)
AEC:	Ability Enhancement Course	SEC:	Skill Enhancement Course
L:	Lecture	T:	Tutorial
P:	Practical	S/SDA	Skill Development Activity
CIE:	Continuous Internal Evaluation	SEE:	Semester End Evaluation
K :	Common to all the stream of engineering	ESC:	Engineering Science Course
ETC:	Emerging Technology Course	PLC:	Programming Language Course

Professional Core Course (IPCC): Refers to Professional Core Course Theory Integrated with practicals of the same course. Credit for IPCC can be 04 and its Teaching– Learning hours (L : T : P : S) can be considered as (3 : 0 : 2 : 0) or (2 : 2 : 2 : 0). The theory part of the IPCC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper. For more details, the regulation governing the Degree of Bachelor of Engineering /Technology (B.E./B.Tech.) 2022-23 may please be referred.

National Service Scheme /Physical Education/Yoga: All students have to register for any one of the courses namely National Service Scheme (NSS), Physical Education (PE)(Sports and Athletics), and Yoga(YOG) with the concerned coordinator of the course during the first week of III semesters. Activities shall be carried out between III semester to the VI semester (for 4 semesters). Successful completion of the registered course and requisite CIE score is mandatory for the award of the degree. The events shall be appropriately scheduled by the colleges and the same shall be reflected in the calendar prepared for the NSS, PE, and Yoga activities. These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the course is mandatory for the award of degree.

Mathematics for Computer Science

Course Code	22MATS31	CIE Marks	50
Course Type	Theory	SEE Marks	50
Teaching Hours/Week (L: T: P: S)	2:2:0:0	Total Marks	100
Total Hours of Pedagogy	40 hours	Exam Hours	03
		Credits	03

Course objectives:

The goal of the course **Mathematics for Computer Science** is to,

1. Introduce the concept of random variables, probability distributions, specific discrete and continuous distributions with practical application in Computer Science Engineering and social life situations.
2. Provide the principles of statistical inferences and the basics of hypothesis testing with emphasis on some commonly encountered hypotheses.
3. Determine whether an input has a statistically significant effect on the system's response through ANOVA testing.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. In addition to the traditional lecture method, different types of innovative teaching methods may be adopted so that the delivered lessons shall develop students theoretical and applied mathematical skills.
2. State the need for Mathematics with Engineering Studies and Provide real-life examples.
3. Support and guide the students for self-study.
4. You will also be responsible for assigning homework, grading assignments and quizzes, and documenting students' progress.
5. Encourage the students for group learning to improve their creative and analytical skills.
6. Show short related video lectures in the following ways:
 - As an introduction to new topics (pre-lecture activity).
 - As a revision of topics (post-lecture activity).
 - As additional examples (post-lecture activity).
 - As an additional material of challenging topics (pre-and post-lecture activity).
 - As a model solution of some exercises (post-lecture activity).

Module-1

Probability Distributions:

Review of basic probability theory. Random variables (discrete and continuous), probability mass and density functions. Mathematical expectation, mean and variance. Binomial, Poisson and normal distributions- problems (derivations for mean and standard deviation for Binomial and Poisson distributions only).

8 Hours.

[Text 1: 26.1, 26.2, 26.7, 26.8, 26.9, 26.10, 26.13, 26.14, 26.15, 26.16]

[RBT Levels: L1, L2 and L3]

Self-Study: Exponential distribution.

Applications: Used for Modeling and prediction, analyzing data, algorithm design, cryptography, error detection, machine learning, computer vision, computer graphics, random number generation and natural language processing.

Module-2	
Joint probability distribution & Markov Chain: Joint probability distribution: Joint Probability distribution for two discrete random variables, expectation, covariance and correlation. Markov Chain: Introduction to Stochastic Process, Probability Vectors, Stochastic matrices, Regular stochastic matrices, Markov chains, Higher transition probabilities, Stationary distribution of Regular Markov chains and absorbing states. [Text 3: 8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 5.6, 5.7] [RBT Levels: L1, L2 and L3] Self-Study: Joint Probability distribution for two continuous random variables. Applications: Joint distribution for system design and maintenance decisions. Markov chain for algorithmic design and networking.	
8 Hours	
Module-3	
Statistical Inference 1: Introduction, sampling distribution, standard error, testing of hypothesis, levels of significance, test of significances, confidence limits, simple sampling of attributes, test of significance for large samples, comparison of large samples. Sampling variables, central limit theorem and confidence limit for unknown mean. Test of Significance for means of two large samples. [Text 1: 27.1, 27.2, 27.3, 27.4 27.5, 27.6, 27.7, 27.8, 27.9, 27.10, 27.11, 27.12] [RBT Levels: L1, L2 and L3] Self-Study: Applications: Decision making and problem solving, software testing and quality control	
8 Hours	
Module-4	
Statistical Inference 2: Sampling of variables-small samples, students 't' distribution, Chi-square distribution as a test of goodness of fit. F-Distribution. [Text 1: 27.13, 27.14, 27.15, 27.16, 27.17, 27.18, 27.19] [RBT Levels: L1, L2 and L3] Self-Study: Fisher's Z-Distribution. Applications: Algorithm performance evaluation, Software testing, Hardware testing, Quality assurance, Biometric systems, Network security, database management, Biomedical informatics, Information retrieval, signal processing and image processing.	
8 Hours	
Module-5	
Design of Experiments and ANOVA: Principles of experimentation in design, Analysis of completely randomized design, randomized block design. The ANOVA Technique, Basic Principle of ANOVA, One-way ANOVA, Two-way ANOVA, Latin-square Design, and Analysis of Co-Variance. [Text 1:] [RBT Levels: L1, L2 and L3] Self-Study: Applications: Algorithm Optimization, Network performance, Database management, User experience design and Hardware design.	
8 Hours	
Teaching-Learning Process for all modules	Chalk and Talk/PowerPoint presentation/YouTube videos.

Course Outcomes (Course Skill Set):

After successfully completing the course, the students will be able to:

CO1: Understand the basic concepts of probability, random variables, probability distribution and apply suitable probability distribution models for the given scenario.

CO2: Learn the concept of joint distribution and make use of the notion of a discrete-time Markov chain and n-step transition probabilities to solve the engineering application problem

CO3: Use statistical methodology and tools in the sampling analysis.

CO4: Compute the confidence intervals for the mean of the population by using different tests.

CO5: Apply the ANOVA test related to engineering problems.

Evaluation Details:

Evaluation Type		Component	Max Marks	Marks Reduced to	Min. Marks	Evaluation Details
Theory Component	Internal Assessment Tests (IAT)	IAT-1	25	25	20	Average of two IATs, Scaled down to 25 marks
		IAT-2	25			
	Comprehensive Continuous Evaluations (CCE)	CCE-1	25	25		Any two Assessment methods as per 220B4.2 of regulations. Average of two CCEs, scaled down to 25 marks
		CCE-2	25			
	Total CIE -Theory			50	20	
SEE			100	50	18	Conducted for 100 marks And scaled down to 50.
CIE + SEE				100	40	

Suggested Learning Resources:**Text Books:**

1. **B. S. Grewal:** "Higher Engineering Mathematics", Khanna publishers, 44th Ed.2021.
2. **Ronald E. Walpole, Raymond H Myers, Sharon L Myers & Keying Ye** "Probability & Statistics for Engineers & Scientists", Pearson Education, 9th edition, 2017.
3. **Seymour Lipschutz and Marc Lars Lipson:** "Probability", (Chapters: 5 and 8), McGraw Hill Education (India) Private Limited, Chennai, Special Indian Edition, 2010.

Reference Books:

1. **Erwin Kreyszig**, "Advanced Engineering Mathematics", John Wiley & Sons, 9th Edition, 2006.
2. **Peter Bruce, Andrew Bruce & Peter Gedeck** "Practical Statistics for DataScientists" O'Reilly Media, Inc., 2nd edition **2020**.
3. **G Haribaskaran** "Probability, Queuing Theory & Reliability Engineering", LaxmiPublication, Latest Edition, 2006.
4. **Irwin Miller & Marylees Miller**, John E. Freund's "Mathematical Statistics with Applications" Pearson. Dorling Kindersley Pvt. Ltd. India, 8th edition, 2014.
5. **S C Gupta and V K Kapoor**, "Fundamentals of Mathematical Statistics", S Chand and Company, Latest edition.
6. **Robert V. Hogg, Joseph W. McKean & Allen T. Craig**. "Introduction to Mathematical Statistics", Pearson Education 7th edition, 2013.

- ### E-Resources:

- ### **Activity-Based Learning (Suggested Activities in Class)/ Practical Based learning**

- ### CO- PO Mapping :

[illegible]

Data Structures and Applications			
Course Code	22ISI32	CIE Marks	50
Teaching Hours/Week (L: T: P: S) (3:0:2:0)	Credits (3:0:0:0)	SEE Marks	50
Total Hours of Pedagogy	40 hours Theory 10 hours Laboratory	Total Marks	100
Credits	03	Exam Hours	03
Course objectives: This course will enable students to: <ul style="list-style-type: none"> • Understand the basics of pointers and dynamic memory allocation. • Learn concepts of structure and its application in programming. • Gain knowledge to choose the specific linked lists for implementing real world problems. • Grasp the use of stacks and queues in solving complex problems. • Acquire knowledge of non linear data structure like trees. 			
Teaching-Learning Process (General Instructions) These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes. <ol style="list-style-type: none"> 1. Lecture method (L) does not mean only traditional lecture method, but different type of teaching methods may be adopted to develop the outcomes. 2. Show Video/animation films to explain evolution of communication technologies. 3. Encourage collaborative (Group) Learning in the class 4. Ask at least three HOTS (Higher order Thinking) questions in the class, which promotes critical thinking. 5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it. 6. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them. 7. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding. 			
Module-1			
Introduction: Data Structures, Classifications (Primitive & Non Primitive), Abstract Data Types(ADT)-Array, Structures, Self-Referential Structures and Unions, Arrays Review. Pointers and Dynamic Memory Allocation Functions. Pointer as function arguments, Functions returning pointers. Textbook 1: Chapter 1: 1.2; Chapter 2: 2.1 - 2.6; Textbook 2: Chapter 1: 1.1 - 1.4; Chapter 4: 4.1 - 4.8;			
			08 Hours
Module-2			
Recursion: Introduction to Recursion, Examples of Recursion: Factorial, Fibonacci Sequence, Tower of Hanoi Stacks: Definition, ADT-Stack, Array Representation of Stacks along with Stack Operations, Stack			

Applications: Polish notation, Infix to Postfix conversion, Infix to Prefix conversion, Evaluation of postfix expression. Textbook 1: Chapter 3: 3.1 - 3.7; Textbook 2: Chapter 6: 6.1 - 6.3, 6.5-6.14;		08 Hours	
Module-3			
Queues: Definition, ADT-Queue, Array Representation, Queue Operations, Circular Queues, Programming Examples. Linked Lists: Definition, Representation of linked lists in Memory, Memory allocation; Garbage Collection. Linked list operations: Traversing, Searching, Insertion, and Deletion. Stacks and Queues implementation using Linked Lists. Programming Examples. Textbook 1: Chapter 4: 4.1– 4.3, 4.7 - 4.8; 1 – 5.9;			08 Hours
Module-4			
Doubly Linked Lists, Circular lists: Doubly Linked lists, Circular Singly and Doubly linked lists; Basic operations: Insert, Delete and Display with programming examples. Application: Adding Polynomials. Textbook 1: Chapter 4: 4.4 – 4.5; Chapter 8: 8.1 - 8.2; Textbook 2: Chapter 5: 5.10			08 Hours
Module-5			
Trees: Terminology, Binary Trees, Properties of Binary trees, Array and linked Representation of Binary Trees, Binary Tree Traversals - Inorder, Postorder, Preorder; Binary Search Trees – Definition, Insertion, Deletion, Traversal, Searching, Application: Evaluation of Expression. Textbook 1: Chapter 5: 5.1 – 5.3, 5.5, 5.7;			08 Hours
Teaching-Learning Process for all modules	Chalk and Talk, PowerPoint presentation, flip teaching, YouTube videos		
LIST OF LABORATORY PROGRAMS			
1	Design, develop and execute a program in C based on the following requirements: An EMPLOYEE structure is to contain the following members: Employee_Number (an integer), Employee_Name (a string of characters), Basic_Salary (an integer), All_Allowances (an integer), IT (an integer), Net_Salary (an integer). Write a function to read the data of an employee, to calculate Net_Salary and to print the values of all the structure members. (All_Allowances = 123% of Basic, Income Tax (IT) = 30% of the gross salary (gross salary = Basic_Salary + All_Allowance), Net_Salary = Basic_Salary + All_Allowances –IT). Display the above data for at least 5 employees.		

2	Write a program to Store Roll number of N students. Perform Insert and delete Roll_No at a given valid position (POS) using pointers. Display the status of array elements at any given point of time. Support the program with functions for each operations.
3	Develop an array implementation on stack and perform Push and Pop operations. Check for overflow and underflow conditions. Demonstrate stack implementation to check palindrome. Display the status of the stack for all the operations performed. Support the program with appropriate functions for each of the above operations.
4	Write a Program in C: a. Evaluate the Suffix (Postfix) expression with single digit operands and operators.
5	Implement Circular QUEUE program in C for rainbow colors (VIBGOYR) and perform Insert and Delete operations. Check for overflow and underflow conditions. Display the status of the Circular QUEUE for all the operations performed. Use pointers and functions.
6	Implement a Menu driven Program in C for the following operations on Singly Linked List (SLL) of Student Data with the fields: <i>USN, Name, Avg_Marks</i> a. Create N number of Students Data by inserting at end of the list. b. Insert and Delete at front of the list c. Delete at the end of list d. Display the status of SLL d. Demonstration stack and queue e. Exit
7	Design and Develop following operations on Doubly Linked List (DLL) of Employee Data with the fields: <i>SSN, Name, Dept etc.</i> a. Create a Node of N Employees Data by inserting in front. b. Insert a new node to the right of key value. c. Perform Insertion and Deletion at End of DLL d. Display the status of DLL and count the number of nodes e. Exit
8	Design and Develop a program in C for the following operations on Binary Search Tree (BST) of Integers. a. Create a BST of N Integers b. Traverse the BST using Inorder, Preorder and Post Order techniques c. Search a KEY element in BST and display the appropriate message

Course Outcomes

At the end of the course the student will be able to :

CO1: Explore pointers and heterogeneous datatypes

CO2: Implement linear data structures, stack and Queue in solving real time scenario

CO3: Demonstrate various operations of singly and doubly linked Lists

CO4: Analyze usage of circular lists for application oriented problems.

CO5: Apply the concept of non-linear data structures – trees

Assessment Details (both CIE and SEE)					
Evaluation Type	Component	Max. Marks	Marks Reduced To	Min Marks	Evaluation Details
Internal Assessment Test (IAT)	IAT 1	25	25	20	Average of two IATs, Scaled down to 25 Marks
	IAT 2	25			
Comprehensive Continuous Evaluation (CCE)	CCE-1	25	25		Minimum of two Assessment Methods as per 22OB4.2 of regulation. Average of CCEs, Scaled down to 25
	CCE-2	25			
Total CIE		-	50	20	Scaled down Marks of IAT and CCE to 25
SEE		100	50	18	Conducted for 100 Marks and Scaled down to 50
CIE + SEE		-	100	40	

Suggested Learning Resources:

Text Books:

1. Ellis Horowitz and Sartaj Sahani, Fundamentals of Data Structures in C, 2nd Ed, Universities Press, 2014.
2. Seymour Lipschutz, Data Structures Schaum's Outlines, Revised 1st Ed, McGraw Hill, 2014.

Reference Books:

1. Gilberg & Forouzan, Data Structures: A Pseudo-code approach with C, 2nd Ed, Cengage Learning, 2014.
2. Reema Thareja, Data Structures using C, 3rd Ed, Oxford press, 2012.
3. Jean-Paul Tremblay & Paul G. Sorenson, An Introduction to Data Structures with Applications, 2nd Ed, McGraw Hill, 2013
4. A M Tenenbaum, Data Structures using C, PHI, 1989
5. Robert Kruse, Data Structures and Program Design in C, 2nd Ed, PHI, 1996.

E-Resources:

- 1) <https://www.cs.princeton.edu/>
- 2) <https://www.opendatastructures.org/ods-cpp>
- 3) <https://www.lib.mdp.ac.in/ebook/DSa>
- 4) <https://www.cs-fundamentals.com/data-structures/introduction-to-datastructures.php>
- 5) <https://www.cprogramming.com/algorithms-and-data-structures.html>
- 6) <https://online-learning.harvard.edu/course/data-structures-and-algorithms>

CO-PO-PSO Mapping:

POS	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PSO	PSO	PSO
COs	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	2	-	-	-	-	-	-	-	-	3	2	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	3	2	-	-
CO3	3	3	3	2	-	-	-	-	-	-	-	3	2	-	1
CO4	3	3	3	2	3	-	-	-	-	-	2	3	2	3	2
CO5	3	3	3	3	3	-	-	-	-	-	2	3	3	3	2
Avg	3	3	2.8	2.3	3	-	-	-	-	-	2	3	2.2	3	1.6

Object Oriented Programming Using Java

Course Code	22ISI33	CIE Marks	50
Teaching Hours/Week(L: T:P:S)	(3:0:2:0)	SEE Marks	50
Total Hours of Pedagogy	40hours Theory+13Labslots	Total Marks	100
Credits	04	Exam Hours	03

Course objectives:

This course will enable students to:

1. Learn the basic concepts of object-oriented programming.
2. Understand the basics of JAVA Programming using classes and objects.
3. Gain the knowledge of Inheritance and Interfaces.
4. Expose to the concepts of Packages and Exceptions that occur while programming in JAVA.
5. Acquire the knowledge of multi-threaded programming and String handling in JAVA.

Module – I

Introduction: Object Oriented Concepts: Procedure–Oriented Programming, Object Oriented Programming, Comparison of Object-Oriented Language with C. Introduction to Java: Java Buzzwords, The Byte code, Java Development Kit (JDK), Data types, Variables and arrays, Operators, Control statements, Simple Java programs.(Chapter 1,2,3,4 and 5 of Text 1)

08 Hours

Module – II

Classes: Classes fundamentals, Declaring objects, Reference variables, this keyword, garbage collection. **Methods:** Method Prototyping, Member functions and Data members, Constructors, Objects and methods, MethodOverloading, Objects and arrays, Access modifiers, Setters and getters, Nested classes. (Chapter 6 and 7 of Text 1)

08 Hours

Module – III

Inheritance, Interfaces: Inheritance basics, using super, creating multi-level hierarchy, method overriding, using Abstract classes, using final, **Interfaces:** Defining an Interface, Implementing an Interface, Nested Interfaces, Applying an Interface, variables in Interface, Interfaces can be extended. (Chapter 8 and 9 of Text 1)

08 Hours

Module - IV

Packages, Exceptions: Access Protection, Importing Packages. **Exceptions:** Exception handling fundamentals, Exception types, uncaught exceptions, using try and catch, using multiple catch clauses, nested try statements, throw, throws, finally, Java's built-in exceptions. (Chapter 9 and 10 of Text 1)

08 Hours

Module – V

Multi-Threaded Programming, String Handling: What are threads? How to make the classes threadable, Extending threads, Implementing runnable, Synchronization. **String Handling:** String Constructors, String Operations, Character Extraction, String Comparison (Chapter 11 and 15 of Text 1)

08 Hours

Lab Programs

1.	A. Develop a Java program for an advanced arithmetic calculator that takes two integer operands and an operator from the user. The program should be capable of performing addition, subtraction, multiplication, and division. Ensure that the program handles input validation, including checking for the validity of the operator and non-negative values for the operands. After each calculation, ask the user if they want to perform another operation and provide a history of previous calculations upon request.
	B. Write a Java program to generate the first 'n' terms of the Fibonacci series and determine the following: 1. Calculate the sum of all even terms in the series. 2. Find the product of all odd terms in the series. 3. Check and display the largest prime number within the series. 4. Calculate the average of the entire series.
2.	A. Develop a Java program showcasing method overloading with a base class "Phone" containing the dial() method, and two subclasses "CameraPhone" and "SmartPhone" that inherit from the base class and enhance its features. The program should demonstrate and print the results of these enhancements..
	B. Develop a Java program illustrating constructor overloading for calculating the area of a rectangle and a circle using appropriate constructors.
3.	A. Create a Java program with a vehicle hierarchy, including Vehicle, Car, SportsCar, and Truck classes. Implement methods for starting and stopping in the base class and specialized methods for accelerating, adding turbo boost, and loading cargo in the subclasses, with appropriate method overrides.
	B. Create a Java program that models electronic devices (e.g., smartphones, laptops, and tablets) using a common interface for power management. The program should allow users to interact with the devices and control their power state.
4.	A. Develop a Java program that emulates a library system. Create two packages, `library` and `patron`. In the `library` package, define a `Book` class with a private title field. In the `patron` package, implement a `Patron` class that can borrow books. Demonstrate the use of packages, access protection, and class imports. Ensure that the book title remains inaccessible from outside the `library` package due to the `private` access modifier. Create a scenario where a patron, Alice, borrows a book from the library.
	B. Develop a Java lab program that handles exceptions for division by zero and invalid input. Use `try-catch` blocks to catch `ArithmeticException` for division by zero and `InputMismatchException` for non-integer input and provide user-friendly error messages.
5.	A. Write a Java program that implements a multi-thread application that has three threads. First thread generates a random integer for every 1 second; second thread computes the square of the number and prints; third thread will print the value of cube of the number.
	B. Design a Java lab program to demonstrate string handling, including creating strings using constructors and literals, concatenating strings, extracting characters at a specified index, and comparing strings for equality.

Course Outcomes:

CO1: Explain the basic concepts of object-oriented programming.

CO2: Analyse the working of JAVA Programming using classes and objects.

CO3: Implementation of Inheritance and Interfaces.

CO4: Expose to the concepts of Packages and Exceptions that occur while programming in JAVA.

CO5: Develop the multi-threaded programming and String handling in JAVA.

Assessment Details (both CIE and SEE)

Evaluation Type	Component	Max. Marks	Marks Reduced To	Min Marks	Evaluation Details
Internal Assessment Test (IAT)	IAT 1	25	25	20	Average of two IATs, Scaled down to 25 Marks
	IAT 2	25			
Comprehensive Continuous Evaluation (CCE)	CCE-1	25	25		Minimum of two Assessment Methods as per 22OB4.2 of regulation. Average of CCEs, Scaled down to 25
	CCE-2	25			
Total CIE		-	50	20	Scaled down Marks of IAT and CCE to 25
SEE		100	50	18	Conducted for 100 Marks and Scaled down to 50
CIE + SEE		-	100	40	

Text Books:

- Herbert Schildt, "Java The Complete Reference", 7th Edition, Tata McGraw Hill, 2013, ISBN13:978-0072263855, (Chapters 1-11).

Reference Books:

- E Balagurusamy, "Programming with Java-A primer", 2nd Edition, Tata McGraw Hill companies, 2009, ISBN-13:978-9351343202.

CO-PO-PSO Mapping:

POS COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	3	3	-	3	-	-	-	3	2	-	3	-	-	-
CO2	3	3	3	-	3	-	-	-	3	2	-	3	2	-	-
CO3	3	3	3	2	3	-	-	-	3	2	-	3	2	-	-
CO4	3	3	3	2	3	-	-	-	3	2	2	3	2	2	2
CO5	3	3	3	2	3	-	-	-	3	3	2	3	2	2	2
Avg	3	3	3	2	3	-	-	-	3	2.2	2	3	2	2	2

Logic Design and Computer Organization			
Course Code	22IST34	CIE Marks	50
Teaching Hours/Week(L: T:P:S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40 Hours	Total Marks	100
Credits	03	Exam Hours	03
Pre-Requisites: Students must be aware of basic Logic gates like AND, OR and NOT. Students should have the knowledge of Digital logic and its design and computer concepts like what is keyboard, mouse, monitor, input, output, primary memory and secondary memory etc.			
Course Objectives : The Student will: <ol style="list-style-type: none"> 1. Make use of simplifying techniques in the design of combinational circuits. 2. Illustrate combinational and sequential digital circuits. 3. Understand the organization and architecture of computer systems, their structure and operation. 4. Illustrate the concept of machine instructions and programs. 5. Understand the arithmetic and logical operations. 			
Module I			
Karnaugh maps: Introduction to Binary logic and digital logic gates. Minimum forms of switching functions, Two and Three variable Karnaugh maps, Four variable Karnaugh maps, Determination of minimum expressions using essential prime implicants,			
Quine-McClusky Method: Determination of prime implicants, the prime implicant chart, Petrick's method, Simplification of incompletely specified functions, Simplification using map-entered variables			
08 Hours			
Module II			
Combinational circuit: Review of Combinational circuit design, Hazards in combinational Logic. Multiplexers, Decoders and Programmable Logic Devices: Multiplexers, three state buffers, decoders and encoders, Programmable Logic devices, Programmable Logic Arrays, Programmable Array Logic.			
Flip Flops: Introduction, Flip-Flops, D Flip-Flop, S-R Flip-Flop, J-K Flip-Flop, T Flip-Flop			
08 Hours			
Module III			
Basic Structure of Computers: Basic Operational Concepts, Bus Structures, Performance – Processor Clock, Basic Performance Equation, Clock Rate, Performance Measurement.			
Machine Instructions and Programs: Memory Location and Addresses, Memory Operations, Instructions and Instruction Sequencing, Addressing Modes.			
08 Hours			
Module IV			
Input/output Organization: Accessing I/O Devices, Interrupts – Interrupt Hardware, Direct Memory Access, Buses, Interface Circuits.			
08 Hours			

Module V

Computer Airthmetic

Arithmetic: Addition and Subtraction of signed numbers, Design of Fast Adders, Multiplication of positive Numbers, Signed Operand Multiplication, Fast Multiplication, Integer Division floating –point Numbers and Operations.

08 Hours

Course outcomes:

The Student will be able to:

CO1: Simplify digital circuits using Karnaugh Map, and Quine-McClusky Methods.

CO2: Design various synchronous and asynchronous circuits using flip flops.

CO3: Describe the structure of computer and its basic processing unit with instruction set.

CO4: Analyze the input/output devices communicating with computer system.

CO5: Apply algorithms to perform arithmetic and logical operations, solve problems using computer performance equations.

Assessment Details (both CIE and SEE)

Evaluation Type	Component	Max. Marks	Marks Reduced To	Min Marks	Evaluation Details
Internal Assessment Test (IAT)	IAT 1	25	25	20	Average of two IATs, Scaled down to 25 Marks
	IAT 2	25			
Comprehensive Continuous Evaluation (CCE)	CCE-1	25	25		Minimum of two Assessment Methods as per 22OB4.2 of regulation. Average of CCEs, Scaled down to 25
	CCE-2	25			
Total CIE		-	50	20	Scaled down Marks of IAT and CCE to 25
SEE		100	50	18	Conducted for 100 Marks and Scaled down to 50
CIE + SEE		-	100	40	

Text Books

1. **Charles H Roth and Larry L Kinney, Analog and Digital Electronics**, Cengage Learning, 2019, 5th Edition, ISBN:81-315-0043-8. (**Chapter 5:** 5.1,5.2,5.3,5.4 **Chapter 6:** 6.1,6.2,6.3,6.4,6.5 **Chapter 8:** 8.1,8.4 **Chapter 9:** 9.1,9.2,9.3,9.4,9.5,9.6 **Chapter 11:** 11.4,11.5,11.6,11.7)
2. Donald P Leach, Albert Paul Malvino & Goutam Saha, Digital Principles and Applications, 8th Edition, Tata McGraw Hill, 2015.
3. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, Computer Organization, 5th Edition, Tata McGraw Hill, ISBN:978-1-25-900527-5. (**Chapter 1:** 1.3,1.4,1.6 **Chapter 2:** 2.2,2.3,2.4,2.5 **Chapter 4:** 4.1,4.2,4.4,4.5,4.6 **Chapter 6:** 6.1,6.2,6.3,6.4,6.5,6.6,6.7)
4. M. Morris Mano, Computer System Architecture, PHI, 3rd Edition, ISBN-81-203-0855-7.

Reference Books:

1. William Stallings: Computer Organization & Architecture, 9th Edition, Pearson
2. Anil K Maini, Varsha Agarwal, Electronic Devices and Circuits, Wiley, 2012.

E - Resources:

1. Analog Electronic Circuits: <https://nptel.ac.in/courses/108/102/108102112/>
2. Digital Electronic Circuits: <https://nptel.ac.in/courses/108/105/108105132/>
3. <https://nptel.ac.in/courses/106/103/106103068/>
4. <https://nptel.ac.in/content/storage2/courses/106103068/pdf/coa.pdf>

CO-PO-PSO Mapping

PO'S	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	3	2	-	-	-	-	-	-	2	2	3	3	2
CO2	3	2	3	1	-	-	-	-	-	-	2	2	3	3	2
CO3	3	2	1	2	-	-	-	-	-	-	1	1	3	2	1
CO4	3	2	1	2	-	-	-	-	-	-	1	1	3	2	2
CO5	3	2	2	1	-	-	-	-	-	-	1	1	2	2	3

Python Based Mini Project			
Course Code	22ISL35	CIE Marks	50
Teaching Hours/Week(L: T:P:S)	0:0:2:0	SEE Marks	50
Total Hours of Pedagogy	28 Hours	Total Marks	100
Credits	01	Exam Hours	03
Course Objectives: <ol style="list-style-type: none"> 1.Motive students to work on literature survey, to understand the domain of their interest preferable in advanced and emerging technologies. 2.Summarize the literature survey and finalize their project work under selected domain. 3.Develop team work & presentation skills, and prepare the report. 			
Course Content: <ul style="list-style-type: none"> • Survey and study of published literature on the assigned topic related to emerging technologies like machine learning, Cyber security, Data Science, Web technologies etc. • Working out a preliminary Approach to the Problem relating to the assigned topic. • Preparing a written report on the Study conducted for presentation to the Department. • Final Seminar, as oral Presentation before a Departmental Committee. 			
Assessment Details (both CIE and SEE)			
Parameter			Marks
Formation of team, selection of domain and submission of Synopsis			12
Carry out literature survey			10
Design and development, Preparation of the report			18
Rubrics based evaluation of Presentation and Viva			10
CIE Total Marks			50
Final Exam will be conducted for 50 marks (SEE)			
Total			100
Course Outcomes <p>CO1 Review the current state of Art and trends in their area of interest in current technologies and identify a suitable problem in their chosen subject domain with justification.</p> <p>CO2 Survey the available research literature/documents for the tools and techniques to be used.</p> <p>CO3 Examine the functional, non-functional, and performance requirements of their chosen problem definition.</p> <p>CO4 Design system architecture and different components and develop all the system components using appropriate tools and techniques.</p> <p>CO5 Work effectively in a team and use good project management practices and defend the project work as a team.</p>			

CO-PO & PSO Mapping:

PO's CO's	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	1	3	2	2	3	-	3	3	3	3	3	3	2
CO2	3	3	-	3	3	2	-	3	3	2	3	3	2	2	2
CO3	3	3	3	2	2	2	-	-	3	2	3	3	3	3	1
CO4	3	3	3	3	3	2	-	3	3	2	3	3	3	3	-
CO5	2	2	3	3	3	1	-	3	3	3	3	3	3	3	-
Avg.	2.8	2.8	2.5	2.8	2.6	1.8	3	1.8	3	2.4	3	3	2.8	2.8	1.67

IT Infrastructure and Management

Course Code	22IST36A	CIE Marks	50
Teaching Hours/Week(L: T:P:S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40 Hours	Total Marks	100
Credits	03	Exam Hours	03

Pre-Requisites: Computer hardware platforms, Operating system platforms, Software applications, Data management and storage, Networking and telecommunications platforms, Internet, Consulting and system integration services.

Course Objectives :

The Student will:

1. Understanding the role of IT infrastructure with its functions and services.(Understanding)
2. Recognize the research, reporting and presentation approach using the latest ICT tools.
3. Study the combination of the technical and management issues in contemporary infrastructure management.
4. Learn the concepts related with Deadlock to solve Problems.
5. Familiarize the Protection and Security Mechanism in Operating System.

Module I

Infrastructure management overview: Introduction, IS components, Services of IT infrastructure, welfare of IT, Roles and responsibilities, challenges.

Organizing for Infrastructure management: IT infrastructure design factors, model of IT management, Elucidation methods, Documentation.

08 Hours

Module II

Staffing for system management: Introduction, Determining Required Skill Sets and Skill Levels Assessing the Skill Levels of Current Onboard Staff.

Customer Service: Introduction, Key Elements of Good Customer Service: Key Customers, Identifying Key Services, Identifying Key Processes that Support Key Services, Key Suppliers, Integrating the Key Elements of Good Customer Service, Cardinal Sins that Undermine Good Customer Service.

08 Hours

Module III

Performance and Tuning: Introduction, Performance and Tuning Applied to the Five Major Resource Environments: Server Environment, Disk Storage Environment, Database Environment, Network Environment and Desktop Computer Environment.

Problem management: The role of service desk, segregating and integrating service desk, Developing a Problem Management Process, client issues with problem management.

08 Hours

Module IV

Storage Management: Storage Management Capacity, Storage Management Performance, Storage Management Reliability, Storage Management Recoverability.

Network Management: Key Decisions about Network Management, business IT networks and components, digital transmission, IS vulnerabilities and threats.

08 Hours

Module V

Strategic Security: Introduction, Developing a Strategic Security Process, IT Strategic planning process, Tools & methodologies of IT strategic planning, Business system planning approach.

Facilities management: Introduction, Major Elements of Facilities Management, Tips to improve facilities management process.

08 Hours

Course outcomes:

The Student will be able to:

- CO1:** Investigate, critically analyse and evaluate the impact of new and current ICT services to an organization.
- CO2:** Demonstrate the technical and communications skills that contribute to the operation of ICT services in an organization.
- CO3:** Explain critically the role of an enterprise architect in an organization.
- CO4:** Gain Knowledge on theoretical, technical and management issues that deliver ICT services to an organization
- CO5:** Analyse how effective IT Infrastructure Management requires strategic planning with alignment from both the IT and business perspectives in an organization.

Assessment Details (both CIE and SEE)

Evaluation Type	Component	Max. Marks	Marks Reduced To	Min Marks	Evaluation Details
Internal Assessment Test (IAT)	IAT 1	25	25	20	Average of two IATs, Scaled down to 25 Marks
	IAT 2	25			
Comprehensive Continuous Evaluation (CCE)	CCE-1	25	25		Minimum of two Assessment Methods as per 22OB4.2 of regulation. Average of CCEs, Scaled down to 25
	CCE-2	25			
Total CIE		-	50	20	Scaled down Marks of IAT and CCE to 25
SEE		100	50	18	Conducted for 100 Marks and Scaled down to 50
CIE + SEE		-	100	40	

Text Books

1. Rich Schiesser, IT Systems Management: Designing, Implementing, And Managing World-Class Infrastructure, Second Edition, Pearson, 2015.
2. Efraim Turban, Linda Volonino, Gregory Wood, IT for Management: Advancing Sustainable, Profitable Business Growth, 9th Edition, Wiley Publisher, 2015.

Reference Books:

1. Efraim Turban, Ephraim Mclean and James Wetherbe, Information Technology for Management: Transforming Organizations in the Digital Economy, 6th Edition, Wiley-India publisher, 2008.
2. Kenneth C Laudon, Jane P Laudon, Management Information Systems: Managing the Digital Firm, 15th Edition, Pearson, 2018.
3. Roger S Pressman, Software Engineering: A Practitioner's Approach, 7th Edition, McGraw Hill Education Publisher, 2009.

4. James A O'Brien, George M. Marakas, Management Information Systems, 10th Edition, McGraw-Hill Irwin Publisher, 2011.
5. Walker Royce, Software Project Management: A Unified Framework, Addison-Wesley Publisher, 1998

E - Resources:

1. <https://www.scribd.com/doc/45079962/IT-Infrastructure-Management>
2. <https://www.scribd.com/document/509694935/IT-Infrastructure-Management-eI9RGuDM0m>

CO-PO-PSO Mapping

PO'S	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	3	3	3						1		2	2		2
CO2	1	1	2	2						2	1	2	2		2
CO3	2	2	2	2						2		2	2		2
CO4	2	1	1	1		2				2	1	2	2	1	2
CO5	1	3	1	1						2	1	2	2	1	2
Avg	1.6	2.0	1.8	1.8		2.0				1.8	1.0	2.0	2.0	1.3	2.0

Business Process Fundamentals			
Course Code:	22IST36B	CIE Marks	50
Teaching Hours/ Week(L:T:P:S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40 Hours	Total Marks	100
Credits	03	Exam Hours	03

Prerequisite:

Basic Probability concepts

Course Learning Objectives:

This course will enable students to:

- CLO 1: Understand the basics of business and economy
- CLO 2: Learn the basics ethics of entrepreneurship and how to start a business.
- CLO 3: Understand the roles of ownership, management and leadership.
- CLO 4: Learn how to design an organization and its operations.
- CLO 5: Understand the roles and management of human resource in an organization.

Teaching-Learning Process(General Instructions)

These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

1. Lecturer method (L) need not to be only traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes.
2. Use of Video/Animation to explain functioning of various concepts.
3. Encourage collaborative (Group Learning) Learning in the class.
4. Ask at-least three HOT (Higher order Thinking) questions in the class, which promotes critical thinking.
5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop design thinking skills such as the ability to design, evaluate, generalize, and analyze information rather than simply recall it.
6. Introduce Topics in manifold representations.
7. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
8. Discuss how every concept can be applied to the real world-and when that's possible, it helps to improve the students' understanding.

Module– I

Teamwork & Economics

Teamwork in Business, The Foundation of Business – Introduction, Getting Down to Business, Functional Areas of Business, External Forces that Influence Business Activities

Economics and Business - What is Economics? Perfect Competition and Supply and Demand, Monopolistic Competition, Oligopoly, and Monopoly, Measuring the Health of the Economy, Government's Role in Managing the Economy

08 hours

Textbook1: Chapter 1 & 2
Teaching Learning Methodology: Chalk & Talk, Demo using Python IDE
Module–II
Ethics and Entrepreneurship Ethics – Introduction, What is Business Ethics? Identifying Ethical Issues and Dilemmas, Corporate Social Responsibility, Ethical Organizations, The Individual Approach to Ethics Entrepreneurship - The Nature of Entrepreneurship, The Importance of Small Business to the U.S. Economy, What Industries Are Small Businesses In? Advantages and Disadvantages of Business Ownership, Starting a Business, Why Some Businesses Fail and Where to Get Help 08 hours
Textbook1: Chapter 3, 4, 5 & 6
Teaching Learning Methodology: Chalk & Talk, Problem based learning: https://onlinecourses.nptel.ac.in/noc19_ee53/
Module– III
Ownership, Management and Leadership Ownership - The Ice Cream Men , Factors to Consider, Mergers and Acquisitions Management and Leadership - Noteworthy Management, What Do Managers Do?, Planning, Leading, Controlling, Managerial Skills, Applying Your Skills at Notes-4-You 08 hours
Textbook1: Chapter 7
Teaching Learning Methodology: Chalk & Talk, Problem based learning: https://onlinecourses.nptel.ac.in/noc19_ee53/
Module– IV
Organizational structures and Operation Management Organizational structure – Organizing, Organizational Structure: How companies do the job done Operation Management - The Challenge: Producing Quality Jetboards, Operations Management in Manufacturing, Managing the Production Process in a Manufacturing Company, Graphical Tools: Gantt and PERT Charts, The Technology of Goods Production, Operations Management for Service Providers, Producing for Quality 08 hours
Textbook1: Chapter 8 & 9
Teaching Learning Methodology: Chalk & Talk, Problem based learning: https://onlinecourses.nptel.ac.in/noc22_ge04/
Module– V
Human resources and Motivating employees Motivating Employees – Motivation, Hierarchy of Needs Theory, Two-Factor Theory, Expectancy Theory, Equity Theory Managing Human Resources - Human Resource Management, Developing Employees, What Makes a Great Place to Work? Compensation and Benefits, Performance Appraisal 08 hours

Textbook1: Chapter 10 & 11

Teaching Learning Methodology: Chalk & Talk, Problem based learning:
https://onlinecourses.nptel.ac.in/noc22_ge04/

Course Outcomes:

On completion of this course, the students will be able to:

- Design the basics of any business
- Design the rules and social responsibility of an organization.
- Develop the roles of the interrelated functions of management.
- Construct and manage an organization.
- Utilize the human resources effectively by motivating the employees.

Assessment Details (both CIE and SEE)

Evaluation Type	Component	Max. Marks	Marks Reduced To	Min Marks	Evaluation Details
Internal Assessment Test (IAT)	IAT 1	25	25	20	Average of two IATs, Scaled down to 25 Marks
	IAT 2	25			
Comprehensive Continuous Evaluation (CCE)	CCE-1	25	25		Minimum of two Assessment Methods as per 22OB4.2 of regulation. Average of CCEs, Scaled down to 25
	CCE-2	25			
Total CIE		-	50	20	Scaled down Marks of IAT and CCE to 25
SEE		100	50	18	Conducted for 100 Marks and Scaled down to 50
CIE + SEE		-	100	40	

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (25 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination(SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together

Continuous Internal Evaluation:

Two Internal Assessment Test each of **25 Marks (duration 01 hour)**

1. First test at the end of 7th week of the semester
2. Second test at the end of the 14th week of the semester

Comprehensive Continuous Evaluation Tests each of **25 Marks**

3. First test at the end of 4th week of the semester
4. Second test at the end of 9th week of the semester

The sum of Two Comprehensive Continuous Evaluation tests, two Internal Assessment Test will be out of 100 marks and will be **Scaled down to 50marks** (to have a less stressed CIE, the portion of the syllabus should not be

common / repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods/question paper has to be designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by the institute as per the scheduled time table, with common question

Suggested Learning Resources:

Text Books:

1. Stephen J. Skripak, Fundamentals of Business, Pamplin college of Business and Virginia Tech Libraries, 2016.

Reference Books:

1. S.S. Kanaka, Entrepreneurial Development, S-Chand Fourth Edition.
2. Robert D. Hisrich and Michael P. Peters, Entrepreneurship, McGraw – Hill Publication.
3. Poornima M. Charantimath, Entrepreneurship Development Small Business Enterprises, Pearson Education.
4. Thomas. W. Zimmerer & Norman. M. Scarborough, Essentials of Entrepreneurship and Small Business Management, PHI.

E-RESOURCES:

- Lee Angelelli (1994). "Steve Paul Jobs." Retrieved from: <http://ei.cs.vt.edu/~history/Jobs.html>
- Warren E. Buffet and Carol Loomis (2003). "America's Growing Trade Deficit Is Selling The Nation Out From Under Us. Here's A Way To Fix The Problem--And We Need To Do It Now." Fortune. November 10, 2003. Retrieved June 9, 2016 from: http://archive.fortune.com/magazines/fortune/fortune_archive/2003/11/10/352872/index.htm
- Coca Cola Company (2016). "Our Company: Vision, Mission, and Values." Cocacola.com. Retrieved from: <http://www.coca-colacompany.com/our-company/mission-vision-values>
- Johnson and Johnson (2016). "Company Structure." Retrieved from: <http://www.jnj.com/about-jnj/company-structure>
- Burger King (2016). "About Us." Burger King Website: bk.com. Retrieved from: <http://www.bk.com/about-bk>
- Starbucks (2016). "Working at Starbucks." Starbucks.com. Retrieved from: <http://www.starbucks.com/careers/working-at-starbucks>
- Fortune (2007). "100 Top MBA Employers." Fortune. Retrieved from: http://archive.fortune.com/magazines/fortune/mba100/2007/full_list/index.html

Activity Based Learning (Suggested Activities in Class) / Practical Based learning

- Real world problem solving by giving group projects.
- Group discussion on finding suitable learning algorithm for the problem.
- Seminar on advanced techniques by the students.

CO-PO-PSO Mapping

COURSE OUTCOMES (CO's)	PROGRAM OUTCOMES (PO's)												PROGRAM SPECIFIC OUTCOMES (PSO'S)		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	2							2	3		2	2			
CO2	2						3	3			2	2			
CO3	2							3	3		3	2			
CO4	2	2							3		3	2			
CO5	2							3	3		3	3			

Supply Chain Management

Course Code	22IST36C	CIE Marks	50
Teaching Hours/Week(L: T:P:S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40 Hours	Total Marks	100
Credits	03	Exam Hours	03

Course Objectives:

The objectives of this course are

- To provide Knowledge on logistics and supply chain management
- To enable them in designing the distribution network
- To train the students in knowing the supply chain Analysis
- Impart knowledge on Dimensions of logistic
- To know the recent trends in supply chain management

Syllabus

Module – I

Introduction to Supply Chain Management: Supply chain - objectives - importance - decision phases - process view competitive and supply chain strategies - achieving strategic fit – supply chain drivers - obstacles – framework – facilities -inventory-transportation-information-sourcing-pricing.

08 Hours

Module – II

Designing the distribution network: Role of distribution - factors influencing distribution - design options - e-business and its impact distribution networks in practice –network design in the supply chain - role of network - factors affecting the network design decisions modeling for supply chain. Role of transportation - modes and their performance – transportation infrastructure and policies - design options and their trade-offs tailored transportation.

08 Hours

Module – III

Supply Chain Analysis: Sourcing - In-house or Outsource - 3rd and 4th PLs - supplier scoring and assessment, selection - design collaboration - Procurement process - Sourcing planning and analysis. Pricing and revenue management for multiple customers, perishable products, seasonal demand, bulk and spot contracts.

08 Hours

Module – IV

Dimensions of Logistics: A macro and micro dimension - logistics interfaces with other areas - approach to analyzing logistics systems - logistics and systems analysis - techniques of logistics system analysis - factors affecting the cost and importance of logistics. Demand Management and Customer Service Outbound to customer logistics systems - Demand Management –Traditional Forecasting CPFRP - customer service - expected cost of stock outs - channels of distribution.

08 Hours

Module – V

Recent Trends in Supply Chain Management-Introduction, New Developments in Supply Chain Management, Outsourcing Supply Chain Operations, Co-Maker ship, The Role of E- Commerce in Supply Chain Management, Green Supply Chain Management, Distribution Resource Planning, World Class Supply Chain Management.

08 Hours

Course Outcomes:

At the end of the course, students will be able to

- Understand the strategic role of logistic and supply chain management in the cost reduction and offering best service to the customer
- Understand Advantages of SCM in business
- Apply the knowledge of supply chain Analysis
- Analyze reengineered business processes for successful SCM implementation
- Evaluate Recent trend in supply chain management

Assessment Details (both CIE and SEE)

Evaluation Type	Component	Max. Marks	Marks Reduced To	Min Marks	Evaluation Details
Internal Assessment Test (IAT)	IAT 1	25	25	20	Average of two IATs, Scaled down to 25 Marks
	IAT 2	25			
Comprehensive Continuous Evaluation (CCE)	CCE-1	25	25		Minimum of two Assessment Methods as per 22OB4.2 of regulation. Average of CCEs, Scaled down to 25
	CCE-2	25			
Total CIE		-	50	20	Scaled down Marks of IAT and CCE to 25
SEE		100	50	18	Conducted for 100 Marks and Scaled down to 50
CIE + SEE		-	100	40	

TEXT BOOKS:

- Sunil Chopra and Peter Meindl, Supply Chain Management – “Strategy, Planning and Operation”, 3rd Edition, Pearson/PHI,2007.
- Supply Chain Management by Janat Shah Pearson Publication2008.

REFERENCE BOOKS:

- A Logistic approach to Supply Chain Management – Coyle, Bardi, Longley, Cengage Learning,1/e
- Donald J Bowersox, Dand J Closs, M Bixby Coluper, “Supply Chain Logistics Management”, 2nd edition, TMH,2008.
- Wisner, Keong Leong and Keah-Choon Tan, “Principles of Supply Chain Management A Balanced Approach”, Cengage Learning,1/e
- David Simchi-Levi et al, “Designing and Managing the Supply Chain” –Concepts

CO-PO-PSO Mapping

PO'S/ CO's	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	3	3	-	-	-	-	-	-	-	2	2	-	2
CO2	1	1	2	2	-	-	-	-	-	-	-	2	2	-	2
CO3	2	2	2	2	-	-	-	-	-	-	-	2	2	-	2
CO4	2	1	1	1	-	-	-	-	-	-	-	2	2	1	2
CO5	1	3	1	1	-	-	-	-	-	-	-	2	2	1	2
Avg	1.6	2.0	1.8	1.8	-	-	-	-	-	-	-	2.0	2.0	1.3	2.0

HUMAN COMPUTER INTERACTION			
Course Code	22IST36D	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
Course Learning Objectives CLO 1. To learn the foundations of Human Computer Interaction. CLO 2. To become familiar with the design technologies for individuals and persons with disabilities. CLO 3. To be aware of mobile HCI. CLO 4. To learn the guidelines for user interface. CLO 5. Develop meaningful user interface.			
Module - I			
Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design. The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.			
			08 Hours
Module - II			
Design Process & Screen Designing: Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions. Screen Designing: Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.			
			08 Hours
Module - III			
Windows and Components Windows – New and Navigation schemes selection of window, selection of devices based and screen-based controls. Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.			
			08 Hours
Module - IV			
HCI in the Software Process HCI in the software process, The software life cycle Usability engineering Iterative design and prototyping Design Focus: Prototyping in practice Design rationale Design rules Principles to support usability Standards Golden rules and heuristics HCI patterns Evaluation techniques, Goals of evaluation, Evaluation through expert analysis, Evaluation through user participation, Choosing an evaluation method. Universal design, Universal design principles Multi-modal interaction.			
			08 Hours
Module - V			
Cognitive Models Cognitive models Goal and task hierarchies Design Focus: GOMS saves money Linguistic models The challenge of display-based systems Physical and device models Cognitive architectures Ubiquitous computing and augmented realities Ubiquitous computing applications research Design Focus: Ambient Wood – augmenting the physical Virtual and augmented reality Design Focus: Shared experience Design Focus: Applications of augmented reality Information and data visualization Design Focus: Getting the size right.			
			08 Hours

Teaching-Learning Process	Chalk and board, Active Learning, Demonstration, Web content, Case Study
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Course Outcomes

On completion of this course, the students will be able to,

CO1: Design effective dialog for HCI.

CO2: Design effective HCI for individuals and persons with disabilities.

CO3: Explain the HCI implications for designing multimedia/ ecommerce/ e-learning Web sites.

CO4: Assess the importance of user feedback.

CO5: Design and develop meaningful user interface.

Assessment Details (both CIE and SEE)

Evaluation Type	Component	Max. Marks	Marks Reduced To	Min Marks	Evaluation Details
Internal Assessment Test (IAT)	IAT 1	25	25	20	Average of two IATs, Scaled down to 25 Marks
	IAT 2	25			
Comprehensive Continuous Evaluation (CCE)	CCE-1	25	25		Minimum of two Assessment Methods as per 22OB4.2 of regulation. Average of CCEs, Scaled down to 25
	CCE-2	25			
Total CIE		-	50	20	Scaled down Marks of IAT and CCE to 25
SEE		100	50	18	Conducted for 100 Marks and Scaled down to 50
CIE + SEE		-	100	40	

Suggested Learning Resources:

Textbooks:

1. Wilbert O. Galitz, The Essential Guide to user Interface Design: An Introduction to GUI Design Principles and Techniques, Wiley, Second Edition 2002. (Module I, II, III)
2. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, Human Computer Interaction, 3rd Edition, Pearson Education, 2005 (Module IV, V)

Reference:

1. Andrew Monk, Fundamentals of Human Computer Interaction, 1st Edition, Academic Press, 2014.
2. Ben Shneiderman, Catherine Plaisant, Maxine S. Cohen, Steven M. Jacobs, Designing the User Interface: Strategies for Effective Human-Computer Interaction, 5th Edition, Pearson Education Asia Pearson, 2009
3. Brian Fling, Mobile Design and Development, First Edition, O'Reilly Media Inc., 2009
4. Bill Scott and Theresa Neil, Designing Web Interfaces, First Edition, O'Reilly, 2009.

Weblinks and Video Lectures (e-Resources):

1. <https://nptel.ac.in/courses/106103115>
2. <https://archive.nptel.ac.in/courses/106/106106177/>
3. https://www.tutorialspoint.com/human_computer_interface/index.htm

CO- PO-PSO Mapping:

POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
COs															
CO1	3	3	3	3	2	-	-	-	-	-	2	2	3	1	2
CO2	2	3	3	3	2	3	-	-	-	-	2	2	3	3	2
CO3	1	2	2	1	3	-	-	-	-	-	-	1	1	-	-
CO4	1	2	1	1	3	-	-	-	-	-	-	1	2	-	-
CO5	2	3	3	3	2	-	-	-	-	-	2	2	3	2	2
Avg.	1.8	2.6	2.4	2.2	2.4	3.0	-	-	-	-	2.0	1.6	2.4	2.0	2.0

Social Connect and Responsibility			
Course Code	22UHV37	CIE Marks	100
Teaching Hours/Week(L: T:P:S)	(0:0:2:0)	SEE Marks	-
Total Hours of Pedagogy	28 Hours	Total Marks	100
Credits	01	Exam Hours	-
Course objectives: The course will enable the students to: <ul style="list-style-type: none"> • Provide a formal platform for students to communicate and connect to the surrounding. • Create a responsible connection with the society. • Understand the community in general in which they work. • Identify the needs and problems of the community and involve them in problem –solving. • Develop among themselves a sense of social & civic responsibility & utilize their knowledge in finding practical solutions to individual and community problems. • Develop competence required for group-living and sharing of responsibilities & gain skills • In mobilizing community participation to acquire leadership qualities and democratic attitudes. 			
Syllabus			
Module – I			
Plantation and adoption of a tree: Plantation of a tree that will be adopted for four years by a group of BE / B.Tech students. (ONE STUDENT ONE TREE) They will also make an excerpt either as a documentary or a photo blog describing the plant's origin, its usage in daily life, its appearance in folklore and literature - – Objectives, Visit, case study, report, outcomes.			
Module – II			
Heritage walk and crafts corner: Heritage tour, knowing the history and culture of the city, connecting to people around through their history, knowing the city and its craftsman, photo blog and documentary on evolution and practice of various craft forms - – Objectives, Visit, case study, report, outcomes.			
Module – III			
Organic farming and waste management: effectiveness of organic farming, wet waste management in neighboring villages, and implementation in the campus – Objectives, Visit, case study, report, outcomes.			
Module – IV			
Water conservation: Knowing the present practices in the surrounding villages and implementation in the campus, documentary or photoblog presenting the current practices – Objectives, Visit, case study, report, outcomes.			
Module – V			
Foods walk: City's culinary practices, food lore, and indigenous materials of the region used in cooking – Objectives, Visit, case study, report, outcomes.			

Course Outcomes:

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

CO1: Communicate and connect to the surrounding.

CO2: Create a responsible connection with the society.

CO3: Involve in the community in general in which they work.

CO4: Develop among them of social & civic responsibility & utilize their knowledge in finding practical solutions to individual and community problems.

CO5: Develop competence required for group-living and sharing of responsibilities & gain skills in mobilizing community participation to acquire leadership qualities and democratic attitudes.

Pedagogy – Guidelines:

It may differ depending on local resources available for the study as well as environment and climatic differences, location and time of execution.

Sl No	Topic	Groupsize	Location	Activity execution	Reporting	Evaluation Of the Topic
1.	Plantation and adoption of a tree:	May be individual or team	Farmers land/ parks / Villages / roadside/ community area / College campus etc.....	Site selection /proper consultation/Continuous monitoring/ Information board	Report should be submit by individual to the concerned evaluation authority	Evaluation as per the rubricsOf scheme and syllabus by Faculty
2.	Heritage walk and crafts corner:	May be individual or team	Temples / monumental places / Villages/ City Areas / Grama panchayat/ public associations/Government Schemes officers/ campus etc.....	Site selection /proper consultation/Continuous monitoring/ Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubricsOf scheme and syllabus by Faculty
3.	Organic farming and waste management:	May be individual or team	Farmers land / parks / Villages visits / roadside/ community area / College campus etc.....	Group selection / proper consultation / Continuous monitoring / Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubricsOf scheme and syllabus by Faculty
4.	Water conservation: & conservation techniques	May be individual or team	Villages/ City Areas / Grama panchayat/ public associations/Government Schemes officers / campus etc.....	site selection / proper consultation/Continuous monitoring/ Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubricsOf scheme and syllabus by Faculty
5.	Food walk: Practices in society	May be individual or team	Villages/ City Areas / Grama panchayat/ public associations/Government Schemes officers/ campus	Group selection / proper consultation / Continuous monitoring / Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubricsOf scheme and syllabus by Faculty

Plan of Action (Execution of Activities)

Sl.No.	Practice Session Description
1	Lecture session in field to start activities
2	Students Presentation on Ideas
3	Commencement of activity and its progress
4	Execution of Activity
5	Execution of Activity
6	Execution of Activity
7	Execution of Activity
8	Case study based Assessment, Individual performance
9	Sector/ Team wise study and its consolidation
10	Video based seminar for 10 minutes by each student At the end of semester with Report.

- Each student should do activities according to the scheme and syllabus.
- At the end of semester student performance has to be evaluated by the faculty for the assigned activity progress and its completion.
- At last consolidated report of all activities from 1st to 5th, compiled report should be submitted as per the instructions and scheme.

Assessment Details for CIE (both CIE and SEE)

Weightage	CIE – 100%	<ul style="list-style-type: none"> • Implementation strategies of the project (NSS work). • The last report should be signed by NSS Officer, the HOD and principal. • At last report should be evaluated by the NSS officer of the institute. • Finally the consolidated marks sheet should be sent to the university and also to be made available at LIC visit.
Field Visit, Plan, Discussion	10 Marks	
Commencement of activities and its progress	20 Marks	
Case study based Assessment Individual performance with report	20 Marks	
Sector wise study & its consolidation 5*5 = 25	25 Marks	
Video based seminar for 10 minutes by each student At the end of semester with Report. Activities 1 to 5, 5*5 = 25	25 Marks	
Total marks for the course in each semester	100 Marks	
For each activity, 20 marks CIE will be evaluated for IA marks at the end of semester, Report and assessment copy should be made available in the department.		
<ul style="list-style-type: none"> • Students should present the progress of the activities as per the schedule in the prescribed practical session in the field. • There should be positive progress in the vertical order for the benefit of society in general through activities. 		

Activities:

Jamming session, open mic, and poetry: Platform to connect to others. Share the stories with others. Share the experience of Social Connect. Exhibit the talent like playing instruments, singing, one-act play, art-painting, and fine art.

PEDAGOGY:

The pedagogy will include interactive lectures, inspiring guest talks, field visits, social immersion, and a course project. Applying and synthesizing information from these sources to define the social problem to address and take up the solution as the course project, with your group. Social immersion with NGOs/social sections will be a key part of the course. Will all lead to the course project that will address the needs of the social sector.

COURSE TOPICS:

The course will introduce social context and various players in the social space, and present approaches to discovering and understanding social needs. Social immersion and inspiring conversational will culminate in developing an actual, idea for problem-based intervention, based on an in-depth understanding of a key social problem.

Duration:

A total of 40 - 50 hrs engagement per semester is required for the 3rd semester of the B.E./B.Tech. Program. The students will be divided into groups. Each group will be handled by faculty mentor. Faculty mentor will design the activities (particularly Jamming sessions open mic, and poetry) Faculty mentors has to design the evaluation system as per VTU guidelines of scheme & syllabus.

Guideline for Assessment Process:**Continuous Internal Evaluation (CIE):**

After completion of the course, the student shall prepare, with daily diary as reference, a comprehensive report in consultation with the mentor/s to indicate what he has observed and learned in the social connect period. The report should be signed by the mentor. The report shall be evaluated on the basis of the following criteria and/or other relevant criteria pertaining to the activity completed. Marks allotted for the diary are out of 50. Planning and scheduling the social connect Information/Data collected during the social connect Analysis of the information/data and report writing Considering all above points allotting the marks as mentioned below

Excellent**: 80 to 100****Good****: 60 to 79****Satisfactory****: 40 to 59 Unsatisfactory and fail: <39**

Unified Modeling Language Tools - STAR UML			
Course Code	22ISL38A	CIE Marks	50
Teaching Hours/Week (L: T: P: S)	0:0:2:0	SEE Marks	50
Total Hours of Pedagogy	12 Lab slots	Total Marks	100
Credits	01	Exam Hours	03
Course objectives: This course will enable students to experience practically on: <ul style="list-style-type: none">Master Object-Oriented Principles and UML Fundamentals for a Strong Foundation□Attain a comprehensive grasp on UML application and design diagram utilizationAcquire knowledge of iterative, incremental, and development processesExamine Extreme Programming (XP) principles through comprehensive study and practical application□Discover and apply key design patterns in practical contexts for hands-on experience.			
	PROGRAMS		
1	Imagine you are tasked with developing a comprehensive UML diagram for an Automated Teller Machine (ATM) application. The ATM system should support basic banking transactions such as cash withdrawals, balance inquiries, and fund transfers.		
2	Describe the UML representation of interactions in a Library Management System's bookborrowing process, emphasizing actor roles, event flow, decision points, and ensuring scalability for future system enhancements.		
3	Design an UML representation of interactions in an Online Book Shop, emphasizing systemcomponents, user roles, transaction processes, and scalability features for future enhancements.		
4	Design the UML diagram for a Railway Reservation System, emphasizing interactions, user roles,booking processes, and scalability features tailored for accommodating future system enhancements.		
5	Demonstrate the UML representation of the Banking System's Account Transfer Process, highlighting interactions, user roles, transaction sequence, security measures, validation, exception handling, and scalability for future enhancements.		
6	Draw a model for Airport management system in different views i.e. Use case view, logical view, component view, Deployment view, Database design, forward and Reverse Engineering, and Generation of documentation of the project.		
7	Draw a model for E-commerce sites in different views i.e Use case view, logical vie component view, Deployment view,Database design, forward and Reverse Engineering, and Generation of documentation of the project.		
8	Design Activity and Class Diagram for Hospital management system to demonstrate the Activitiwhich will be carried out in Hospital.		
Course Outcomes: On completion of this course, the students will be able to: CO1: Analyze complex problems, design effective solutions and communicate their ideas through UML diagrams.			

CO5: Design the application of key design patterns in real-world scenarios and demonstrating hands-on proficiency.

Continuous Internal Assessment of Laboratory/Practical Courses		
Lab Test 1	Lab Test 2	Lab Records
15 marks	15 marks	20 marks
Semester End Examination(SEE)		50 marks

[illegible]

Introduction to MATLAB / SCILAB			
Course Code	22ISL38B	CIE Marks	50
Teaching Hours/Week (L: T:P:S)	0:0:2:0	SEE Marks	50
Total Hours of Pedagogy	-	Total Marks	100
Credits	01	Exam Hours	03
<p>SCILAB stands for <i>SCIENTIFIC LABORATORY</i> is an <i>open-source alternative</i> to MATLAB. SCILAB is free and open-source software for numerical computation providing a powerful computing environment for engineering and scientific applications. SCILAB software is used for performing numerical computation. It is used in all major scientific areas such as space, aeronautics, defense, finance, etc.</p> <p>Course Objectives:</p> <ol style="list-style-type: none"> 1.To become familiar with SCILAB programming environment including Maths & Simulation for usual engineering and science applications including mathematical operations and data analysis. 2.To implement elementary mathematical functions, polynomial arithmetic, scalar and vector operations. 3.To develop programming for 2-D & 3-D Visualization Graphics functions to visualize, annotate and export data and many ways to create and customize various types of plots and charts. 4.To develop optimization Algorithms to solve constrained and unconstrained continuous and discrete optimization problems. 5.To explore the statistics tools to perform data analysis and modeling. <p>Course Content:</p> <p>Programs/Assignment on:</p> <ol style="list-style-type: none"> 1. SCILAB Introduction and Vector Operations, Variables and Matrix Operations 2. Conditional Branching, Iterations and Loops Scripts Functions 3. Toolboxes and SCILAB Applications using Garuda Cloud 4. 2D, 3D Graphs and Advanced Plotting Commands 5. Image Processing Toolbox and Implementation of Face and Eye Detection Techniques 6. Curve Fitting, Polynomials and Differential Equations with OpenCV/ SCILAB 7. Simulation using XCOS 8. Numerical Optimization Techniques and Artificial Intelligence 			

Course Outcomes

CO1: Explain the SCILAB programming environment to solve given problem.

CO2: Develop algorithms to implement elementary mathematical functions, polynomial arithmetic, scalar and vector operations.

CO3: Analyze the working of 2D, 3D Graphs and Advanced Plotting.

CO4: Designing the optimization techniques for efficient solutions.

CO5: Implementation of SCILAB programs to solve real world problems.

Assessment Details (both CIE and SEE)

Continuous Internal Assessment of Laboratory/Practical Courses		
Lab Test 1	Lab Test 2	Lab Records
15 marks	15 marks	20 marks
Semester End Examination (SEE)		50 marks

CO-PO and PSO Mapping

PO's CO's	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	3	3	2	-	-	-	-	-	3	3	3	3	2
CO2	3	3	3	3	3	-	-	-	-	-	3	3	2	2	2
CO3	3	3	3	2	2	-	-	-	-	-	3	3	3	3	1
CO4	3	3	3	3	3	-	-	-	-	-	3	3	3	3	2
CO5	3	3	3	3	3	-	-	-	-	-	3	3	3	3	3
Avg.	3	3	3	2.8	2.6	-	-	-	-	-	3	3	2.8	2.8	2

Introduction to Office Tools			
Course Code	22ISL38C	CIE Marks	50
Teaching Hours/Week (L: T:P:S)	0:0:2:0	SEE Marks	50
Total Hours of Pedagogy	-	Total Marks	100
Credits	01	Exam Hours	03
Course Objectives: <ol style="list-style-type: none"> 1. Attain a comprehensive understanding of Microsoft Office tools including Word, Excel, PowerPoint, and potentially others like Access, Outlook, or Publisher. 2. Learn how to use Office tools effectively to increase productivity in academic, professional, and personal tasks. 3. Develop the ability to adapt and apply acquired skills to different scenarios and tasks requiring Office applications. 			
Course Content: Programs/Assignment on: <u>Microsoft Word:</u> <ol style="list-style-type: none"> 1. Using MS WORD formatting tools like font styles, sizes, colors, alignment, and line spacing. 2. Using MS WORD Create and customize document templates for different purposes (e.g., resumes, flyers, reports). 3. Explore creating and formatting tables, inserting and formatting images, shapes, and SmartArt. 4. Introduce basic arithmetic operations, SUM, AVERAGE, MAX, MIN, etc. <u>Microsoft PowerPoint:</u> <ol style="list-style-type: none"> 5. Creating Presentations: Cover slide layouts, inserting text, images, shapes, and slide transitions. 6. Animation and Multimedia: Practice adding animations, audio, video, and customizing timing. 7. Master Slides: Explore using master slides for consistent formatting and design. 8. Microsoft Access: Design and create a simple database, define relationships, and run 			

queries.

9. Outlook: Manage emails, calendar appointments, tasks, and rules for organizing mail.
10. OneNote: Explore note-taking, organizing information, and collaboration features.
11. Publisher: Designing various print materials like newsletters, brochures, or posters.
12. SharePoint: Introduction to document management, team sites, and collaboration tools.

Course Outcomes

CO1: Explain the usage of Microsoft Office environment to solve given problem.

CO2: Demonstrate the working of Microsoft Office tools.

CO3: Analyze the working of Word, Excel and PowerPoint settings to create the documents.

CO4: Designing the animated presentation to explore the Critical thinking.

CO5: Implementation of efficient Microsoft Office tools programs to solve real world problems for better productivity.

Assessment Details (both CIE and SEE)

Continuous Internal Assessment of Laboratory/Practical Courses		
Lab Test 1	Lab Test 2	Lab Records
15 marks	15 marks	20 marks
Semester End Examination (SEE)		50 marks

CO-PO and PSO Mapping

PO's CO's	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	3	3	2	-	-	-	-	-	3	3	3	3	2
CO2	3	3	3	3	3	-	-	-	-	-	3	3	2	2	2
CO3	3	3	3	2	2	-	-	-	-	-	3	3	3	3	1
CO4	3	3	3	3	3	-	-	-	-	-	3	3	3	3	2
CO5	3	3	3	3	3	-	-	-	-	-	3	3	3	3	3
Avg.	3	3	3	2.8	2.6	-	-	-	-	-	3	3	2.8	2.8	2

Introduction to Linux/Unix Shell Programming			
Course Code	22ISL38D	CIE Marks	50
Teaching Hours/Week (L: T:P:S)	0:0:2:0	SEE Marks	50
Total Hours of Pedagogy	-	Total Marks	100
Credits	01	Exam Hours	03
Course Objectives: This course will enable students to, 1. Understand effective use of Unix concepts, commands and terminology. 2. Identify, access, and evaluate UNIX file system. 3. Understand UNIX command syntax and semantics. 4. Read and understand specifications, scripts and programs. 5. Analyze Facility with UNIX Process.			
Course Content: Introduction to Shell scripting: <ul style="list-style-type: none"> • Use of Basic UNIX Shell Commands and options related to them: vi, ls, mkdir, rmdir, cd, cat, touch, file, wc, sort, cut, who, man etc. • Commands related to inode, I/O redirection and piping. • Shell Programming: Shell script exercises based on following: <ol style="list-style-type: none"> (i) Interactive shell scripts (ii) Positional parameters (iii) Arithmetic (iv) if-then-fi, if-then- else-fi, nested if-else (v) Logical operators (vi) else + if equals elif, case structure (vii) while, until, for loops, use of break Programs/Assignment on: <ol style="list-style-type: none"> 1. Write a shell script to check whether the entered username and password is valid or not. 2. Write a shell script to add, subtract, multiply, divide two numbers and add two strings. 3. Write a shell script that accepts two file names as arguments, and checks the permissions of these files are similar or different. 4. Write a shell program to perform convert lowercase to uppercase using tr statement. 5. Write a non-recursive shell script that accepts any number of arguments and prints them in a reverse order. 6. Write a shell script to check the given file is a directory or not. 7. Write a shell script to compute GCD & LCM of two numbers. 8. Write a shell script to find whether a given number is prime. 9. Write a shell script to check whether the given year is Leap year or not. 10. Write a shell script to check whether the given string is Palindrome or not. 			

Course Outcomes**CO1:** Know the basics of Unix concepts and commands.**CO2:** Evaluate the UNIX file system.**CO3:** Apply Changes in file system.**CO4:** Write scripts and programs.**CO5:** Analyse Facility with UNIX system process.**Text Book:**

- 1) Sumitabha Das: “UNIX – Concepts and Applications”, Tata McGraw Hill, Noida, 4th Edition, 15th Reprint, 2011, ISBN-13: 978-0-07-063546-3.
- 2) Behrouz A. Forouzan and Richard F. Gilberg: “UNIX and Shell programming”, Cengage Learning, India, 1st Edition, 2005, ISBN: 81-35-0325-9.
- 3) M G Venkatesh Murthy: “UNIX and Shell programming”, Pearson Education, Delhi, 1st Edition, 2005, ISBN: 81-7758-745-5.

E-Resources:

- 1) <http://www.mhhe.com/das/uca>
- 2) http://www.tutorialspoint.com/unix/unix_tutorials.pdf.
- 3) <http://www.perldoc.perl.org/>

Assessment Details (both CIE and SEE)

Continuous Internal Assessment of Laboratory/Practical Courses		
Lab Test 1	Lab Test 2	Lab Records
15 marks	15 marks	20 marks
Semester End Examination (SEE)		50 marks

CO-PO and PSO Mapping

PO's CO's	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
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CO2	3	3	3	3	3	-	-	-	-	-	3	3	2	2	2
CO3	3	3	3	2	2	-	-	-	-	-	3	3	3	3	1
CO4	3	3	3	3	3	-	-	-	-	-	3	3	3	3	2
CO5	3	3	3	3	3	-	-	-	-	-	3	3	3	3	3
Avg.	3	3	3	2.8	2.6	-	-	-	-	-	3	3	2.8	2.8	2