IV SEM

(2018-19)

Forth Semester (Regular)									
S.No.	Course Code	Course		Contact Hours L – T - P	Total Contact Hours/week	Total credits	Marks		
							CIE	SEE	Total
1	18MATIS41	Discrete Mathematical Structures and Graph Theory	BS	4 – 0 – 0	4	4	50	50	100
2	18IS42	Operating System	PC	4 – 0 – 0	4	4	50	50	100
3	18IS43	Database Management System	PC	4 – 0 – 0	4	4	50	50	100
4	18IS44	Design and Analysis of Algorithm	PC	3 – 0 – 0	3	3	50	50	100
5	18IS45	Software Engineering	PC	3 – 0 – 0	3	3	50	50	100
6	18ISL46	Python Programming (Integrated)	PC	2 – 0 – 2	4	3	25	25	50
7	18ISL47	Algorithms Lab	LAB	0 – 0 – 3	3	1.5	25	25	50
8	18ISL48	Database Application Lab	LAB	0 – 0 – 3	3	1.5	25	25	50
9	18IS49	Kannada	HS	2 – 0 – 0	2	MNC	25	_	25
		Total			30	24	350	325	675

Forth Semester (Diploma)									
S.No.	Course Code	Course		Contact Hours	Total Contact Hours/week	Total credits	Marks		
				L – T - P			CIE	SEE	Total
1	18DMATIS41	Graph Theory and Discrete Mathematical Structures	BS	4 – 0 – 0	4	4	50	50	100
2	18IS42	Operating System	PC	4 – 0 – 0	4	4	50	50	100
3	18IS43	Database Management System	PC	4 – 0 – 0	4	4	50	50	100
4	18IS44	Design and Analysis of Algorithm	PC	3 – 0 – 0	3	3	50	50	100
5	18IS45	Software Engineering	PC	3 – 0 – 0	3	3	50	50	100
6	18ISL46	Python Programming(Integrated)	PC	2 – 0 – 2	4	3	25	25	50
7	18ISL47	Algorithms Lab	LAB	0 – 0 – 3	3	1.5	25	25	50
8	18ISL48	Database Application Lab	LAB	0 – 0 – 3	3	1.5	25	25	50
9	18IS49	Kannada	HS	2 – 0 – 0	2	MNC	25	_	25
		Total			30	24	350	325	675

Discrete Mathematical Structures and Graph Theory

(Computer Science / Information Science)

Subject Code:	18MATIS41	**Credits:**	4
Course Type:	BS	**CIE Marks:**	50
Hours/week: L – T – P	4 –0– 0	**SEE Marks:**	50
Total Hours:	50	**SEE Duration:**	3 Hours

Course Learning Objectives (CLOs):

Students should

1. Understand and apply Logic in the field of Computer science.
2. Understand the various Relations and Functions.
3. Understand advanced counting techniques.
4. Get acquainted with basic concepts of Graph Theory and their applications.
5. Get acquainted with elementary Number theory, and their properties for applications in Cryptography.

Prerequisites:

1. Set Theory
2. Power series

3. Binomial Series
4. Basics of Counting

Detailed Syllabus

Unit-I **10 hrs**

Fundamentals of Logic: Laws of Logic, Logical Implication-Rules of Inference. Quantifiers- Universal and Existential Quantifiers, Proofs Techniques: direct, indirect and Contradiction.

Unit –II **10 hrs**

Relations and Functions: Zero-One Matrices and Directed Graphs, Closure and Equivalence Relations and Partitions, Partial Orders, Hasse Diagrams, Lattice, Properties of functions, Composition and Invertible functions.

Unit III **10 hrs**

Advanced Counting Techniques: Sterling Number of second kind, Inclusion and Exclusion, Pigeonhole Principle, Generating Function, Recurrence relations, Solution of Linear homogeneous and non-homogeneous recurrence relations with constant coefficients, Divide and Conquer Algorithms, Merge sort algorithm.

Unit IV **10hrs**

Basic Graph Theory: Definitions and Examples, Subgraphs, Complements and Graph Isomorphism, Connectivity, Euler Trails and Circuits, Planar Graphs, Hamiltonian Paths and Cycles, Coloring, Matching.

Unit V **10 hrs**

Elementary Number Theory and Cryptography: Fields, Modular Arithmetic, Prime Numbers, Fermat's and Euler's theorem. Testing of Primality, Chinese Remainder Theorem. Caesar Encryption/Decryption, RSA Cryptosystem.

Text Books:

1. Kolman, Busby, Ross "Discrete Mathematical Structures", 6th Edition Prentice Hall of India, 2010 onwards.
2. William Stallings "Cryptography and Network Security", Pearson Prentice Hall 6th Edition, 2013 onwards.
5. Kenneth H. Rosen "Discrete Mathematics and its applications", Mc Graw Hill 7th Edition.

Reference Books:

1. Ralph P. Grimaldi, "Discrete and Combinatorial Mathematics", 5th Edition, Pearson Education, 2004 onwards.
2. K. D. Joshi, "Foundations of Discrete Mathematics", 2nd Edition, New Age International Publishers, 2014 onwards.

Course Outcomes (COs): At the end of the course students will be able to:

1. Understand and Apply the Logic of Mathematics in the field of Computer science. [L2, L3]
2. Explain and Analyze Different Relations and Functions. [L2, L3]
3. Discuss basic concepts of Graph Theory and its Use in Computer Science. [L2, L3]
4. Explain the concept of Finite Fields. [L2]
5. Apply Finite Fields to Cryptography. [L3]

	Program Outcome of this course (POs)	**PO No.**
	Students will acquire	
1.	An ability to apply knowledge of mathematics, science and engineering.	**PO1**
2.	Identify, formulate, research literature and analyze complex engineering problems, reaching substantiated conclusions using first principles of mathematics, natural Sciences and Engineering. Sciences	**PO2**
3.	Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities	**PO5**

with an understanding of the limitations.

Course delivery methods	Assessment methods
1. **Black board teaching**	1. **Internal Assessment Tests**
2. **Power point Presentation**	2. **Assignments**
3. **Matlab/Scilab/R lab**	3. **Quizzes**

Scheme of Continuous Internal Evaluation (CIE):

Components	Addition of two IA tests	Average of two assignments /matlab/Scilab activity	Quiz/Seminar /Course project	Total Marks
Maximum Marks: 50	15+15 = 30	10	10	50

Minimum marks required to qualify for SEE to pass: 20 out of 50 marks

Scheme of Semester End Examination (SEE):

It will be conducted for 100 marks of 3 hours duration. It will be reduced to 50 marks for the calculation of SGPA and CGPA.

Minimum marks required in SEE to pass: 40 out of 100 marks

Question paper contains10 questions each carrying 20 marks. Students have to answer FIVE full questions selecting atleast one from each unit.

Operating System (Theory)

Course Code	18CS42/18IS42	**Credits**	4
Course type	PC	**CIE Marks**	50 marks
Hours/week: L-T-P	4-0-0	**SEE Marks**	50 marks
Total Hours:	Lecture = 47Hrs; Tutorial = 0 Hrs Total = 47 Hrs	**SEE Duration**	3 Hours for 100 marks

Course learning objectives

1. To introduce the functions of operating system, design, structure and associated system calls.
2. To study and analyze various scheduling algorithms and process synchronization techniques.
3. To develop an understanding about deadlocks and deadlock recovery techniques.
4. To discuss and realize the importance of memory management techniques.

5. To gain the knowledge of file systems and secondary storage structures.

Pre-requisites: Basic knowledge of computer concepts & programming, Computer Organization.

Unit – I **10 Hours**

Introduction to Operating System: System structures: What operating systems do; Operating System operations; Process management; Memory management; Storage management; Protection and security; Distributed system; Operating System Services; System calls; Types of system calls; Operating System structure; System boot.

Introduction to UNIX File System: Inside UNIX, Internal and External Commands, Command structure.

Case Study: Android Operating System / iOS

Unit – II **09 Hours**

Process Management: Process concept; Process scheduling; Process Scheduling: Basic concepts; Scheduling criteria; Scheduling algorithms.

The Process: Understanding the process, How a process is created, the login shell, init, internal and external commands, ps.

Unit – III **09 Hours**

Process Synchronization: Synchronization: The Critical section problem; Peterson's solution; Semaphores; Classical problems of synchronization.

Deadlocks: Deadlocks: System model; Deadlock characterization; Methods for handling deadlocks; Deadlock prevention; Deadlock avoidance; Deadlock detection and recovery from deadlock.

Unit – IV **09 Hours**

Memory Management: Memory Management Strategies: Background; Swapping; Contiguous

memory allocation; Paging; Virtual Memory Management: Background; Demand paging; Copy-on-write; Page replacement;

Unit – V **10 Hours**

File System: Implementation of File System: File System: File concept; Access methods; Directory structure; File system mounting; File sharing; Protection. Implementing File System: File system structure.

The File System: The parent child relationship, The UNIX file system, Absolute Pathnames, Relative Pathnames, pwd, cd, mkdir, rmdir, cp, rm, mv, cat. **File Attributes:** ls, ls-l, ls-d, file permissions, chmod.

Books

Text Books:

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, "Operating System Principles", Wiley India, 6th edition and onwards.
2. Sumitabha Das: "YOUR UNIX – The Ultimate Guide" , Tata McGraw Hill, 23rd reprint , 2012 and onwards.

Reference Books:

1. Gary Nutt, "Operating System", Pearson Education, 2nd edition and above.
2. Harvey M Deital, "Operating system", Addison Wesley, 2nd edition and above.
3. D.M Dhamdhere, "Operating System", "A concept based Approach", Tata McGraw- Hill, 2nd edition and onwards.
4. Behrouz A. Forouzan and Richard F. Gilberg: "UNIX and Shell Programming ", Cengage Learning, 2005 and onwards.

E-resourses (NPTEL/SWAYAM)

1. **https://onlinecourses.nptel.ac.in/**

Course Outcome (COs)

At the end of the course, the student will be able to	Bloom's Level
1. **Explain** the computer system resources and the role of an operating system in managing those resources.	**L2**
2. **Develop** applications keeping concurrency and synchronization, semaphores, Monitors, sharedmemory, **mutual** exclusion, process scheduling services of general operating system in the mind.	**L3**
3. **Describe and analyze memory** management, file management and secondary Memory Management techniques**.**	**L3**
4. **Discuss** UNIX shell commands for file handling , process control and do the case study on on Android Operating System / iOS.	**L2**

Program Outcome of this course (POs)	**PO No.**

1.	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.	**PO1**
2.	**Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	**PO2**

Course delivery methods	**Assessment methods**
1. Lecture & Board	1. Assignments
2. Power-point Presentation	2. Quizzes
3. Online Videos / Learning	3. Internal Assessment Tests
4. NPTEL / Edusat	4. Course Seminar
5. Class Room Exercises	5. Course Project (Mini project)
	6. Case Studies

Scheme of Continuous Internal Evaluation (CIE):

Components	Addition of two IA tests	Average of two assignments	Quiz/Seminar/Course Project	Total Marks
Maximum marks :50	15+15 = 30	10	10	50
Writing two IA tests is compulsory. Minimum marks required to qualify for SEE : 20 out of 50 marks				

Semester End Examination (SEE):

1. It will be conducted for 3 hours duration and 100 marks. It will be reduced to 50 marks for the calculation of SGPA and CGPA.
2. Minimum passing marks required to be scored in SEE: 40 out of 100 marks
3. Question paper will have 10 questions carrying 20 marks each. Students have to answer FIVE full questions selecting atleast one full question from each unit.

Database Management System(Theory)

Course Code	18CS43/18IS43	**Credits**	4
Course type	PC	**CIE Marks**	50 marks
Hours/week: L-T-P	4 – 0 – 0	**SEE Marks**	50 marks
Total Hours:	Lecture = 48 Hrs; Tutorial = 00 Hrs Total = 48 Hrs	**SEE Duration**	3 Hours for 100 marks

Course learning objectives

1. To discuss and realize the importance of Database Architecture Design notations, ER Modeling, Mapping and Schema design.
2. To gain the knowledge Relational algebra and learn the use of SQL and PL/SQL.

3. To introduce formal database design approach through normalization and discuss various normal forms.
4. To understand the importance of Concurrent Transactions and discuss issues and transaction control algorithms.

Pre-requisites :

- Basic programming concepts.

Unit – I **9 Hours**

Introduction: Introduction to database, Characteristics of Database approach, Advantages of using DBMS approach, Three-schema architecture and data independence.

Entity-Relationship Model: Using High-Level Conceptual Data Models for Database Design; An Example Database Application; Entity Types, Entity Sets, Attributes and Keys; Relationships, Relationship types, Roles and Structural Constraints; Weak Entity Types.

CASE STUDY: ER-Modeling of Airline Reservation System, Hospital Management and Educational Institute.

Unit – II **9 Hours**

Relational Model and Relational Algebra: Relational Model Concepts; Relational Model Constraints and Relational Database Schemas; Update Operations, Dealing with constraint violations; Unary Relational Operations: SELECT and PROJECT; Relational Algebra Operations from Set Theory; Binary Relational Operations: JOIN and DIVISION; Additional Relational Operations.

Unit – III **9 Hours**

Database Design: Informal Design Guidelines for Relation Schemas; Functional Dependencies; Normal Forms Based on Primary Keys; General Definitions of Second and Third Normal Forms; Boyce-Codd Normal Form.

Transaction Processing Concepts: Introduction to Transaction processing, Transaction and System concepts, Desirable properties of Transactions and issues with concurrent transactions.

SELF STUDY: Triggers **1 Hour**

Unit – IV **9 Hours**

SQL :SQL Data Definition and Data Types; Specifying basic constraints in SQL; Schema change statements in SQL; Basic queries in SQL; More complex SQL Queries. Insert, Delete and Update statements in SQL.

Unit – V **9 Hours**

PL/SQL : PL/SQL Block Structure, PL/SQL Variables, PL/SQL Function , PL/SQL Procedure, PL/SQL IF Statement , PL/SQL Loop Statement: PL/SQL WHILE Loop Statement, PL/SQL FOR Loop Statement.

SELF STUDY: PLSQL installation and Programming. **2 Hours**

Text Books:

1. Elmasri and Navathe: Fundamentals of Database Systems, Addison-Wesley, 3rd edition and onwards.
2. Raghu Ramakrishnan and Johannes Gehrke: Database Management Systems, McGraw-Hill, 2nd edition and onwards.

Reference Books::

1. Silberschatz, Korth and Sudharshan: Data base System Concepts, Mc-GrawHill, 3rd edition and onwards.
2. C.J. Date, A. Kannan, S. Swamynatham: A Introduction to Database Systems, Pearson education, 5th edition and onwards.

E Resources:

3. PL/SQL study material.

Course Outcome (Cos)

At the end of the course, the student will be able to	**Bloom's Level**
1. **Apply** the database concepts and design database for given application scenerio.	**L3**
2. **Apply** the concepts of Normalization and design database which eliminates all anomalies.	**L3**
3. **Create** database and develop database programming skills in SQL and PL/SQL.	**L4**
4. **Explain** the issue of concurrency control in transaction processing.	**L2**

Program Outcome of this course (POs)	**PO No.**
1. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	**PO2**
2. **Design/development of solutions:** Design solutions for complex 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.	**PO3**
3. **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.	**PO4**
4. **Communication:** Communicate effectively on complex 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.	**PO10**
5. **Life-long learning:** Recognize the need for, and have the preparation and ability to	**PO12**

engage in independent and life-long learning in the broadest context of technological change.

Course delivery methods	**Assessment methods**
1. Lecture & Board	1. Assignments
2. Power-point Presentation	2. Quizzes
3. Online Videos / Learning	3. Internal Assessment Tests
4. NPTEL / Edusat	
5. Class Room Exercises	4. Course Project (Mini project)
	5. Case Studies

Scheme of Continuous Internal Evaluation (CIE):

Components	Addition of two IA tests	Average of two assignments	Quiz/Seminar/Course Project	Total Marks
Maximum marks :50	15+15 = 30	10	10	50
Writing two IA tests is compulsory. Minimum marks required to qualify for SEE : 20 out of 50 marks				

Semester End Examination (SEE):

1. It will be conducted for 3 hours duration and 100 marks. It will be reduced to 50 marks for the calculation of SGPA and CGPA.
2. Minimum passing marks required to be scored in SEE: 40 out of 100 marks
3. Question paper will have 10 questions carrying 20 marks each. Students have to answer FIVE full questions selecting atleast one full question from each unit.

Design and Analysis of Algorithm(Theory)

Course Code	18CS44/18IS44	**Credits**	3
Course type	PC	**CIE Marks**	50 marks
Hours/week: L-T-P	3 – 0 – 0	**SEE Marks**	50 marks
Total Hours:	Lecture = 40 Hrs; Tutorial = 00 Hrs Total = 40 Hrs	**SEE Duration**	3 Hours for 100 marks

Course learning objectives

1. To bring out the importance of the study of algorithms.
2. To study and analyze time complexity of various algorithms.
3. To discuss various algorithm design techniques.
4. To develop a technique of analyzing and computing the performance of algorithms.
5. To discuss various string matching algorithms.

Pre-requisites: Basic Computer Programming

Unit – I **8 Hours**

Introduction: Fundamentals of Algorithmic Problem Solving, Analysis Framework, Asymptotic Notations and basic efficiency classes, Mathematical Analysis of Non-Recursive and Recursive Algorithms, Brute Force Approaches: Introduction, Selection Sort, linear search.

Self learning topics: Short Tutorial on Recurrence Relations, Bubble Sort(1Hr)

Unit – II **8 Hours**

Algorithm Design Technique-I: Divide and Conquer, Decrease-and-Conquer Transform and Conquer, the General approach and illustration.

Applications of Divide and Conquer technique: Binary Search, Merge Sort, Quick Sort and their performance comparison. Counting Leaf-nodes, Tiling-Game Implementation.

Applications of Decrease and Conquer technique: Insertion Sort, Depth First Search and Breadth First Search. Maze-Game implementation.

Applications of Transform and Conquer: Heaps and Heap Sort, Horner's Rule. Clustering.

Self learning topics: Multiplication of Large Integers and Binary Exponentiation. (2 Hrs)

Unit – III **8 Hours**

Algorithm Design Technique-II: The General Greedy Technique, Illustration with examples**.**

Applications of Greedy method: Kruskal's Algorithm – Minimum-Cost Spanning Trees: Prim's Algorithm, Single Source Shortest Path - Dijkstra's Algorithm, Huffman Trees – Encoding of Data.

Unit – IV **8 Hours**

Algorithm Design Technique-III: Dynamic Programming Definition and Concept Illustration. The General Method,

Applications of Dynamic programming: Warshall's Algorithm – Transitive Closure, Floyd's Algorithm for the All-Pairs Shortest Paths, Knapsack using General Weights and 0/1 Knapsack. Longest Common Difference – Used in implementation of Diff command and polynomial interpolation.

Self learning topics: Computing nCr, the dynamic approach (1 Hr)

Unit – V **8Hours**

Algorithm Design Technique-IV: Backtracking, Branch-and-Bound, String Matching, basics and illustrations.

Applications of backtracking: N - Queens's problem, Hamiltonian Circuit Problem, Sum of Subset –

Problem and its use in public key cryptosystem. Graph coloring problem.

Applications of branch and bound: JobAssignment Problem, Knapsack Problem, Traveling Salesperson Problem. Best First Search used in AI.

Applications string matching: Input Enhancement in String Matching, Horsepool's method, Rabin-Karp Algorithm. Used in Text processing toolkits like nltk.

Self learning topics: Naïve String Matching Algorithm. (1Hr)

Text Books:

1. Anany Levitin, Introduction to The Design & Analysis of Algorithms, Pearson Education 1st edition and onwards.
2. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, Fundamentals of Computer Algorithms Universities Press, 1st edition and onwards.

Reference Books:

1. Kenneth Berman, Jerome Paul, Algorithms, Cengage Learning.
2. Thomas H. Cormen, Charles E. Leiserson, Ronal L. Rivest, Clifford Stein, introduction to Algorithms PHI, 2nd edition and above.
3. R.C.T. Lee, S.S. Tseng, R.C. Chang & Y.T.Tsai: Introduction to the Design and analysis of Algorithms A Strategic Approach, TataMcGraw Hill.
4. Narasimha Karumanchi, Data structures and Algorithms Made Easy, Career Monk Publications, 1st edition and above.

E Resources:

https://onlinecourses.nptel.ac.in/

Course Outcome (COs)

At the end of the course, the student will be able to	**Bloom's Level**
1. **Formulate and Solve** recurrence equation and compute time complexity of recursive and iterative algorithms	L3
2. **Explain** divide ,decrease ,transform and conquer strategy as applied to sorting and analyze the algorithm complexity	L2
3. Apply Dynamic Programming, Greedy approach, to solve a variety of problems.	L3
4. Design and analyze String search algorithms and Compare their time complexities.	L4
5. Apply branch and bound and backtracking approaches to solve a variety of practical problems	L3

	Program Outcome of this course (POs)	PO No.
1.	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.	**PO1**
2.	**Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	**PO2**
3.	**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.	**PO4**

Course delivery methods	Assessment methods
1. Lecture & Board	1. Assignments
2. Power-point Presentation	2. Quizzes
3. Online Videos / Learning	3. Internal Assessment Tests
4. NPTEL / Edusat	4. Course Seminar
5. Class Room Exercises	5. Course Project (Mini project)
	6. Case Studies

Scheme of Continuous Internal Evaluation (CIE):

Components	Addition of two IA tests	Average of two assignments	Quiz/Seminar/Course Project	Total Marks
Maximum marks :50	15+15 = 30	10	10	50
Writing two IA tests is compulsory. Minimum marks required to qualify for SEE : 20 out of 50 marks				

Semester End Examination (SEE):

1. It will be conducted for 3 hours duration and 100 marks. It will be reduced to 50 marks for the calculation of SGPA and CGPA.
2. Minimum passing marks required to be scored in SEE: 40 out of 100 marks
3. Question paper will have 10 questions carrying 20 marks each. Students have to answer FIVE full questions selecting atleast one full question from each unit.

Software Engineering (Theory)

Course Code	18CS45/18IS45	**Credits**	3
Course type	PC	**CIE Marks**	50 marks
Hours/week: L-T-P	3 – 0 – 0	**SEE Marks**	50 marks
Total Hours:	40	**SEE Duration**	3 Hours for 100 marks

Course learning objectives

1. **Recall** the professional & ethical responsibilities and process models of Software Engineering.
2. **Prepare** Test cards and Project schedule models for the given scenarios.
3. **Identify** the requirements and the cost for the development of Software.
4. **Compare** the various software testing processes

Pre-requisites : Knowledge of Basic Programming Language.

Unit – I **8 Hours**

Introduction: Professional Software Development: Software Engineering, Software Engineering Ethics. A Case Study.

Software Process: Software Process models: The Waterfall model – A Case study**,** Incremental development, Reuse- oriented software engineering, Process activities: Software specification, Software design and implementation, Software validation, Coping with Change: Prototyping, Incremental Delivery, Boehm's Spiral Model.

Unit – II **8 Hours**

Requirements Engineering: Functional and non-functional requirements: Functional requirements, non-functional requirements, Case studies, The Software requirements document, Introduction to Requirements specification, Requirements Engineering processes: Requirement Elicitation and Analysis.

Unit – III **8 Hours**

Design Engineering: Context Models, Interaction Models, Design within the Context of Software Engineering ,Design Process and Design Quality, Design Concepts: Abstraction , Architecture, Patterns, Modularity , Information Hiding, Functional Independence, Refinement, Refactoring

Agile Software Development: Agile methods, Plan driven and Agile Development, Introduction to Extreme Programming. Self Study: SCRUM

Unit – IV **8 Hours**

Project Planning: Software pricing, Plan-driven Development: Project Plans, Planning process, Project scheduling: Schedule Representation, Agile Planning, Estimation techniques: Algorithmic Cost Modeling. The COCOMO II Model. Project Duration and Staffing.

Unit – V **8 Hours**

Software Testing: Development Testing: Unit Testing, Choosing Unit Test Cases, Component Testing, System Testing, Test Driven Development, Release Testing, Requirements Based Testing, Scenario Testing, Performance Testing, User Testing. A Demo of Selenium.

Books

Text Books:

1. Ian Sommerville: Software Engineering, Pearson Education, 9th Edition onwards.
2. Rajib Mall, Fundamentals of Software Engineering , 4th Edition onwards PHI Learning Private Ltd.

Reference Books:

1. Roger .S. Pressman: Software Engineering-A Practitioners approach, 6th Edition and above, Tata McGraw Hill, 2007 onwards. (Chapter 9th : 9.1 to 9.3)

2. Pankaj Jalote: An Integrated Approach to Software Engineering, Wiley India, 2009 onwards.

E Resources:

1. **https://onlinecourses.nptel.ac.in/**

Course Outcome (COs)

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

		Bloom's Level
1.	Recall the professional & ethical responsibilities and process models of Software Engineering.	L1,L2
2.	Prepare Test cards and Project schedule models for the given scenarios.	L3
3.	Identify the requirements and the cost for the development of Software.	L2
4	Compare the various software testing processes	L4

	Program Outcome of this course (POs)	**PO No.**
1.	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.	1
2.	Design/development of solutions: Design solutions for complex 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.	3
3.	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	8
4.	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	9
5.	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 projects and in multidisciplinary environments.	11
6.	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.	12

Scheme of Continuous Internal Evaluation (CIE):

Components	Addition of two IA tests	Average of two assignments	Quiz/Seminar/Course Project	Total Marks

Maximum marks :50	15+15 = 30	10	10	50
Writing two IA tests is compulsory. Minimum marks required to qualify for SEE : 20 out of 50 marks				

Semester End Examination (SEE):

1. It will be conducted for 3 hours duration and 100 marks. It will be reduced to 50 marks for the calculation of SGPA and CGPA.
2. Minimum passing marks required to be scored in SEE: 40 out of 100 marks
3. Question paper will have 10 questions carrying 20 marks each. Students have to answer FIVE full questions selecting atleast one full question from each unit.

Python Programming (Integrated Lab)

Course Code	**18CSL46/18ISL46**	**Credits**	3
Course type	PC	**CIE Marks**	25 marks
Hours/week: L-T-P	2-0-2	**SEE Marks**	25 marks
Total Hours:	Lecture = 20 Hrs; Lab= 30 Hrs Total = 50 Hrs	**SEE Duration**	3 Hours for 50 marks

Course learning objectives

1. Gain knowledge about basic Python language syntax and semantics to write Python programs and use concepts such as variables, conditional and iterative execution methods etc.
2. Understand the fundamentals of object-oriented programming in Python, including defining classes, objects, invoking methods,exception handling mechanisms.
3. Understand the principles of inheritance, packages and interfaces.

4. Demonstrate the NumPy and SciPy package for scientific computing and data manipulation.

Pre-requisites : Basics of Object Oriented Programming using C++/Java

Unit - I **8 Hours**

Introduction to Python, use IDLE to develop programs, Basic coding skills, working with data types and variables, working with numeric data, working with string data, Python functions, Boolean expressions, selection structure, iteration structure, Illustrative Programs

Unit - II **8 Hours**

Define and use functions and modules, Basic skills for working with lists, work with a list of lists, work with tuples, get started with dictionaries, An introduction to file I/O, use text files, use CSV files, Handle a single exception, handle multiple exceptions Illustrative programs

Unit - III **8 Hours**

Object Oriented Programming, An introduction to classes and objects, define a class, work with object composition, work with encapsulation, work with inheritance, override object methods, Using SQLite Manager to work with a database, Using Python to work with a database, Creating a GUI that handles an event Illustrative programs

Unit - IV **8 Hours**

NumPy Basics: Arrays and Vectorized Computation: Creating ndarrays, Data Types for ndarrays, Operations between Arrays and Scalars, Basic Indexing and Slicing, Indexing with slices, Boolean Indexing, Transposing Arrays and Swapping Axes.

Unit - V **8 Hours**

SciPy:Optimization and Minimization, Interpolation, Integration, Statistics

Books

Text Books:

1. Michael Urban and Joel Murach, Python Programming, Shroff/Murach, 2016
2. Wes McKinney, Python for Data Analysis, OReilly, 1st Edition, 2012
3. Mark Lutz, Programming Python, O`Reilly, 4th Edition, 2010

Reference Books:

1. SciPy and NumPy, O`Reilly, 1st Edition, 2012

E-resourses

1. NumPy Reference Manual

Course Outcome (COs)

At the end of the course, the student will be able to	Bloom's Level
1. **Explain** basic principles of Python programming language	L2
2. **Implement** object oriented concepts, database and GUI applications.	L3
3. **Implement** basic programs using Numpy and Panda packages	L3

Program Outcome of this course (POs)	**PO No.**
1. **Design/development of solutions:** Design solutions for complex engineering	PO3

	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.	
2.	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.	PO5
3.	**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.	PO12

Course delivery methods	Assessment methods
1. Chalk and board	1. Project
2. PPT	2. Experiments
3. Video lectures	

PART A

List of Experiments

1. Develop and execute an Object Oriented program in Python using basic data structures like arrays and dictionaries.
2. Develop and execute an Object Oriented program in Python to demonstrate inheritance and polymorphism.
3. Develop and execute an Object Oriented program in Python to demonstrate database connectivity.
4. Develop and execute an Object Oriented program in Python using file I/O and exception handling.
5. Develop a program in Python to demonstrate the use of the NumPy package.
6. Develop a program in Python to demonstrate the use of the SciPy package.

PART B

An Individual student needs to formulate a problem definition in consultation with the guide for the Project component and work towards completion after approval. Project report has to be submitted by each student.

Scheme of Continuous Internal Evaluation (CIE):

Components	IA test*	Journal and lab test **and** Project report and intermediate evaluation	Total Marks
Maximum marks :50	30	20	50
*IA test could be two tests each of one hour duration or only one test of 2 hours duration. Submitting Journal/ Project report is compulsory. Minimum marks required to qualify for SEE : 20 out of 50 marks			

Semester End Examination (SEE):

1.	It will be conducted for 50 marks having 3 hours/2 hours duration. It will be reduced to 25 marks for the calculation of SGPA and CGPA.		
2.	Initial write up stating the objectives, methodology and the outcome	10 marks	50 marks
	Presentation (PPT) of the project	15 marks	
	Hardware project: Exhibiting and demonstration of working of project. Software project: Demonstration of the programming capabilities by writing flowchart, algorithm and codesrelated to a section of the project.	25 marks	
3.	Minimum passing marks to be scored in SEE: 20 out of 50 marks		

Algorithms Laboratory

Course Code	18CSL47/18ISL47	**Credits**	1.5
Course type	L2	**CIE Marks**	25 marks
Hours/week: L-T-P	0 – 0 – 3	**SEE Marks**	25 marks
Total Hours:	36	**SEE Duration**	3 Hours for 50 marks

Course learning objectives

1. Illustrate the importance of algorithms in a variety of applications.
2. Illustrate the use of recursive/iterative sorting algorithms in different scenarios.
3. Demonstrate time complexity of various algorithms using various design techniques.
4. Demonstrate efficient algorithms by drawing comparisons.

5. Illustrate the use of algorithms for graph search problems.

Pre-requisites :

- Basic computer science concepts such as procedures, decision statements, and loops.
- Basic data structures such as lists, dictionaries, and hash tables.

List of experiments(Programming language C / Java)

1. Implement Merge Sort algorithm to sort a given set of elements and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n.
2. Implement Quick Sort algorithm and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n.
3. Implement Insertion Sort algorithm and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n.
4. Implement Heap Sort algorithm and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n.
5. From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm.
6. Find the Minimum Cost Spanning Tree of a given undirected graph using Prim’s algorithm.
7. Implement All-Pairs Shortest Paths Problem using Floyd's algorithm.
8. Implement 0/1 Knapsack problem using Dynamic Programming.
9. Find a subset of a given set S = {sl, s2,.....,sn} of n positive integers whose sum is equal to a given positive integer d. For example, if S={1, 2, 5, 6, 8} and d = 9 there are two solutions{1,2,6}and{1,8}. A suitable message is to be displayed if the given problem instance doesn't have a solution.
10. Implement N Queen's problem using Back Tracking.

Text Books:

1. Anany Levitin, Introduction to The Design & Analysis of Algorithms, Pearson Education, 1st edition and onwards.
2. Java, The Complete Reference, Herbert Schildt.

Reference Books::

1. Kenneth Berman, Jerome Paul, Algorithms, Cengage Learning.
2. Thomas H. Cormen, Charles E. Leiserson, Ronal L. Rivest, Clifford Stein, introduction to Algorithms PHI, 2nd edition and onwards.

E Resources:

1. https://onlinecourses.nptel.ac.in/

Course Outcome (COs)

At the end of the course, the student will be able to	Bloom's Level
1. **Identify** and implement an appropriate algorithm design technique for a given problem.	**L1**
2. **Implement** and **Compute** time required for recursive and iterative algorithms.	**L3**
3. **Design** algorithms for specific applications using appropriate techniques.	**L6**
4. **Design** graph search and sorting algorithms.	**L6**

Program Outcome of this course (POs)	PO No.
1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.	**PO1**
2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	**PO2**
3. Design/development of solutions: Design solutions for complex 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.	**PO3**
4. 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.	**PO4**

Assessment methods

1. Regular Journal Evaluation & Attendance Monitoring.

2. Lab Internal Assessment.

Scheme of Continuous Internal Evaluation (CIE):

Components	Attendance/conduct of lab	Journal	Lab project	Total Marks
Maximum marks :25	10	10	5	25
Submission and certification of journal is compulsory to qualify for SEE Minimum marks required to qualify for SEE : 10 out of 25 marks				

Semester End Examination (SEE):

1.	It will be conducted for 50 marks having 3 hours/2 hours duration. It will be reduced to 25 marks for the calculation of SGPA and CGPA.		
2.	Only one experiment to be conducted. In case, there are two parts then one experiment from each part.		
3.	Initial write up(Algorithm/Flowchart/Numerical Analysis/Tracing)	10 marks	50 marks
	Conduct of experiment(s), result and conclusion	20 marks	
	One marks question	10 marks	
	Viva-voce	10 marks	
4.	Viva voce is conducted for individual student and not in group		
5.	Minimum passing marks to be scored in SEE: 20 out of 50 marks		

Database Application Laboratory

Course Code	18CSL48/18ISL48	**Credits**	1.5
Course type	LAB	**CIE Marks**	25 marks
Hours/week: L-T-P	0 – 0 – 3	**SEE Marks**	25 marks
Total Hours:	36	**SEE Duration**	3 Hours for 50 marks

Course learning objectives

1. Gain a good understanding of the architecture and functioning of Database Management Systems as well as associated tools and techniques.
2. Understand and apply the principles of data modeling using Entity Relationship and develop a good database design
3. Apply Normalization techniques to normalize a database.
4. Understand the use of Structured Query Language (SQL) and its syntax.

5. Learn the tools required for graphical user interface design

LAB TERM WORKS:

PART – A

1. Suppose you are given the following requirements for a simple database for the National Hockey League (NHL):
   - the NHL has many teams,
   - each team has a name, a city, a coach, a captain, and a set of players,
   - each player belongs to only one team,
   - each player has a name, a position (such as left wing or goalie), a skill level, and a set of injury records,
   - a team captain is also a player,
   - a game is played between two teams (referred to as host_team and guest_team) and has a date (such as May 11th, 1999) and a score (such as 4 to 2).

   Design a ER-Model for this application scenario using all the standard notations of ER-Model. Apply the ER-to-Relational Rules and normalization to get the relational schema and do the following :
   a. Create the database with all necessary constraints(Primary and Foreign keys)
   b. Populate each table with appropriate data
   c. Execute queries on the tables created.(open ended)
   d. Create graphical user interfaces (GUI) using HTML/PHP/VB.Net/Java

2. Design an ER-Model for an educational institute which is required to record the students attendance and IA performance in all the subjects and inform the same to their parents. The institute will have many department, each with its own faculty and Head of the department. The subjects the students study can be either elective or core. A faculty has to take atleast one subject and atmost 2 subjects and the subjects are not shared. The students take 3 tests and the average is computed by taking average of best two of

   the three scores. The model be designed to record only the CIE marks and not SEE marks. After the ER-Model, map it to relational schema by indentifying Primary and Foreign keys. Normalize and do the following.
   a. Create the database with all necessary constraints(Primary and Foreign keys)
   b. Populate each table with appropriate data
   c. Execute queries on the tables created.(open ended)
   d. Create graphical user interfaces (GUI) using HTML/PHP/VB.Net/Java

3. Consider the schema for airline flight information Database:

FLIGHTS (*no: integer, fromPlace: string, toPlace: string, distance: integer, Departs: date, arrives: date, price: real*)

AIRCRAFT (*aid: integer, aname: string, cruisingrange: integer*)

CERTIFIED (*eid: integer,aid: integer*)

EMPLOYEES (*eid: integer, ename: string, salary: integer*)

Create tables and populate with appropriate values(Atleast 5 records in each table) for the given database.

Write SQL queries to

1. Find the names of aircraft such that all pilots certified to operate them have salaries more than Rs.80,000.
2. For each pilot who is certified for more than three aircrafts, find the eid, ename and the maximum cruising range of the aircraft for which she or he is certified.
3. Find the names of pilots whose salary is less than the price of the cheapest route from Bengaluru to Frankfurt.
4. Find the aids of all aircraft that can be used on routes from Bengaluru to New Delhi

4. Consider the following schema for Order Database:

SALESMAN (*Salesman_id, Name, City, Commission*) CUSTOMER (*Customer_id, Cust_Name, City, Grade, Salesman_id*) ORDERS (*Ord_No, Purchase_Amt, Ord_Date, Customer_id,Saleman_id)*

Create tables and populate with appropriate values(Atleast 5 records in each table) for the given database.

Write SQL queries to

1. Count the customers with grades above Bangalore‘s average.
2. Find the name and numbers of all salesmen who had more than one customer.
3. List all salesmen names and customer names for whom order amount is more than 4000. (Use UNION operation.)
4. Demonstrate the DELETE operation by removing salesman with id 1000. All his orders must also be deleted.

5. Consider the schema for Movie Database:

ACTOR (*Act_id, Act_Name, Act_Gender*)

DIRECTOR (*Dir_id, Dir_Name, Dir_Phone*)

MOVIES (*Mov_id, Mov_Title, Mov_Year, Mov_Lang, Dir_id*)

MOVIE_CAST (*Act_id,Mov_id, Role*)

RATING (*Mov_id, Rev_Stars*)

Create tables and populate with appropriate values(Atleast 5 records in each table) for the given database.

Write SQL queries to

1. List the titles of all movies directed by "Sanjay Leela Bansali".
2. Find the movie names where one or more actors acted in two or more movies.
3. Find the title of movies and number of stars for each movie that has at least one rating and find the highest number of stars that movie received. Sort the result by movie title.
4. Update rating of all movies directed by "Ram GopalVerma" to 5.

PART – B

The students will design and implement a mini project on the lines of part A.

Text Books:

1. Elmasri and Navathe: Fundamentals of Database Systems, Addison-Wesley, 3rd edition and onwards.
2. Raghu Ramakrishnan and Johannes Gehrke: Database Management Systems, McGraw-Hill, 2nd edition and onwards.

Reference Books::

1. Silberschatz, Korth and Sudharshan: Data base System Concepts, Mc-GrawHill, 3rd edition and onwards.
2. C.J. Date, A. Kannan, S. Swamynatham: A Introduction to Database Systems, Pearson education, 5th edition and onwards.

E Resources:

1. PL/SQL study material.

Course Outcome (COs)

At the end of the course, the student will be able to		**Bloom's Level**
1	**Apply** the ER-Modeling concepts,Normalization and design a database accordingly	**L3**
2	**Demonstrate** use of DDL and DML statements	**L3**
3	**Identify and write** SQL statements for the given end user queries	**L3**
4	**Demonstrate** the use of GUI tools	**L3**

Program Outcome of this course (POs)	**PO No.**
1. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	**PO2**
2. **Design/development of solutions:** Design solutions for complex 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,	**PO3**

societal, and environmental considerations.

3. **Modern tool usage:** Create, select, and apply appropriate techniques,resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. **PO5**

Assessment methods

1. Lab Journal
2. Lab Test
3. Demo and Viva

Scheme of Continuous Internal Evaluation (CIE):

Components	Attendance/conduct of lab	Journal	Lab project	Total Marks
Maximum marks :25	10	10	5	25
Submission and certification of journal is compulsory to qualify for SEE Minimum marks required to qualify for SEE : 10 out of 25 marks				

Semester End Examination (SEE):

1.	It will be conducted for 50 marks having 3 hours/2 hours duration. It will be reduced to 25 marks for the calculation of SGPA and CGPA.		
2.	Only one experiment to be conducted. In case, there are two parts then one experiment from each part.		
3.	Initial write up (Algorithm/Flowchart/Numerical Analysis/ Tracing)	10 marks	50 marks
	Conduct of experiment(s), result and conclusion	20 marks	
	One marks question	10 marks	
	Viva-voce	10 marks	
4.	Viva voce is conducted for individual student and not in group		
5.	Minimum passing marks to be scored in SEE: 20 out of 50 marks		

Graph Theory and Discrete Mathematical Structures

(Computer Science / Information Science)

Subject Code:	18DMATIS41	**Credits:**	4
Course Type:	BS	**CIE Marks:**	50
Hours/week: L – T – P	4 –0– 0	**SEE Marks:**	50
Total Hours:	50	**SEE Duration:**	3 Hours

Course Learning Objectives (CLOs):

Students should

1. Understand and apply Logic in the field of Computer science.
2. Understand the various Relations and Functions.
3. Understand advanced counting techniques.
4. Get acquainted with basic concepts of Graph Theory and their applications.

5. Get acquainted with elementary Number theory, and their properties for applications in Cryptography.

Prerequisites:

1. Set Theory
2. Power series
3. Binomial Series
4. Basics of Counting

Detailed Syllabus

Unit-I **10 hrs**

Fundamentals of Logic: Laws of Logic, Logical Implication-Rules of Inference. Quantifiers- Universal and Existential Quantifiers, Proofs Techniques: direct, indirect and Contradiction.

Unit –II **10 hrs**

Relations and Functions: Zero-One Matrices and Directed Graphs, Closure and Equivalence Relations and Partitions, Partial Orders, Hasse Diagrams, Lattice, Properties of functions, Composition and Invertible functions.

Unit III **10 hrs**

Advanced Counting Techniques: Sterling Number of second kind, Inclusion and Exclusion, Pigeonhole Principle, Generating Function, Recurrence relations, Solution of Linear homogeneous and non-homogeneous recurrence relations with constant coefficients, Divide and Conquer Algorithms, Merge sort algorithm.

Unit IV **10 hrs**

Basic Graph Theory: Definitions and Examples, Subgraphs, Complements and Graph Isomorphism, Connectivity, Euler Trails and Circuits, Planar Graphs, Hamiltonian Paths and Cycles, Coloring, Matching.

Unit V **10 hrs**

Elementary Number Theory and Cryptography: Fields, Modular Arithmetic, Prime Numbers, Fermat's and Euler's theorem. Testing of Primality, Chinese Remainder Theorem. Caesar Encryption/Decryption, RSA Cryptosystem.

Text Books:

1. Kolman, Busby, Ross "Discrete Mathematical Structures", 6th Edition Prentice Hall of India, 2010 onwards.
2. William Stallings "Cryptography and Network Security", Pearson Prentice Hall 6th Edition, 2013 ards.
3. Kenneth H. Rosen "Discrete Mathematics and its applications", Mc Graw Hill 7th Edition.

Reference Books:

1. Ralph P Grimaldi, "Discrete and Combinatorial Mathematics", 5th Edition, Pearson Education, 2004 onwards.
2. K. D. Joshi, "Foundations of Discrete Mathematics", 2nd Edition, New Age International Publishers, 2014 onwards.

Course Outcomes (COs): At the end of the course students will be able to:

1. Understand and Apply the Logic of Mathematics in the field of Computer science [L2, L3]
2. Explain and Analyze Different Relations and Functions. [L2, L3]
3. Discuss basic concepts of Graph Theory and its Use in Computer Science. [L2, L3]

4. Explain the concept of Finite Fields. [L2]
5. Apply Finite Fields to Cryptography. [L3]

Program Outcome of this course (POs)	PO No.

Students will acquire

1.	An ability to apply knowledge of mathematics, science and engineering.	**PO1**
2.	Identify, formulate, research literature and analyze complex engineering problems, reaching substantiated conclusions using first principles of mathematics, natural Sciences and Engineering. Sciences	**PO2**
3.	Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.	**PO5**

Course delivery methods	Assessment methods
1. **Black board teaching**	1. **Internal Assessment Tests**
2. **Power point Presentation**	2. **Assignments**
3. **Matlab/Scilab/R lab**	3. **Quizzes**

Scheme of Continuous Internal Evaluation (CIE):

Components	Addition of two IA tests	Average of two assignments /matlab/Scilab activity	Quiz/Seminar /Course project	Total Marks
Maximum Marks: 50	15+15 = 30	10	10	50

Minimum marks required to qualify for SEE to pass: 20 out of 50 marks

Scheme of Semester End Examination (SEE):

1. It will be conducted for 100 marks of 3 hours duration. It will be reduced to 50 marks for the calculation of SGPA and CGPA.
2. **Minimum marks required in SEE to pass:40 out of 100 marks**
3. Question paper contains10 questions each carrying 20 marks. Students have to answer FIVE full questions selecting at least one from each unit.

Communicative Kannada/ Kannada for Communication
(for **Non – Kannadigas,** Common to all branches**)**

Course Code	**18IS49**	**Credits**	MNC
Course type	HS	**CIE Marks**	25 marks
Hours/week: L-T-P	2-0-0	**SEE Marks**	---
Total Hours:	Lecture = 2 Hrs; Tutorial = 0 Hrs	**SEE Duration**	---

	Total = 28 Hrs		

Course learning objectives	
1.	Learners are Non – Kannadigas, so that course will make them to understand thekannada words and to communicate in kannada language.

Unit - I	1 Hours
About Kannada Language and Karnataka State **Vyavaharika Kannada** – Parichaya (Introduction to VyavaharikaKannada)	

Unit - II	8 Hours
Kannada Aksharamale haagu Uchcharane (Kannada Alphabets and Pronunciation): Kannada Aksharamale Kannada stress letters - vattakshara (Ottakashara) Kannada letters Pronunciation – Uchcharane	

Unit - III	8 Hours
Sambhashanegaagi Kannada Padagalu (**Kannada Vocabulary for Communication**): Kannada Vocabulary for Communication	

Unit - IV	8 Hours
Kannada Grammar in Conversations (SambhashaneyalliKannada Vyakarana)	

Unit - V	3 Hours
Activities in Kannada: General Conversations in Kannada with Activities	

Books	
	Text Books:
1.	Vyavaharika Kannada Text Book, Published by Prasaranga,Visvesvaraya Technological University, Belagavi.
	E-resourses :
1.	https://play.google.com/store/apps/details?id=com.englearner.kannadatohindispeaking&hl=en_US
2.	http://www.kannada-praadhikaara.gov.in/docs/KANNADA_ABHIVRUDDHI_PRADHIKARA.pdf

Course Outcome (COs)		
At the end of the course, the student will be able to		Bloom's Level
1.	Spell and Translate in Kannada language	L1,L2

Program Outcome of this course (POs)		PO No.
1.	Communicate effectively with society at large	**10**

Course delivery methods

1. Lectures
2. Presentation
3. Videos

Assessment methods

1. IA tests
2. Presentation
3.

Scheme of Continuous Internal Evaluation (CIE):

Components	Two IA Tests	Assignment/Quiz/Presentation/activity	Total marks
Maximum Marks: 25	10 + 10	5	25
•Writing two IA tests is compulsory. •Minimum marks required: 10 out of 25 marks			

ಆಡಳಿತ ಕನ್ನಡ ಪಠ್ಯಕ್ರಮ

Kannada for Administration (for**Kannadigas,** Common to all branches**)**

Course Code	**18IS49**	**Credits**	MNC
Course type	HS	**CIE Marks**	25 marks

Hours/week: L-T-P	2-0-0	**SEE Marks**	---
Total Hours:	Lecture = 2 Hrs; Tutorial = 0 Hrs Total = 28 Hrs	**SEE Duration**	---

Course learning objectives

ಆಡಳಿತ ಕನ್ನಡ ಭಾಷಾ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:

- ಪದವಿ ವಿದ್ಯಾರ್ಥಿಗಳಾಗಿರುವುದರಿಂದ ಆಡಳಿತ ಕನ್ನಡದ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.
- ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಕನ್ನಡ ಭಾಷೆಯ ವ್ಯಾಕರಣದ ಬಗ್ಗೆ ಅರಿವು ಮೂಡಿಸುವುದು.
- ಕನ್ನಡ ಭಾಷಾ ರಚನೆಯಲ್ಲಿನ ನಿಯಮಗಳು ಮತ್ತು ಕನ್ನಡ ಭಾಷಾ ಬರಹದಲ್ಲಿ ಕಂಡುಬರುವ ದೋಷಗಳು ಹಾಗೂ ಲೇಖನ ಚಿಹ್ನೆಗಳನ್ನು ಪರಿಚಯಿಸುವುದು.
- ಸಾಮಾನ್ಯ ಅರ್ಜಿಗಳು, ಸರ್ಕಾರಿ ಮತ್ತು ಅರೆ ಸರ್ಕಾರಿ ಪತ್ರವ್ಯವಹಾರದ ಬಗ್ಗೆ ಅರಿವು ಮೂಡಿಸುವುದು.
- ಭಾಷಾಂತರ ಮತ್ತು ಪ್ರಬಂಧ ರಚನೆ ಬಗ್ಗೆ ಅಸಕ್ತಿ ಮೂಡಿಸುವುದು.
- ಕನ್ನಡ ಭಾಷಾಭ್ಯಾಸ ಮತ್ತು ಸಾಮಾನ್ಯ ಕನ್ನಡ ಹಾಗೂ ಆಡಳಿತ ಕನ್ನಡದ ಪದಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

Unit - I — 1 Hours

ಅಧ್ಯಾಯ – 1, ಆಡಳಿತ ಕನ್ನಡ – ಒಂದು ಪಕ್ಷಿನೋಟ

Unit - II — 6 Hours

ಅಧ್ಯಾಯ – 2, ಕನ್ನಡ ಭಾಷಾ ಬರಹದಲ್ಲಿ ಕಂಡುಬರುವ ದೋಷಗಳು ಹಾಗೂ ನಿವಾರಣೆಗಳು

ಅಧ್ಯಾಯ – 3, ಲೇಖನ ಚಿಹ್ನೆಗಳು ಮತ್ತು ಅವುಗಳ ಉಪಯೋಗ ಹಾಗೂ ಬಳಕೆಯ ರೀತಿ

Unit - III — 8 Hours

ಅಧ್ಯಾಯ – 4, ಸಾಮಾನ್ಯ ಅರ್ಜಿಗಳು ಮತ್ತು ವಿವಿಧ ರೀತಿಯ ಅರ್ಜಿಗಳ ನಮೂನೆಗಳು

ಅಧ್ಯಾಯ – 5, ಆಡಳಿತ ಪತ್ರವ್ಯವಹಾರ – ವಿವಿಧ ರೀತಿಯ ಅರ್ಜಿಗಳ ನಮೂನೆಗಳು, ಸರ್ಕಾರಿ ಪತ್ರಗಳು ಮತ್ತು ಅರೆಸರ್ಕಾರಿ ಪತ್ರಗಳು, ವೈಯಕ್ತಿಕ ಪತ್ರಗಳು ಮತ್ತು ಮನವಿ ಪತ್ರಗಳು

ಅಧ್ಯಾಯ – 6, ಸರ್ಕಾರದ ಆದೇಶ. ನಡೆವಳಿ. ಅದಿಸೂಚನೆ. ಸುತ್ತೋಲೆಗಳು ಮತ್ತು ಜಾಹೀರಾತು, ಪತ್ರಿಕಾ ಪ್ರಕಟಣೆ ಹಾಗೂ ಟೆಂಡರ್ ಪತ್ರಗಳು

Unit - IV — 8 Hours

ಅಧ್ಯಾಯ – 7, ಭಾಷಾಂತರ ಮಾಡುವುದು, ಸಂಕ್ಷೇಪ್ತ ಪ್ರಬಂಧ ಹಾಗೂ ಪ್ರಬಂಧ ರಚನೆ. ಭಾಷಾಂತರ ಮತ್ತು ಪ್ರಬಂಧದ ಮಾದರಿಗಳು.

ಅಧ್ಯಾಯ – 8, ಕನ್ನಡ ಭಾಷಾಭ್ಯಾಸ, ಕನ್ನಡದ ದೇಶ್ಯ ಪದಗಳು ಮತ್ತು ಕನ್ನಡೀಕರಣಗೊಂಡಿರುವ ಅನ್ಯದೇಶ್ಯ ಪದಗಳು.

Unit - V **5 Hours**

ಅಧ್ಯಾಯ – 9, ಕನ್ನಡ ಮತ್ತು ಕಂಪ್ಯೂಟರ್/ಮಾಹಿತಿ ತಂತ್ರಜ್ಞಾನ

ಅಧ್ಯಾಯ – 10, ಪಾರಿಭಾಷಿಕ ಕನ್ನಡ ಪದಗಳು ಮತ್ತು ತಾಂತ್ರಿಕ / ಕಂಪ್ಯೂಟರ್ ಕನ್ನಡ ಪಾರಿಭಾಷಿಕ ಪದಗಳು

Books

Text Books:

1. ಆಡಳಿತ ಕನ್ನಡ ಪಠ್ಯ ಪುಸ್ತಕ
   ಪ್ರಕಾಶಕರು : ಪ್ರಸಾರಾಂಗ, ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ.

Course Outcome (COs)

At the end of the course, the student will be able to	Bloom's Level
1. Explain, interpret, summarize and Translate in Kannada language for administrative purposes	L1,L2

Program Outcome of this course (POs)	**PO No.**
1. Communicate effectively with society at large	10

Course delivery methods	**Assessment methods**
1. Lectures	1. IA tests
2. Presentation	2. Presentation
3. Videos	3.

Scheme of Continuous Internal Evaluation (CIE):

Components	Two IA Tests	Assignment/Quiz/Presentation/activity	Total marks
Maximum Marks: 25	10 + 10	5	25
•Writing two IA tests is compulsory. •Minimum marks required: 10 out of 25 marks			