Nagarjuna College of Engineering & Technology, Bengaluru
An Autonomous Institute, Affiliated to VTU Belagavi

Department of Information Science and Engineering

Curriculum Scheme & Structure

3rd Semester Syllabus

As per the NEP 2020 Guidelines

w.e.f.

Academic Year 2024-2025

NAGARJUNA COLLEGE OF ENGINEERING & TECHNOLOGY, BENGALURU
B.E. in Information Science and Engineering
Scheme of Teaching and Examinations 2023
Outcome Based Education (OBE) and Choice Based Credit System (CBCS) (Effective from the academic year 2024-25)

III SEMESTER

Sl. No	Course	Course Code	Course Title	Teaching Department (TD) and Question Paper Setting(PSB)	Teaching Hours /Week				Examination				Credits
					Theory Lectur	Tutorial	Practical	SDA	Duration in	CIE Marks	SEE Marks	Total Mark	
					L	T	P	S					
1	PCC/BSC	23MAT31	Mathematics for Computer Science	Math's Dept.	3	0	0		03	50	50	100	3
2	IPCC	23ISI32	Data Structures and Applications	CSEB	3	0	2		03	50	50	100	4
3	IPCC	23ISI33	Object Oriented Programming using Java	CSEB	3	0	2		03	50	50	100	4
4	PCC	23IST34	Logic Design and Computer Organization	CSEB	3	0	0		03	50	50	100	3
5	PCCL	23ISL35	Python based Mini project	CSEB	0	0	2		03	50	50	100	1
6	ESC	23IST36X	ESC/ETC/PLC	CSEB	3	0	0		03	50	50	100	3
7	UHV	23UHV37	Social Connect and Responsibility	Any Department	0	0	2		01	100	---	100	1
8	AEC/ SEC	23ISL38X	Ability Enhancement Course/Skill Enhancement Course - III	CSEB	0	0	2		02	50	50	100	1
9	MC	23NS39	National Service Scheme (NSS)	NSS coordinator	0	0	2			100	---	100	0
		23PE39	Physical Education(PE) (Sports and Athletics)	Physical Education Director									
		23YO39	Yoga	Yoga Teacher									
									Total	**550**	**350**	**900**	**20**

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 : This letter in the course code indicates common to all the stream of engineering. ESC: Engineering Science Course, ETC: Emerging Technology Course, PLC: Programming Language Course

.

Engineering Science Course (ESC/ETC/PLC)			
23IST36A	IT Infrastructure and Management	23IST36C	Supply Chain Management
23IST36B	Business Process Fundamentals	23IST36D	Human Computer Interaction
Ability Enhancement Course – III (All are Laboratory Courses 0-0-2-0)			
23ISL38A	Unified Modelling Language Tools-Star UML	23ISL38C	Introduction to Office Tools
23ISL38B	Introduction to MATLAB / SCILAB	23ISL38D	Introduction to Linux/Unix Shell Programming

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.) 2023-23 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	**23MATS31**	**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	**40hours**	**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 socialllife situations.
2. Provide the principles of statistical inferences and the basics of hypothesis testing with emphasison 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 are vision 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,L2andL3]

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. **8 Hours.**

[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.

Module-3

Statistical Inference1:

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. **8 Hours.**

[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,L2andL3]

Applications: Decision making and problem solving, software testing and quality control

Module-4

Statistical Inference2:

Sampling of variables-small samples, students 't' distribution, Chi-square distribution as a test of Goodness of fit. F-Distribution. **8 Hours.**

[Text 1:27.13, 27.14, 27.15, 27.16,27.17, 27.18, 27.19]

[RBT Levels:L1,L2and 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.

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.**8 Hours.**

[Text 2:]

[RBT Levels: L1,L2andL3]

Applications: Algorithm Optimization, Network performance, Database management, User experience design and Hardware design.

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:

1. Explain the basic concepts of probability, random variables, probability distribution and apply suitable probability distribution models for the given scenario.
2. 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.
3. Use statistical methodology and tools in the sampling analysis.
4. Compute the confidence intervals for the mean of the population by using different tests.
5. Apply the ANOVA test related to engineering problems.

Evaluation Details:

EvaluationType		Component	Max Marks	Marks Reducedto	Min. Marks	Evaluation Details
Theory Component	Internal Assessment Tests (IAT)	IAT-1	25	25	20	Average of two IATs, Scaled down to25marks
		IAT-2	25			
	Comprehensive Continuous Evaluations (CCE)	CCE-1	25	25		Any two Assessmentmethodsasper22OB4.2ofregulations. Averageof two CCEs, scaleddownto 25 marks
		CCE-2	25			
	TotalCIE -Theory			**50**	**20**	
SEE			100	**50**	**18**	Conductedfor100marks Andscaled downto 50.
CIE + SEE				**100**	**40**	

Suggested Learning Resources:

Text Books:

1. **B.S.Grewal**:"HigherEngineeringMathematics",Khannapublishers,44thEd.2021.
2. **RonaldE.Walpole,Raymond H Myers, SharonLMyers & KeyingYe** "Probability & Statisticsfor 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:

4. **ErwinKreyszig**,"Advanced Engineering Mathematics", John Wiley & Sons,9thEdition,2006.
5. **Peter Bruce,AndrewBruce & PeterGedeck** "Practical Statistics for Data Scientists" O' Reilly Media, Inc., 2nd edition **2020**.
6. **G Haribaskaran** "Probability,Queuing Theory & ReliabilityEngineering",LaxmiPublication, Latest Edition, 2006.
7. **Irwin Miller & Marylees Miller,**JohnE.Freund's "Mathematical Statistics withApplications "Pearson. Dorling Kindersley Pvt.Ltd.India, 8th edition, 2014.
8. **SC Gupta and VK Kapoor**, "Fundamentals of Mathematical Statistics",S Chandand Company,Latest edition.
9. **Robert V.Hogg, Joseph W.McKean & AllenT.Craig**."Introduction to Mathematical Statistics", Pearson Education 7thedition, 2013.
10. **Jim Pitman**.Probability,Springer-Verlag,1993.
11. **Sheldon M. Ross,** "Introduction to Probability Models"11th edition.Elsevier,2014.

12. **A.M.YaglomandI.M.Yaglom**,"Probability and Information".D.Reidel PublishingCompany. Distributed by Hindustan Publishing Corporation (India) Delhi,1983.
13. **P.G.Hoel,S.C.PortandC.J.Stone**,"IntroductiontoProbabilityTheory",UniversalBo okStall, (Reprint), 2003.
14. **S.Ross**,"A First Course in Probability", Pearson EducationIndia,6th Ed.,2002.
15. **W.Feller**,"An Introduction to Probability Theory and its Applications ",Vol.1,Wiley, 3rdEd., 1968.
16. **N.P.Bali and Manish Goyal**,A Text book of Engineering Mathematics, LaxmiPublications, Reprint, 2010.
17. **VeerarajanT**,Engineering Mathematics(for semester III),TataMcGraw-Hill,NewDelhi,2010.

E-Resources:

- http://.ac.in/courses.php?disciplineID=111
- http://www.class-central.com/subject/math(MOOCs)
- http://academicearth.org/
- VTUe-ShikshanaProgram
- VTUEDUSATProgram

Activity-BasedLearning(SuggestedActivitiesinClass)/PracticalBasedlearning

- Quizzes
- Assignments
- Seminars

CO- PO Mapping :

Course Outcomes	PO 1	PO 2	PO 3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
23MATS31.1	3	3	1	-	-	-	-	-	-	-	-	-
23MATS31.2	3	3	2	-	-	-	-	-	-	-	-	-
23MATS31.3	3	3	-	-	-	-	-	-	-	-	-	-
23MATS31.4	3	3	-	-	-	-	-	-	-	-	-	-
23MATS31.5	2	3	1	-	-	-	-	-	-	-	-	-

Level3- HighlyMapped, Level 2-ModeratelyMapped,Level1-LowMapped,Level 0- NotMapped

Data Structures and Applications

Course Code	**23ISI32**	**CIE Marks**	**50**
Teaching Hours/Week (L: T: P: S)	**3:0:2:0**	**SEE Marks**	**50**
Total Hours of Pedagogy	**40 hours Theory 10 hours Laboratory**	**Total Marks**	**100**
Credits	**04**	**Exam Hours**	**03**

Course objectives:

This course will enable students to:

- Explain 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.

1. Lecture method (L) does not mean only traditional lecture method, but different type of teachingmethods 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 skillssuch 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 theirowncreative ways to solve them.
7. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve thestudents' 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 postfixexpression.

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; Basicoperations: 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 he 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: *USN, Name, Avg_Marks* 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 Datawith the fields: *SSN, Name, Dept etc.* 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: Apply the basic concept of linear and nonlinear data structures.

CO2: Analyze data structure operations for a various problem.

CO3: Design and develop solutions using the operations of linear and nonlinear data structures for agiven problem specification

CO4: Conduct practical experiments for demonstrating the operations of different data structures.

CO5: Work in team/individual and Demonstrate effectively on data structures implementation and visualization.

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 andScaled 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://ww.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 Mapping:

POS / COs	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	--	--	--	--	--	--	--	--	--	--	--	2	--	--
CO2	--	3	--	--	2	--	--	--	--	--	--	--	3	--	--
CO3	--	--	3	--	--	--	--	--	--	--	--	--	2	--	--
CO4	--	--	--	3	2	--	--	--	--	--	--	--	--	2	2
CO5	--	--	--	--	2	--	--	--	2	2	1	1	--	1	2

CO-PO Mapping Justification:

CO1: Apply the basic concept of linear and nonlinear data structures.

- PO 1 (Engineering Knowledge): Mapping strength 3. This CO is fundamental to understanding basic data structures, which is a key aspect of engineering knowledge.
- PSO 1 (Professional Skills): Mapping strength 2. Understanding linear and nonlinear data

structures contributes to developing algorithms and writing application programs in IT.

CO2: Analyze data structure operations for various problems.

- PO 2 (Problem Analysis): Mapping strength 3. Analyzing data structure operations is essential for problem analysis.
- PO 5 (Modern Tool Usage): Mapping strength 2. Analyzing operations may require modern tools for data structure analysis and simulation.
- PSO 1 (Professional Skills): Mapping strength 3. Data structure analysis is key to developing efficient algorithms in IT applications.

CO3: Design and develop solutions using the operations of linear and nonlinear data structures for a given problem specification.

- PO 3 (Design/Development of Solutions): Mapping strength 3. This CO directly involves designing solutions, which aligns with PO 3.
- PSO 1 (Professional Skills): Mapping strength 2. Designing algorithms and solutions based on data structures is a key aspect of professional skills in IT.

CO4: Conduct practical experiments for demonstrating the operations of different data structures.

- PO 4 (Investigation of Complex Problems): Mapping strength 3. This CO involves experimentation, which aligns with the investigation of complex data structure problems.
- PO 5 (Modern Tool Usage): Mapping strength 2. Practical experiments require modern tools like programming environments and software.
- PSO 3 (Foundation of Mathematical Concepts): Mapping strength 2. Practical experiments build on mathematical foundations and promote higher studies and research skills.

CO5: Work in a team/individual and demonstrate effectively on data structures implementation and visualization.

- PO 5 (Modern Tool Usage): Mapping strength 2. Effective implementation and visualization of data structures require the use of modern software tools.
- PO 9 (Individual and Teamwork): Mapping strength 2. This CO emphasizes collaboration and teamwork in the demonstration of implementations.
- PO 10 (Communication): Mapping strength 2. Demonstrating data structure implementation involves effective communication.
- PO 11 (Project Management and Finance): Mapping strength 1. Understanding project management, can be relevant to larger team projects.
- PO 12 (Life-Long Learning): Mapping strength 1. Demonstration of implementations and continuous learning skills.
- PSO 2 (Problem-Solving Skills): Mapping strength 1. Implementing and demonstrating data structures can contribute to solving societal problems by fostering teamwork and ethical practice.
- PSO 3 (Foundation of Mathematical Concepts): Mapping strength 2. Visualization and implementation require practical knowledge grounded in mathematical concepts.

Object Oriented Programming Using Java

Course Code	**23ISI33**	**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 bulit-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 Extarction, String Comparision (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 ofa 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 allowusers 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 `Arithmetic Exception` for division by zero and `Input Mismatch Exception` 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 specifiedindex, and comparing strings for equality.

Course Outcomes:

CO1: Apply object-oriented programming principles to design, develop, and implement robust Javaapplications.

CO2: Design comprehensive Java applications by using inheritance, interfaces, exception handling, and multi-threading to ensure robust functionality and effective data management.

CO3: Analyse the working of object-oriented principles using java to evaluate and improve the efficiency androbustness of software applications.

CO4: Develop fully functional Java applications by utilizing object-oriented concepts for solving real-worldproblems.

CO5: Demonstrate Java programming skills by developing and experimenting with code.

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

Reference Books:

1. E Balagurusamy, "Programmingwith Java-A primer", 2nd Edition, Tata McGrawHillcompanies,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	PO 10	PO 11	PO 12	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	**23IST34**	**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:

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 implicates, the prime implicant chart, Petricks 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, Scaleddown 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.(**Chapter1:**1.3,1.4,1.6 **Chapter 2:** 2.2,2.3,2.4,2.5 **Chapter 4:**
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)
5. 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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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	**23ISL35**	**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:

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:

- 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:

CO1 Review the current state of Art and trends in their area of interest in current technologies andidentify a suitable problem in their chosen subject domain with justification.

CO2 Survey the available research literature/documents for the tools and techniques to be used.

CO3 Examine the functional, non-functional, and performance requirements of their chosen problemdefinition.

CO4 Design system architecture and different components and develop all the system componentsusing appropriate tools and techniques.

CO5 Work effectively in a team and use good project management practices and defend the projectwork as a team.

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	**23IST36A**	**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 S kill 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.** Apply the knowledge of partition concepts to resolve IT services and storage related issues.
- **CO2.** Design and configure different servers based on the company requirements
- **CO3.** Analyze and evaluate the impact of new and current IT services to an organization
- **CO4.** Develop the network resources and security policy of an organizations
- **CO5.** Implement various system administration related tasks automatically.

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:

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

6.James A O'Brien, George M. Marakas, Management Information Systems, 10th Edition, McGraw-Hill Irwin Publisher, 2011.

7.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					1		2	2		2
CO2	1	1	2	2	3					2	1	2	2		2
CO3	2	2	2	2	2					2		2	2		2
CO4	2	1	1	1	2	2				2	1	2	2	1	2
CO5	1	3	1	1	2					2	1	2	2	1	2
Avg	**1.6**	**2.0**	**1.8**	**1.8**	**2.0**	**0.4**				**1.8**	**0.6**	**2.0**	**2.0**	**0.4**	**2.0**

Business Process Fundamentals

Course Code:	23IST36B	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: Explain the basics of business and economy

CLO 2: Learn the basics ethics of entrepreneurship and how to start a business.

CLO 3: Analyze 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

Textbook1: Chapter 1 & 2 **08 hours**

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 the14th week of the semesterComprehensive Continuous Evaluation Tests each of **25Marks**

First test at the end of 4th week of the semester

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 syllabusportion 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 TechLibraries, 2016.

Reference Books:

1. S.S. Kanaka, Entrepreneurial Development, S-Chand Fourth Edition.
2. Robert D. Hisrish 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. Scarboraugh, 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	2	-	-
CO2	2	-	-	-	-	-	3	3	-	-	2	2	-	-	-
CO3	2	-	-	-	-	-	-	3	3	-	3	2	-	1	-
CO4	2	2	-	-	-	-	-	-	3	-	3	2	-	-	3
CO5	2	-	-	-	-	-	-	3	3	-	3	3	-	-	-

Supply Chain Management

Course Code	**23IST36C**	**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 costreduction 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 andOperation", 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, CengageLearning,1/e
- Donald J Bowersox, Dand J Closs, M Bixby Coluper, "Supply Chain LogisticsManagement", 2nd edition, TMH,2008.
- Wisner, Keong Leong and Keah-Choon Tan, "Principles of Supply Chain Management ABalanced 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	**23IST36D**	**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

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/106/106/106106177/
3. https://www.tutorialspoint.com/human_computer_interface/index.htm

CO- PO-PSO Mapping:

POs / COs	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	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 & Responsibility

Course Code	**23UHV37**	CIE Marks	**100**
Teaching Hours/Week (L:T:P: S)	0:0:2:0	SEE Marks	------
Total Hours of Pedagogy	30 hour Practical Session	Total Marks	**100**
Examination nature (No SEE – Only CIE)	For CIE Assessment - Activities Report Evaluation by College NSS Officer / HOD / Sports Dept / Any Dept.		
Credits	01 - Credit		

Course objectives: The course will enable the students to:

1. Provide a formal platform for students to communicate and connect to the surrounding.
2. create a responsible connection with the society.
3. Understand the community in general in which they work.
4. Identify the needs and problems of the community and involve them in problem –solving.
5. Develop among themselves a sense of social & civic responsibility &utilize their knowledgein finding practical solutions to individual and community problems.
6. Develop competence required for group-living and sharing of responsibilities & gain skillsin mobilizing community participation to acquire leadership qualities and democratic attitudes.

General Instructions - Pedagogy :

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

1. In addition to the traditional lecture method, different types of innovative teaching methods may be adopted sothat the activities will develop students' theoretical andapplied social and cultural skills.
2. State the need for activities and its present relevance in the society and Provide real-life examples.
3. Support and guide the students for self-planned activities.
4. You will also be responsible for assigning homework, grading assignments and quizzes,and documenting

   students' progress in real activities in the field.
5. Encourage the students for group work to improve their creative and analytical skills.

Contents :

The course is mainly activity-based that will offer a set of activities for the student that enablesthem to connect with fellowhuman beings, nature, society, and the world at large.

The course will engage students for interactive sessions, open mic, reading group, storytelling sessions, and semester-longactivities conducted by faculty mentors.

In the following a set of activities planned for the course have been listed:

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. **6 hrs**

Module-II

Heritage walk and crafts corner:

Heritage tour, knowing the history and culture of the city, connecting to people around throughtheir history, knowing the city and its craftsman, photo blog and documentary on evolution andpractice of various craft forms. 6 hrs

Module-III

Organic farming and waste management:

Usefulness of organic farming, wet waste management in neighboring villages, and implementation in the campus. 6 hrs

Module-IV

Water conservation:

Knowing the present practices in the surrounding villages and implementation in the campus, documentary or photo blog presenting the current practices. 6 hrs

Module-V

Food fest:

City's culinary practices, food lore, and indigenous materials of the region used in cooking/ foodfestivals. 6 hrs

Course Outcomes:

The students will be able to :

1. Create a responsible connection with the society to address real-world societal

challenges,including issues of corporate social responsibility (CSR) and sustainability.

2. Identify the needs and problems of the community and involve them in problem –solving.
3. Implement practices that promote sustainability in personal and professional life,contributing to long-term societal welfare.
4. Work collaboratively in teams to solve complex social problems, demonstrating teamwork,empathy, and collective responsibility.
5. Demonstrate the implemented idea through presentation and report

E-Resources:

https://ffreedom.com/english/about-app?gad_source=1&gclid=CjwKCAjw74e1BhBnEiwAbqOAjBOnuaO-a6CMVTjwubTiz2e13DWkkZ7ZpwX8PELXz5NRhe2a5cG2dBoCjwQQAvD_BwE
https://prasarbharati.gov.in/dd-kisan-homepage/

Co-Po Mapping

PO/CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2
CO1							3	3				
CO2						3						
CO3							3					3
CO4								2	3	3		
CO5									3	3		
Avg						**3**	**3**	**3**	**3**	**3**	**-**	**3**

ACTIVITIES:

Jamming session, open mic, and poetry: Platform to connect to others. Share the stories withothers. 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 immersionwith 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 conversional will culminate in developing an actual, idea for problem-based intervention, basedon 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 beevaluated 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 59Unsatisfactory and fail : <39

Special Note :

NO SEE – Semester End Exam – Completely Practical and activities based evaluation

Pedagogy – Guidelines :

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

Sl No	Topic	Group size	Location	Activity execution	Reporting	Evaluation Of the Topic
1.	**Plantation andadoption 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 submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics Of scheme and syllabus by Faculty
2.	**Heritage walkand crafts corner:**	May be individual or team	Temples / monumentalplaces / 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 rubrics Of scheme and syllabus by Faculty

3.	**Organic farmingand waste management:**	May be individu alor team	Farmers land / parks /Villages visits / roadside/ community area / College campusetc…..	Group selection / proper consultation / Continuous monitoring / Information board	Report should be submitte d by individu al to the concerne d evaluation authority	Evaluation as per the rubricsOf scheme and syllabus by Faculty
4.	**Water conservatio n:** & conservation techniques	May be individu alor team	Villages/ City Areas /Grama panchayat/ public associations/Govern me nt Schemes officers / campus etc…..	site selection / proper consultation/Cont in uous monitoring/ Information board	Report should be submitted byindividual to the concerned evaluation authority	Evaluation as per the rubricsOf scheme and syllabus by Faculty
5.	**Food fest: Practices insociety**	May be individu alor team	Villages/ City Areas /Grama panchayat/ public associations/Govern me nt Schemes officers/ campus etc…..	Group selection / proper consultation / Continuous monitoring / Information board	Report should be submitted byindividual 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 assignedactivity progressand its completion.
- At last consolidated report of all activities from 1st to 5th, compiled report should be submitted asper the instructionsand scheme.

Assessment Details for CIE (both CIE and SEE)

Weightage	CIE – 100%	• 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 NSSofficer of the institute. • Finally the consolidated marks sheet should be sent to the university and also to be madeavailable 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 eachsemester	100 Marks	
For each activity, 20 marks CIE will be evaluated for IA marks at the end of semester, Report andassessment copy should be made available in the department.		
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.		

Unified Modeling Language Tools - STAR UML

Course Code	**23ISL38A**	**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:

- Master Object-Oriented Principles and UML Fundamentals for a Strong Foundation
- Attain a comprehensive grasp on UML application and design diagram utilization
- Acquire knowledge of iterative, incremental, and development processes
- Examine 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 Activitiewhich 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.

CO2: Develop the expertise needed to employ UML as a powerful tool for precise and effective communication in theanalysis and design phases of software development.

CO3: Gain competency in understanding and applying iterative, incremental and agile development processes.

CO4: Develop practical proficiency in Extreme Programming principles through in-depthstudy and hands-onapplication

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

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 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**
CO 1	**3**	**3**	**3**	-	**1**	-	-	-	-	-	-	-	-	-	-
CO 2	**3**	**3**	**3**	-	**1**	-	-	-	-	-	-	-	-	-	-
CO 3	**3**	**3**	**3**	-	**1**	-	-	-	-	-	-	-	-	-	-
CO 4	**3**	**3**	**3**	-	**1**	-	-	-	-	-	-	-	-	-	-
CO 5	**3**	**3**	**3**	-	**1**	-	-	-	-	-	-	-	-	-	-
Avg.	**3**	**3**	**3**	-	**1**	-	-	-	-	-	-	-	-	-	-

Introduction to MATLAB / SCILAB

Course Code	23ISL38B	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

SCILAB stands for ***SCIENTIFIC LABORATORY*** is an *open-source alternative* to MATLAB. SCILAB is free and open-source software for numerical computation providing a powerful computing environment for engineering and scientific aplications. SCILAB software is used for performing numerical computation. It is used in all major scientific areas such as space, aeronautics, defense, finance, etc.

Course Objectives:

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.

Course Content:

Programs/Assignment on:

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	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
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	23ISL38C	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:

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>

1. Using MS WORD formatting tools like font styles, sizes, colors, alignment, and linespacing.
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, andSmartArt.
4. Introduce basic arithmetic operations, SUM, AVERAGE, MAX, MIN, etc.

<u>Microsoft PowerPoint:</u>

5. Creating Presentations: Cover slide layouts, inserting text, images, shapes, and slide transitions.
6. Animation and Multimedia: Practice adding animations, audio, video, and customizingtiming.

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	**23ISL38D**	**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:

- 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:
  (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:

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 permissionsof 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 themin 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**
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**