IV SEMESTER SYLLABUS

DISCRETE MATHEMATICAL STRUCTURES AND GRAPH THEORY

Sub Code :	**21SCS41**	**IA Marks :**	**50**
Hrs/ Week :	**4**	**Exam Hours :**	**2**
Credits :	**4**	**Exam Marks:**	**50**
Mode of Delivery:	**RM**	**Total Hours :**	**50**

Course Objectives:

- Provide theoretical foundations of computer science to perceive other courses in the programme.
- Illustrate applications of discrete structures: logic, relations, functions, set theory and counting.
- Describe different mathematical proof techniques.
- Illustrate the use of graph theory in computer science.

Course Outcomes:

On Completion of this course the students are able to,

CO1: Use propositional and predicate logic in knowledge representation and truth verification.
CO2: Demonstrate the application of discrete structures in different fields of computer science.
CO3: Solve problems using recurrence relations and generating functions.
CO4: Application of different mathematical proofs techniques in proving theorems in the courses.
CO5: Compare graphs, trees and their applications.

MODULE 1

Fundamentals of Logic: Basic Connectives and Truth Tables, Logic Equivalence – The Laws of Logic, Logical Implication – Rules of Inference. Fundamentals of Logic contd.: The Use of Quantifiers, Quantifiers, Definitions and the Proofs of Theorems.

Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept*.

10 Hours

MODULE 2

Properties of the Integers: The Well Ordering Principle – Mathematical Induction, Recursive Definitions, The division algorithm, The Greatest common divisor.

Fundamental Principles of Counting: The Rules of Sum and Product, Permutations, Combinations – The Binomial Theorem, Combinations with Repetition.

Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept.*

10 Hours

MODULE 3

Relations and Functions: Cartesian Products and Relations, Functions – Plain and One-to- One, Onto Functions. The Pigeon-hole Principle, Function Composition and Inverse Functions.

Relations: Properties of Relations, Computer Recognition – Zero-One Matrices and Directed Graphs, Partial Orders – Hasse Diagrams, Equivalence Relations and Partitions.

Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept.*

10 Hours

MODULE 4

The Principle of Inclusion and Exclusion: The Principle of Inclusion and Exclusion, Generalizations of the Principle, Derangements – Nothing is in its Right Place, Rook Polynomials. **Recurrence Relations:** First Order Linear Recurrence Relation, The Second Order Linear Homogeneous Recurrence Relation with Constant Coefficients.

Teaching Methodology:*: Chalk and talk using PPT and Demo to explain the Concept.*

10 Hours

MODULE 5

Introduction to Graph Theory: Definitions and Examples, Sub graphs, Complements, and Graph Isomorphism, Vertex Degree, Euler Trails and Circuits. **Trees**: Definitions, Properties, and Examples, Routed Trees, Trees and Sorting, Weighted Trees and Prefix Codes.

Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept.*

10 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Solving Challenging Problems/Case Study	Regular mode of Assessment	15
2	One Open Book written Exam at theend of the Module 4	Regular mode of Assessment	10
3	Assignments on Advanced Topics(group of size 2)/individual)	Regular mode of Assessment	10
4	MCQ at the end of each module	2 marks for each Module	10
5	Attendance	As per the guidelines given in the regulations	5
Total			**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Discrete and Combinatorial Mathematics, Ralph P. Grimaldi, 5th Edition, Pearson Education. 2004.

Reference Books:

1. Discrete Mathematics – A Concept based approach, Basavaraj S Anami and Venakanna S Madalli, Universities Press, 2016.

2. Kenneth H. Rosen: Discrete Mathematics and its Applications, 6th Edition, McGraw Hill, 2007.
3. A Treatise on Discrete Mathematical Structures, JayantGanguly, Sanguine-Pearson, 2010.
4. Discrete Mathematical Structures: Theory and Applications, D.S. Malik and M.K. Sen, Thomson, 2004.
5. Discrete Mathematics with Applications, Thomas Koshy, Elsevier, 2005, Reprint 2008.

DESIGN AND ANALYSIS OF ALGORITHMS

Sub Code :	**21SCS42**	**IA Marks :**	**50**
Hrs/ Week :	**3**	**Exam Hours :**	**2**
Credits :	**3**	**Exam Marks:**	**50**
Mode of Delivery:	**RM**	**Total Hours :**	**40**

Course Objectives:

- Analyze the asymptotic performance of algorithms.
- Explain various computational problem solving techniques.
- Apply appropriate method to solve a given problem and describe various methods of algorithm analysis.
- Describe the classes P, NP, and NP Complete.

Course Outcomes:

On Completion of this course the students are able to,

CO1: Estimate the computational complexity of different algorithms using asymptotic analysis.

CO2: Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Derive and solve recurrences describing the performance of divide-and-conquer algorithms

CO3: Describe the greedy paradigm and explain when an algorithmic design situation calls for it.

CO4: Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it.

CO5: Able to describe the classes P, NP, and NP Complete and be able to prove that a certain problem is NP-Complete.

MODULE 1

Introduction: What is an Algorithm?, Algorithm Specification Analysis Framework, Performance Analysis: Space complexity, Time complexity. Asymptotic Notations: Big-Oh notation (O), Omega notation (Ω), Theta notation (Q), and Little-oh notation (o), Mathematical analysis of Non Recursive and recursive Algorithms with Examples

Important Problem Types: Sorting, Searching, String processing, Graph Problems, Combinatorial Problems. Fundamental Data Structures: Stacks, Queues, Graphs, Trees, Sets and Dictionaries. .

Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept*.

08 Hours

MODULE 2

Divide and Conquer: General method, Binary search, Recurrence equation for divide and conquer, Finding the maximum and minimum, Merge sort, Quick sort, Strassen's matrix multiplication, Advantages and Disadvantages of divide and conquer. Decrease and Conquer Approach: Topological Sort.

Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept.*

08 Hours

MODULE 3

Greedy Method: General method, Coin Change Problem, Knapsack Problem, Job sequencing with deadlines. Minimum cost spanning trees: Prim's Algorithm, Kruskal's Algorithm. Single source shortest paths: Dijkstra's Algorithm

Optimal Tree problem: Huffman Trees and Codes, Transform and Conquer Approach: Heaps and Heap Sort.

Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept.*

08 Hours

MODULE 4

Dynamic Programming: General method with Examples, Multistage Graphs, Transitive Closure: Warshall's Algorithm, All Pairs Shortest Paths: Floyd's Algorithm, Optimal Binary Search Trees, Knapsack problem, Bellman-Ford Algorithm, Travelling Sales Person problem.

Teaching Methodology:*: Chalk and talk using PPT and Demo to explain the Concept.*

08 Hours

MODULE 5

Backtracking: General method, N-Queens problem, Sum of subsets problem, Graph coloring, Hamiltonian cycles. Branch and Bound: Assignment Problem, LC Branch and Bound solution, FIFO Branch and Bound solution. NP-Complete and NP-Hard problems: Basic concepts, nondeterministic algorithms, P, NP, NP Complete, and NP-Hard classes.

Teaching Methodology: *Chalk and talk using PPT and Demo to explain the Concept.*

08 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Solving Challenging Problems/Case Study	Regular mode of Assessment	15
2	One Open Book written Exam at theend of the Module 4	Regular mode of Assessment	10
3	Assignments on Advanced Topics(group of size 2)/individual)	Regular mode of Assessment	10
4	MCQ at the end of each module	2 marks for each Module	10
5	Attendance	As per the guidelines given in the regulations	5
Total			**50**

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Introduction to the Design and Analysis of Algorithms, AnanyLevitin:, 2rd Edition, 2009. Pearson.
2. Computer Algorithms/C++, Ellis Horowitz, SatrajSahni and Rajasekaran, 2nd Edition, 2014, Universities Press

Reference Books:

1. Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronal L. Rivest, Clifford Stein, 3rd Edition, PHI.
2. Design and Analysis of Algorithms , S. Sridhar, Oxford (Higher Education)Kenneth H. Rosen: Discrete Mathematics and its Applications, 6th Edition, McGraw Hill, 2007.

DATA BASE MANAGEMENT SYSTEM

Sub Code :	**21SCS43**	**IA Marks :**	**50**
Hrs./ Week :	**3**	**Exam Hours :**	**2**
Credits :	**3**	**Exam Marks:**	**50**
Mode of Delivery:	**PBL**	**Total Hours :**	**40**

Course Objectives:

- Provide a strong foundation in database concepts.
- Provide knowledge regarding database technology and practice.
- Practice SQL programming through a variety of database problems.
- Demonstrate the use of concurrency and transactions in database.
- Design and build database applications for real world problems.

Course Outcomes:

After studying this course, students will be able to:

CO1: Identify, analyze and define database objects on a database using RDBMS

CO2: Identify and analyze enforce integrity constraints on a database using RDBMS

CO3: Use Structured Query Language (SQL) for database manipulation.

CO4: Design and build simple database systems

CO5: Develop application to interact with databases.

MODULE 1

Introduction to Databases: Introduction, Characteristics of database approach, Advantages of using the DBMS approach, History of database applications.

Overview of Database Languages and Architectures: Data Models, Schemas, and Instances. Three schema architecture and data independence, database languages, and interfaces, The Database System environment. **Conceptual Data Modelling using Entities and Relationships:** Entity types, Entity sets, attributes, roles, and structural constraints, Weak entity types, ER diagrams, examples.

08 Hours

MODULE 2

Relational Model: Relational Model Concepts, Relational Model Constraints and relational database schemas, Update operations, transactions, and dealing with constraint violations.

Relational Algebra: Unary and Binary relational operations, additional relational operations (aggregate, grouping, etc.) Examples of Queries in relational algebra.

SQL: SQL data definition and data types, specifying constraints in SQL, retrieval queries in SQL, INSERT, DELETE, and UPDATE statements in SQL, Additional features of SQL.

08 Hours

MODULE 3

SQL : Advances Queries: More complex SQL retrieval queries, Specifying constraints as assertions and action triggers, Views in SQL, Schema change statements in SQL.

Database Application Development: Accessing databases from applications, An introduction to JDBC, JDBC classes and interfaces, SQLJ, Stored procedures, Case study: The internet Bookshop.

Internet Applications: The three-Tier application architecture, The presentation layer, The Middle Tier.

08 Hours

MODULE 4

Normalization: Database Design Theory – Introduction to Normalization using Functional and Multivalued Dependencies: Informal design guidelines for relation schema, Functional Dependencies, Normal Forms based on Primary Keys, Second and Third Normal Forms, Boyce-Codd Normal Form, Multivalued Dependency and Fourth Normal Form, Join Dependencies and Fifth Normal Form. **Normalization Algorithms:** Inference Rules, Equivalence, and Minimal Cover.

08 Hours

MODULE 5

Transaction Processing: Introduction to Transaction Processing, Transaction and System concepts, Desirable properties of Transactions, Characterizing schedules based on recoverability, Characterizing schedules based on Serializability, Transaction support in SQL.

Concurrency Control in Databases: Two-phase locking techniques for Concurrency control, Concurrency control based on Timestamp ordering, Multi version Concurrency control techniques, Validation Concurrency control techniques.

08 Hours

Continuous Internal Assessment

Project Based Learning(PBL) - I

Sl.No	Type of Assessment	Marks	Weight-age
1	Project Assessment (3 Assessment each 10 marks)	30	30
2	IA1	50	10
3	QUIZ- I	10	10
Total			50

Project Based Learning (PBL) - II

Sl. No.	Type of Assessment	Marks	Weight-age
1	Project Assessment (3 Assessment each 10 marks)	30	30
2.	Certification / MOOC	10	10
3.	QUIZ	10	10
Total			50

Scheme of Examination for End Semester Examination of 50 Marks:

PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.

1 Marks x 10 = **10 Marks**

PART B: TWO question to be set from each module.

Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Fundamentals of Database Systems, Ramez Elmasri and Shamkant B. Navathe, 7th Edition, 2017, Pearson.

2. Database management systems, Ramakrishnan, and Gehrke, 3rd Edition, 2014,McGraw Hill.

Reference Books:

1. Silberschatz Korth and Sudharshan, Database System Concepts, 6th Edition, Mc-GrawHill, 2013.
2. Coronel, Morris, and Rob, Database Principles Fundamentals of Design, Implementation and Management, Cengage Learning 2012.

SOFTWARE ENGINEERING

Sub Code :	**21SCS44**	**IA Marks :**	**50**
Hrs/ Week :	**3**	**Exam Hours :**	**2**
Credits :	**3**	**Exam Marks:**	**50**
Mode of Delivery:	**RM**	**Total Hours :**	**40**

Course Objectives:

This course will enable students to:

- Identify ethical and professional issues and explain why they are of concern to software engineers.
- Describe the process of requirements gathering, requirements classification, requirements specification and requirements validation.
- Differentiate system models, use UML diagrams and apply design patterns.
- Discuss the distinctions between validation testing and defect testing.
- Recognize the importance of software maintenance and describe the intricacies involved in software evolution.
- Apply estimation techniques, schedule project activities and compute pricing.
- Identify software quality parameters and quantify software using measurements and metrics.
- List software quality standards and outline the practices involved.
  Recognize the need for agile software development, describe agile methods, apply agile practices and plan for agility.

Course outcomes:

After studying this course, students will be able to:

CO1: Design a software system, component, or process to meet desired needs within realistic constraints.

CO2: Assess professional and ethical responsibility

CO3: Function on multi-disciplinary teams

CO4: Use the techniques, skills, and modern engineering tools necessary for engineering practice

CO5: Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems

MODULE 1

Introduction: Software Crisis, Need for Software Engineering. Professional Software Development, Software Engineering Ethics. Case Studies. **Software Processes**: Models: Waterfall Model, Incremental Model and Spiral Model. Process activities. **Requirements Engineering**: Requirements Engineering Processes. Requirements Elicitation and Analysis**.** Functional and non-functional requirements. The software Requirements Document. Requirements Specification. Requirements validation. Requirements Management.

08 Hours

MODULE 2

System Models: Context models. Interaction models. Structural models. Behavioral models. Model-driven engineering. **Design and Implementation**: Introduction to RUP, Design Principles.

Object-oriented design using the UML. Design patterns. Implementation issues. Open source development.

08 Hours

MODULE 3

Software Testing: Development testing, Test-driven development , Release testing, User testing. Test Automation. **Software Evolution**: Evolution processes. Program evolution dynamics. Software maintenance. Legacy system management.

08 Hours

MODULE 4

Project Planning: Software pricing. Plan-driven development. Project scheduling: Estimation techniques. **Quality management**: Software quality. Reviews and inspections. Software measurement and metrics. Software standards.

08 Hours

MODULE 5

Agile Software Development: Coping with Change, The Agile Manifesto: Values and Principles. Agile methods: SCRUM (Ref "**The SCRUM Primer, Ver 2.0**") and Extreme Programming. Plan-driven and agile development. Agile project management**,** Scaling agile methods.

08 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Solving Challenging Problems/Case Study	Regular mode of Assessment	15
2	One Open Book written Exam at theend of the Module 4	Regular mode of Assessment	10
3	Assignments on Advanced Topics(group of size 2)/individual)	Regular mode of Assessment	10
4	MCQ at the end of each module	2 marks for eachModule	10
5	Attendance	As per the guidelines given in the regulations	5
Total			**50**

Scheme of Examination for End Semester Examination of 50 Marks:
PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.
1 Marks x 10 = **10 Marks**
PART B: TWO question to be set from each module.
Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Ian Sommerville: Software Engineering, 9th Edition, Pearson Education, 2012. (Listed topics only from Chapters 1,2,3,4, 5, 7, 8, 9, 23, and 24)
2. The SCRUM Primer, Ver 2.0, http://www.goodagile.com/scrumprimer/scrumprimer20.pdf

Reference Books:

1. Roger S. Pressman: Software Engineering-A Practitioners approach, 7th Edition, Tata McGraw Hill.
2. Pankaj Jalote: An Integrated Approach to Software Engineering, Wiley India

COMPUTER NETWORK

Sub Code :	**21SCS45**	**IA Marks :**	**50**
Hrs./ Week :	**3**	**Exam Hours :**	**2**
Credits :	**3**	**Exam Marks:**	**50**
Mode of Delivery:	**RM**	**Total Hours :**	**40**

Course Objectives:

- Demonstration of application layer protocols.
- Discuss transport layer services and understand UDP and TCP protocols.
- Explain routers, IP and Routing Algorithms in network layer.
- Disseminate the Wireless and Mobile Networks covering IEEE 802.11Standard.
- Illustrate concepts of Multimedia Networking, Security and Network Management

Course Outcomes:

After studying this course, students will be able to:

CO1: Illustrate basic computer network technology.
CO2: Identify the different types of network topologies and protocols.
CO3: Enumerate the layers of the OSI model and TCP/IP functions of each layer.
CO4: Make out the different types of network devices and their functions within a network.
CO5: Understand the concepts of Multimedia Networking, Security and Network Management.

MODULE 1

Introduction: Data Communications, Networks, Network Types, Internet History, Standards and Administration, Networks Models: Protocol Layering, TCP/IP Protocol suite, The OSI model, Introduction to Physical Layer-1: Data and Signals, Digital Signals, Transmission Impairment, Data Rate limits, Performance, Digital Transmission: Digital to digital conversion (Only Line coding: Polar, Bipolar and Manchester coding)

08 Hours

MODULE 2

Physical Layer-2: Analog to digital conversion (only PCM), Transmission Modes, Analog Transmission: Digital to analog conversion, Bandwidth Utilization: Multiplexing and Spread Spectrum, Switching: Introduction, Circuit Switched Networks and Packet switching.

08 Hours

MODULE 3

Error Detection and Correction: Introduction, Block coding, Cyclic codes, Checksum, Forward error correction, Data link control: DLC services, Data link layer protocols, HDLC, and Point to Point protocol (Framing, Transition phases only).

08 Hours

MODULE 4

Media Access control: Random Access, Controlled Access and Channelization, Wired LANs Ethernet: Ethernet Protocol, Standard Ethernet, Fast Ethernet, Gigabit Ethernet and 10 Gigabit Ethernet, Wireless LANs: Introduction, IEEE 802.11 Project and Bluetooth.

08 Hours

MODULE 5

Other wireless Networks: WIMAX, Cellular Telephony, Satellite networks, Network layer Protocols : Internet Protocol, ICMPv4,Mobile IP, Next generation IP: IPv6 addressing, The IPv6 Protocol, The ICMPv6 Protocol and Transition from IPv4 to IPv6.

08 Hours

Continuous Internal Assessment (CIA) Method:

Sl. No.	Type of Assessment	Mode of Assessment	Marks
1	Solving Challenging Problems/Case Study	Regular mode of Assessment	15
2	One Open Book written Exam at theend of the Module 4	Regular mode of Assessment	10
3	Assignments on Advanced Topics(group of size 2)/individual)	Regular mode of Assessment	10
4	MCQ at the end of each module	2 marks for each Module	10
5	Attendance	As per the guidelines given in the regulations	5
Total			**50**

Scheme of Examination for End Semester Examination of 50 Marks:
PART A: TEN Multiple Choice Questions (MCQs) to be set for **ONE MARK** each.
1 Marks x 10 = **10 Marks**
PART B: TWO question to be set from each module.
Students have to answer **FIVE** full questions. Choosing at least **ONE** full question from each module. 08 Marks x 05 Question = **40 Marks.**

Text Books:

1. Behrouz A. Forouzan, Data Communications and Networking 5E, 5th Edition, Tata McGraw-Hill, 2013. (Chapters 1.1 to 1.5, 2.1 to 2.3, 3.1, 3.3 to 3.6, 4.1 to 4.3, 5.1, 6.1, 6.2, 8.1 to 8.3, 10.1 to 10.5, 11.1 to 11.4, 12.1 to 12.3, 13.1 to 13.5, 15.1 to 15.3, 16.1 to 16.3, 19.1 to 19.3, 22.1 to 22.4)

Reference Books:

1. Alberto Leon-Garcia and Indra Widjaja: Communication Networks - Fundamental Concepts and Key architectures, 2nd Edition Tata McGraw-Hill, 2004.
2. William Stallings: Data and Computer Communication, 8th Edition, Pearson Education, 2007.

DATA BASE MANAGEMENT SYSTEMS LABORATORY

Course Code : 21SCSL46	**IA Marks : 50**
Hours/Week : 1T+2L	**Exam Hours : 3**
Credits : 2	**Exam Marks : 42**
Mode of Delivery: RM	**Total Hours : 42**

Course Objectives:

- Foundation knowledge in database concepts, technology and practice to groom students into well-informed database application developers.
- Strong practice in SQL programming through a variety of database problems.
- Develop database applications using front-end tools and back-end DBMS.

Course Outcomes:

After studying this course, students will be able to:

CO1: Create, Update and query on the database.

CO2: Demonstrate the working of different concepts of DBMS.

CO3: Implement, analyze and evaluate the project developed for an application.

Description (If any):

SQL Programming

- Design, develop, and implement the specified queries for the following problems using Oracle, MySQL, MS SQL Server, or any other DBMS under LINUX/Windows environment.
- Create Schema and insert at least 5 records for each table. Add appropriate database constraints.

Lab Experiments:

1 Consider the following schema for a Library Database:

BOOK(Book_id, Title, Publisher_Name, Pub_Year)

BOOK_AUTHORS(Book_id, Author_Name)

PUBLISHER(Name, Address, Phone)

BOOK_COPIES(Book_id, Branch_id, No-of_Copies)

BOOK_LENDING(Book_id, Branch_id, Card_No, Date_Out, Due_Date)

LIBRARY_BRANCH(Branch_id, Branch_Name, Address)

Write SQL queries to

1. Retrieve details of all books in the library – id, title, name of publisher, authors, number of copies in each branch, etc.
2. Get the particulars of borrowers who have borrowed more than 3 books, but from Jan 2017 to Jun2017.
3. Delete a book in BOOK table. Update the contents of other tables to reflect this data manipulation operation.
4. Partition the BOOK table based on year of publication. Demonstrate its working with a simple query.
5. Create a view of all books and its number of copies that are currently available in the Library.

2 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, Salesman_id)
Write SQL queries to

1. Count the customers with grades above Bangalore's average.
2. Find the name and numbers of all salesman who had more than one customer.
3. List all the salesman and indicate those who have and don't have customers in their cities (Use UNION operation.)
4. Create a view that finds the salesman who has the customer with the highest order of a day.
5. Demonstrate the DELETE operation by removing salesman with id 1000. All his orders must also be deleted.

3 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) Write SQL queries to

1. List the titles of all movies directed by 'Hitchcock'.
2. Find the movie names where one or more actors acted in two or more movies.
3. List all actors who acted in a movie before 2000 and also in a movie after 2015 (use JOIN operation).
4. 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.
5. Update rating of all movies directed by 'Steven Spielberg' to 5.

4 Consider the schema for College Database:
STUDENT(USN, SName, Address, Phone, Gender) SEMSEC(SSID, Sem, Sec)
CLASS(USN, SSID)
SUBJECT(Subcode, Title, Sem, Credits)
IAMARKS(USN, Subcode, SSID, Test1, Test2, Test3, FinalIA) Write SQL queries to

1. List all the student details studying in fourth semester 'C'section.
2. Compute the total number of male and female students in each semester and in each section.
3. Create a view of Test1 marks of student USN '1BI15CS101' in all subjects.
4. Calculate the FinalIA (average of best two test marks) and update the corresponding table for all students.
5. Categorize students based on the following criterion: If FinalIA = 17 to 20 then CAT ='Outstanding'

If FinalIA = 12 to 16 then CAT = 'Average' If FinalIA< 12 then CAT = 'Weak'
Give these details only for 8th semester A, B, and C section students.

5 Consider the schema for Company Database:
EMPLOYEE(SSN, Name, Address, Sex, Salary, SuperSSN, DNo)
DEPARTMENT(DNo, DName, MgrSSN, MgrStartDate)
DLOCATION(DNo,DLoc)
PROJECT(PNo, PName, PLocation, DNo) WORKS_ON(SSN, PNo, Hours)
Write SQL queries to

1. Make a list of all project numbers for projects that involve an employee whose last name is 'Scott', either as a worker or as a manager of the department that controls the project.
2. Show the resulting salaries if every employee working on the 'IoT' project is given a 10 percent raise.
3. Find the sum of the salaries of all employees of the 'Accounts' department, as well as the maximum salary, the minimum salary, and the average salary in this department
4. Retrieve the name of each employee who works on all the projects controlled by department number 5 (use NOT EXISTS operator).
5. For each department that has more than five employees, retrieve the department number and the number of its employees who are making more than Rs.6,00,000.

Continuous Internal Assessment

Sl. No	Type of Assessment	Mode of Assessment	Marks
1	Mini –Project / Solving Challenging Problems	Regular mode of Assessment	10
2	Assessment in each Lab session for 2 marks (10 Lab Sessions)	Regular mode of Assessment using rubrics	20
3	Maintaining the Record Note Book	Regular mode of Assessment	05
4	Viva at the end of each lab session	2 marks for each Module	10
5	Attendance	As per guidelines given in the regulations	05
		Total	**50**

Conduction of Practical Examination:

1. All laboratory experiments (TEN nos) are to be included for practical examination.
2. Students are allowed to pick one experiment from the lot.
3. Strictly follow the instructions as printed on the cover page of answer script
4. Marks distribution: Procedure + Conduction + Viva:12 + 28 +10 = 50
5. Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.

COMPUTER NETWORKS LABORATORY

Course Code : 21SCSL47	**IA Marks : 50**
Hours/Week : 1T+2L	**Exam Hours : 3**
Credits : 2	**Exam Marks : 50**
Mode of Delivery: RM	**Total Hours : 42**

Course Objectives:

- Demonstrate operation of network and its management commands.
- Simulate and demonstrate the performance of GSM and CDMA.
- Implement data link layer and transport layer protocols.

Course Outcomes:

After studying this course, students will be able to:

CO1: Analyze and Compare various networking protocols.

CO2: Demonstrate the working of different concepts of networking.

CO3: Implement, analyze and evaluate networking protocols in NS2 / NS3.

Description (If any):

- For the experiments below modify the topology and parameters set for the experiment and take multiple rounds of reading and analyze the results available in log files. Plot necessary graphs and conclude. Use NS2/NS3.

Lab Experiments:

Part A

1. Implement three nodes point – to – point network with duplex links between them. Set the queue size, vary the bandwidth and find the number of packets dropped.
2. Implement transmission of ping messages/trace route over a network topology consisting of 6 nodes and find the number of packets dropped due to congestion.
3. Implement an Ethernet LAN using n nodes and set multiple traffic nodes and plot congestion window for different source / destination.
4. 4. Implement simple ESS and with transmitting nodes in wire-less LAN by simulation and determine the performance with respect to transmission of packets.
5. Implement and study the performance of GSM on NS2/NS3 (Using MAC layer) or equivalent environment.
6. Implement and study the performance of CDMA on NS2/NS3 (Using stack called Call net) or equivalent environment.

Part B

Implement the following in Java:

1. Write a program for error detecting code using CRC-CCITT (16- bits).
2. Write a program to find the shortest path between vertices using bellman-ford algorithm.
3. Using TCP/IP sockets, write a client – server progr am to make the client send the file name and to make the server send back the contents of the requested file if present.
4. Write a program on datagram socket for client/server to display the messages on client side, typed at the server side.

5. Write a program for simple RSA algorithm to encrypt and decrypt the data.
6. Write a program for congestion control using leaky bucket algorithm.

Continuous Internal Assessment

Sl. No	Type of Assessment	Mode of Assessment	Marks
1	Mini –Project / Solving Challenging Problems	Regular mode of Assessment	10
2	Assessment in each Lab session for 2marks (10 Lab Sessions)	Regular mode of Assessment usingrubrics	20
3	Maintaining the Record Note Book	Regular mode of Assessment	05
4	Viva at the end of each lab session	2 marks for each Module	10
5	Attendance	As per guidelines given in the regulations	05
		Total	**50**

Conduction of Practical Examination:

1. All laboratory experiments (TEN nos) are to be included for practical examination.
2. Students are allowed to pick one experiment from the lot.
3. Strictly follow the instructions as printed on the cover page of answer script
4. Marks distribution: Procedure + Conduction + Viva:12 + 28 +10 = 50
5. Change of experiment is allowed only once and marks allotted to the procedure part to be made zero.

EMPLOYABILITY SKILLS ENHANCEMENT PROGRAMME 2 (ESEP 2)

Sub Code :	**21SQA48**	**IA Marks :**	**50**
Hrs/ Week :	**2**	**SEE Marks :**	**-**
Credits :	**2**	**Total Hours :**	**25**

Course Objectives:

This course enables students to develop their ability to reason by introducing them to elements of formal reasoning. The primary focus will be on recognizing the logical structure of arguments. Topics will include types of statements, symbolism, logical connectives, logical relations, basic deductive inferences, truth tables, validity, invalidity, and soundness. To enhance the problem-solving skills, to improve the basic mathematical skills and to help students who are preparing for any type of competitive examinations. Domain specific training in respective branches with tests

Course Outcomes:

After studying this course, students will be able to:

- Understand the basic concepts of QUANTITATIVE ABILITY
- Understand the basic concepts of LOGICAL REASONING Skills
- Acquire satisfactory competency in use of VERBAL REASONING
- Solve campus placements aptitude papers covering Quantitative Ability, Logical Reasoning and Verbal Ability
- Compete in various competitive exams like CAT, CMAT, GATE, GRE, GATE, UPSC, GPSC etc.

PART - A

Percentages, Simple interest and Compound interest - "a. Percentages as Fractions and Decimals b. Percentage Increase / Decrease c. Simple Interest d. Compound Interest e. Relation Between Simple and Compound Interest f. Finding CI without using formula" **Data interpretation and Data sufficiency -** "a. Data Interpretation – Tables b. Data Interpretation - Pie Chart c. Data Interpretation - Bar Graph d. Data Interpretation - Line Graph e. Data Sufficiency"

Alligation and Mixture, Ratio and Roportion, Partnerships - "a. Basic Cocept of Alligation and Mixture b. concept of mixture containing more than two Ingredients c.Concept and Problem solving technic in Ratio and Proportion d.Partnership "

Permutation, Combination and Probability - "a. Fundamental Counting Principle b. Permutation and Combination c. Computation of Permutation d. Circular Permutations e. Computation of Combination f. Probability g. Total Probability h.Finding Probability without using Combination i. Finding Probability using Pascal Triangle" **Sentence correction -** "a. Subject Verb Agreement. b. Pronoun Reference and Agreement. c. Verb Tense. d. Modifier. e. Parallelism. f. Idioms. g. Comparisons. h. Prepositions. i. Determiners."

PART - B

Operating Systems

DBMS

Computer Networks

Theory of Computation
Software Engineering

Question paper pattern:

- 10 assessment tests will be conducted based on Multiple choice questions.
- Final marks are based on the test marks conducted during the semester.

Reference Books

1. Quantitative abilities by Arun Sharma
2. Quantitative Aptitude for Competitive Examinations by R S Agrawal
3. Verbal and Non-Verbal reasoning by R S Agrawal

INTERNATIONAL CERTIFICATION COURSE ON CURRENT TRENDS-2

Sub Code :	**21SCS40**	**IA Marks :**	**-**
Self Study Hours/Week:	**2**	**SEE Marks :**	**-**
Credits :	**1**	**Total Hours :**	**-**

Course Objectives:

- Exposure to the latest development in the field
- Learn the new skills
- To make the students Industry ready
- To increase the confidence level of students
- To provide additional knowledge

Course Outcomes:

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

CO1: Have exposure on the latest development

CO2: Acquire new skills

CO3: Become Industry ready

CO4: Have more confidence

CO5: Get additional knowledge

About the Course:

- A common Certification Course on current trends will be offered to all the students of the batch.
- The course will be conducted on blended mode.
- At the end of the course, the student has to produce/submit the certificate issued by the certification agency after completing the assessment for the programme.

Assessment Method

- Assessment will be conducted for 2 Hours duration for 50 Marks on completion of the course and based on the marks scored, grading will be done