

**Progressive Education Society's
Modern College of Engineering
Department of Computer Engineering**



Curriculum Booklet

Third Year

2019 Pattern

Semester-I



Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING



Progressive Education Society's
Modern College of Engineering, Shivajinagar, Pune-05.
Department of Computer Engineering

Curriculum Booklet

2019 – Pattern
Class: TE Computer Engineering
Semester: I



Vision of the Institute

"To create a collaborative academic environment to foster professional excellence and ethical values"

Mission of the Institute

- To develop outstanding professionals with high ethical standards capable of creating and managing global enterprises.
- To foster innovation and research by providing a stimulating learning environment.
- To ensure equitable development of students of all ability levels and backgrounds.
- To be responsive to changes in technology, socio-economic and environmental conditions.
- To foster and maintain mutually beneficial partnerships with alumni and industry.

Vision of the Department

- To achieve excellence in the field of computing through quality education.

Mission of the Department

- To develop promising professionals in the field of computing.
- To provide exposure to emerging technologies and inculcate ethics.
- To strengthen association with alumni and industry.



Objectives of the Institute

- To develop infrastructure appropriate for delivering quality education
- To develop the overall personality of students who will be innovators and future leaders capable of prospering in their work environment.
- To inculcate ethical standards and make students aware of their social responsibilities.
- Promote close interaction among industry, faculty and students to enrich the learning process and enhance career opportunities.
- Encourage faculty in continuous professional growth through quality enhancement programs and research and development activities.
- Foster a healthy work environment which allows for freedom of expression and protection of the rights of all stakeholders through open channels of communication

Program Educational Objectives

The graduates of Computer Engineering Department will be,

PEO1: Capable of solving real world problems.

PEO2: Capable of working with multidisciplinary projects.

PEO3: Capable to adapt to changing technologies and life management skills.

PEO4: Able to exhibit professional and ethical responsibilities.

Program Specific Outcomes

Graduate of computer engineering program will demonstrate

- The ability to understand, analyze, develop and evaluate system based on various algorithmic approaches.
- The ability to pursue career in IT industries, to become an entrepreneur and have zest for higher studies.
- The ability to solve problems using engineering principles, tools and techniques.



Program Outcomes

- 1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. Problem analysis:** Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 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.
- 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.
- 5. 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.
- 6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. 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.
- 11. 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.
- 12. 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.



Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING

Departmental Academic Planner: Student Activities

Year: 2021-2022 Editable

Semester: I



Progressive Education Society's
Modern College Of Engineering, Pune-05.

DEPARTMENT OF COMPUTER ENGINEERING

**Departmental Academic Calendar
(Students Activities) (SE to BE)**

Year: 2020-2021

Term: I

Sr. No.	Date	Activity
1.	13/06/20	Time Table display
2.	15/06/20	Registration and commencement of the academic semester. HOD's address.
3.	15/07/2020	Review of First Month Attendance.
4.	16 – 20/07/2020	Remedial Actions to be taken for low attendance category students and its follow-up.
5.	15/08/2020	Independence Day Celebration
6.	16/08/2020	Review of second month attendance.
7.	16//09/2020	Review of third month attendance.
8.	23-28/09/2020	End Term Feedback from Students.
9.	04/10/2020	Display of Submission Schedule.
10.	01 - 12/10/20	Mock Practical / Oral Exams and Final submission.
11.	14/10/2020	Final attendance review (Theory + Practical) (IV th).
12.	*16/10/20	Term End.
13.	*18/10/20 - 05/11/20	University Practical/Oral Exam.
14.	*14/11/20 - 07/12/20	University Theory Exam.
15.	*16/12/20	Second Term Commencement.

* Subject to Change as per the guideline from university.

**Individual staff can take more than one test as per their assessment tool planner.



S. A. Itkar
Prof. Dr. Mrs. S.A.Itkar
(H.O.D.ComputerEngg.)

Note: - .Individual staff can take more assessment test as per their assessment tool planner.

- SPPU Examination will be scheduled as per SPPU notification.

(Prof. Dr. Mrs. S.A. Itkar)
HOD



Course Structure

Savitribai Phule Pune University Third Year of Computer Engineering (2019 Course) <small>me</small> (With effect from Academic Year 2021-22)														
Semester V														
Course Code	Course Name	Teaching Scheme (Hours/week)			Examination Scheme and Marks						Credit Scheme			
		Lecture	Practical	Tutorial	Mid-Sem	End-Sem	Term work	Practical	Oral	Total	Lecture	Practical	Tutorial	Total
310241	Database Management Systems	03	-	-	30	70	-	-	-	100	03	-	-	03
310242	Theory of Computation	03	-	-	30	70	-	-	100	-	-	-	03	
310243	Systems Programming and Operating System	03	-	-	30	70	-	-	100	-	-	-	03	
310244	Computer Networks and Security	03	-	-	30	70	-	-	100	-	-	-	03	
310245	Elective I	03	-	-	30	70	-	-	100	-	-	-	03	
310246	Database Management Systems Laboratory	-	04	-	-	-	25	25	-	50	-	-	02	
310247	Computer Networks and Security Laboratory	-	02	-	-	-	25	-	25	50	-	01	01	
310248	Laboratory Practice I	-	04	-	-	-	25	25	-	50	-	02	02	
310249	Seminar and Technical Communication	-	-	01	-	-	50	-	-	50	-	01	01	
Total		15	10	01	150	350	125	50	25	700	15	05	01	21
310250	Audit Course 5												Grade	



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

		Total Credit	15	05	01	21
310245 Elective I Options: 310245(A) Internet of Things and Embedded Systems 310245(B) Human Computer Interface 310245(C) Distributed Systems 310245(D) Software Project Management	310250 Audit Course 5 Options: 310250 (A) Cyber Security 310250 (B) Professional Ethics and Etiquettes 310250 (C) Learn New Skills 310250 (D) Engineering Economics 310250 (E) Foreign Language					
Laboratory Practice I Assignments from Systems Programming and Operating System and Elective I						



1. Subject - Database Management System

Weekly Work Load(in Hrs)	Lecture	Tutorial	Practical
	3 hrs	--	4hrs

Online/ In-sem	Theory	Practical	Oral	Term- work	Total Marks	Credit
30	70	25	-	25	150	5

Course Objective

- To understand the fundamental concepts of Database Management Systems
- To acquire the knowledge of database query languages and transaction processing
- To understand systematic database design approaches
- To acquire the skills to use a powerful, flexible, and scalable general-purpose databases to handle Big Data
- To be familiar with advances in databases and applications

Course Outcomes

- Analyze and design Database Management System using ER model
- Implement database queries using database languages
- Normalize the database design using normal forms
- Apply Transaction Management concepts in real-time situations
- Use NoSQL databases for processing unstructured data
- Differentiate between Complex Data Types and analyze the use of appropriate data types



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

Syllabus

Unit	<u>Course Contents</u>	<u>Hours</u>
I	<u>Introduction to Database Management Systems and ER Model</u>	06
	Topics – Introduction, Purpose of Database Systems, Database-System Applications, View of Data, Database Languages, Database System Structure, Data Models. Database Design and ER Model: Entity, Attributes, Relationships, Constraints, Keys, Design Process, Entity- Relationship Model, ER Diagram, Design Issues, Extended E-R Features, converting ER and EER diagram into tables	
II	<u>SQL AND PL/SQL</u>	07
	SQL: Characteristics and Advantages, SQL Data Types and Literals, DDL, DML, DCL, TCL, SQL Operators. Tables: Creating, Modifying, Deleting, Updating. SQL DML Queries: SELECT Query and clauses, Index and Sequence in SQL. Views: Creating, Dropping, Updating using Indexes, Set Operations, Predicates and Joins, Set membership, Tuple Variables, Set comparison, Ordering of Tuples, Aggregate Functions, SQL Functions, Nested Queries. PL/SQL: Concept of Stored Procedures and Functions, Cursors, Triggers, Assertions, Roles and Privileges	
III	<u>Relational Database Design</u>	06
	Relational Model: Basic concepts, Attributes and Domains, CODD's Rules. Relational Integrity: Domain, Referential Integrities, Enterprise Constraints, Database Design: Features of Good Relational Designs, Normalization, Atomic Domains and First Normal Form, Decomposition using Functional Dependencies, Algorithms for Decomposition, 2NF, 3NF, BCNF.	
IV	<u>UNIT -IV. Database Transaction Management</u>	06
	Introduction to Database Transaction, Transaction states, ACID properties, Concept of Schedule, Serial Schedule. Serializability: Conflict and View, Cascaded Aborts, Recoverable and Non-recoverable Schedules. Concurrency Control: Lock-based, Time-stamp based Deadlock handling. Recovery methods: Shadow-Paging and Log-Based Recovery, Checkpoints.	
V	<u>UNIT – V. NoSQL Databases</u>	07
	Topics – Introduction to Distributed Database System, Advantages, disadvantages, CAP Theorem. Types of Data: Structured, Unstructured Data and Semi-Structured Data. NoSQL Database: Introduction, Need, Features. Types of NoSQL Databases: Key-value store, document store, graph, wide column stores, BASE Properties, Data Consistency model ACID Vs BASE, Comparative study of RDBMS and NoSQL. MongoDB (with syntax and usage): CRUD Operations, Indexing, Aggregation, Map Reduce, Replication, Sharding.]	
VI	<u>Advances in Databases</u>	07
	Emerging Databases: Active and Deductive Databases, Main Memory Databases, Semantic Databases. Complex Data Types: Semi-Structured Data, Features of Semi-Structured Data Models. Nested Data Types: JSON, XML. Object Orientation: Object-Relational Database System, Table Inheritance, Object-Relational Mapping. Spatial Data: Geographic Data, Geometric Data. Query Processing: Overview, Measures of Query Cost, Selection Operation, Sorting, Join Operation, Evaluation of Expressions.s	



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

Text Books

Sr.No		Text Books
1	T1	Silberschatz A., Korth H., Sudarshan S., "Database System Concepts", McGraw Hill Publishers, ISBN 0-07-120413-X, 6th edition
2	T2	Connally T, Begg C., "Database Systems", Pearson Education, ISBN 81-7808-861-4
3	T3	Pramod J. Sadalage and Martin Fowler, "NoSQL Distilled", Addison Wesley, ISBN- 10: 0321826620, ISBN-13: 978-0321826626

Reference Books

Sr.No		Text Books
1	R1	C J Date, "An Introduction to Database Systems", Addison-Wesley, ISBN: 0201144719
2	R2	2. S.K.Singh, "Database Systems : Concepts, Design and Application", Pearson, Education, ISBN 978-81-317-6092-5
3	R3	3. Kristina Chodorow, Michael Dirolf, "MongoDB: The Definitive Guide", O'Reilly Publications, ISBN: 978-1-449-34468-9.
4	R4	4. Adam Fowler, "NoSQL For Dummies", John Wiley & Sons, ISBN-1118905628 5. Kevin Roebuck, "Storing and Managing Big Data - NoSQL, HADOOP and More", Emereopt Limited, ISBN: 1743045743, 9781743045749

**Reference Web Links/ Research Paper/ Referred Book other than
Mention in Syllabus:**

<http://www.nptelvideos.com/lecture.php?id=6518>



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

Teaching Plan

Sr. No.	Unit	Broad Topics to be Covered	Total Lecture Planned	Mode of Delivery
1	I	Introduction to Database Management Systems and ER Model	06	Discussion, PPT Presentations Example Solving
2	II	SQL AND PL/SQL	07	Discussion, PPT Presentations Example Solving
3	III	Relational Database Design	06	Discussion, PPT Presentations Example Solving
4	IV	Database Transaction Management	07	Discussion, PPT Presentations Example Solving
ss5	V	NoSQL Databases	07	Discussion, PPT Presentations Example Solving
6	VI	Advances in Databases	07	Discussion, PPT Presentations Example Solving
Total Lectures			40	

Assessment Tool Planner

Units	Co No.	Assessment Tool	Marks	Schedule
I	C301.1	Assignment-1	20	4 th week august
II	C301.2	Theory Test -I	20	1 st week September
III	C301.3	Assignment-2	20	2 nd week September
IV	C301.4	Theory Test -II	20	3 rd week September
V	C301.5	Assignment-3	20	4 th week September
VI	C301.5 C301.6	Theory Test -II	20	1 st week October
			120	

Practical Assessment

Sr. No.	Assessment Tool	Total in number	Marks scale down to
1	Lab Assignments (LA1 to LA13)	13 (each of 5 marks)	65
2	Mini Project	1 (of 10 marks)	10
3	Mock Practical (MPR)	01	50
Total			125

Question Bank

Unit 1

1. Construct an E-R diagram for a car-insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents.
2. Construct appropriate tables for the above ER Diagram

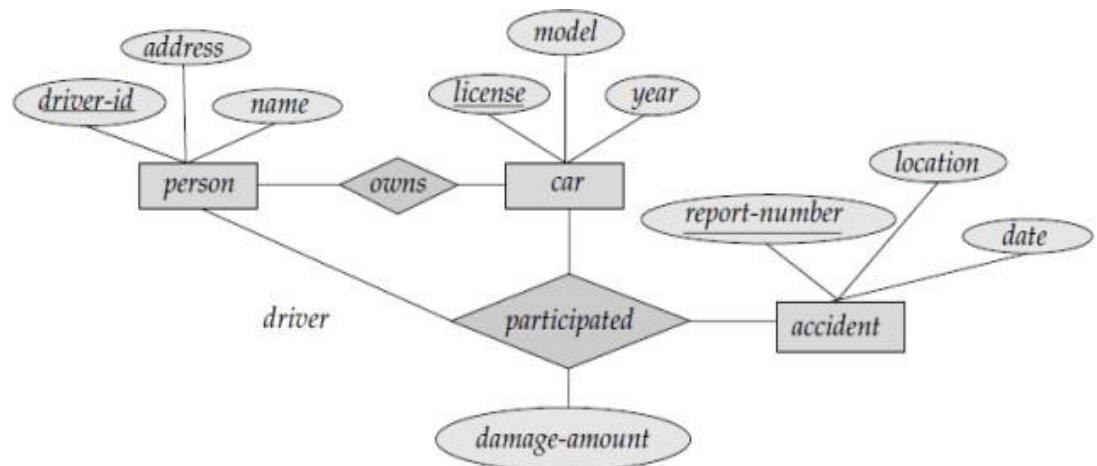
Car insurance tables:

person (driver-id, name, address)

car (license, year,model)

accident (report-number, date, location)

participated (driver-id, license, report-number, damage-amount) .



E-R diagram for a Car-insurance company.

3. A university registrar's office maintains data about the following entities: [10]
4. A weak entity set can always be made into strong entity set by adding to its attributes; the primary key attributes of its identifying entity set. Outline what sort of redundancy will result if we do so while converting into tables. [5]
5. What are the disadvantages of File processing?
6. What is DBMS? Explain advantages and disadvantages of DBMS.
7. What are the different components of DBMS?
8. Explain different types of databases.
9. Explain Data anomalies.
10. What are the functions of DBMS?



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

11. Explain Hierarchical Data Model.
12. Explain Network Data Model.
13. Explain Relational Database Model.
14. Explain Entity Relationship Model.
15. Explain The Object Oriented Model.
16. Explain Data abstraction or 3 schema architecture.
17. Explain basic notations of ER diagram
18. What are the different types of Entities?
19. Explain different types of Attributes.
20. Explain degree of relationships.
21. What are the database design challenges?
22. For the database system to be usable, it must retrieve data efficiently. The need of efficiency has led designers to use complex data structures to represent data in the database. Developers hides this complexity from the database system users through several levels of abstraction. Explain those levels of abstraction in detail.
23. Explain 1. Participation Constraints 2. Mapping Cardinalities.
24. Draw ER for Online Book store and Convert it into tables. (At-least 4 entities)

Unit 2

1. What is a Table and explain its characteristics?
2. Explain different types of keys available in Relational Model.
3. Explain Database Integrity rules.
4. Explain different Relational set operators.
5. Explain different types of joins.
6. What are the different types of Relationships in DBMS?
7. What is INDEX?
8. Explain Codd's Relational database rules.
9. Schema definition for supplier-and-parts database. keys are under lined.[5]
10. Any database system to be good relational database system, codd's have proposed 12 rules, explain any 2 rules proposed by codd with example.
11. Write a trigger for after insert for table Library (bid, bname, doi, status) to update



**Progressive Education Society's
Modern College of Engineering**

DEPARTMENT OF COMPUTER ENGINEERING

the number of copies (noc) according to ISSUE & RETURN status.

Increase the noc if status is RETURN, Decrease noc if status is ISSUE.

12. Write PL/SQL function to find percentage of the students from table **Student (rollno, name, Marks1, Marks2, Marks3, Marks4, Marks5)**.

Consider the following database.

Doctor (Doctor_no, Doctor_name, Address, City).

Hospital (Hospital_no, Name, Street, City).

Doc_Hosp (Doctor_no, Hospital_no, Date).

Construct the following Queries in SQL.

- 1) Find out all Doctors who have visited to Hospital in same city in which they live.
- 2) Find to which Hospital “Dr. Joshi” has visited.
- 3) Count no. of Doctors visited to “Shree Clinic” on 1st March 2014.

13. Write the PL/SQL block of code to calculate the factorial value of a number. [5]

14. Write a trigger for overdraft withdrawal from account: [5]

Instead of allowing negative account balances, the bank deals with overdrafts by creating a loan in the amount of the overdraft giving this loan a loan number identical to the account number of the overdrawn account setting the account balance to zero. The condition for executing the trigger is an update to the account relation that results in a negative balance value.

15. Write a PL/SQL block for following requirement and handle the exceptions

Roll no. of student will be entered by user. Attendance of roll no. entered by user will be checked in Student table. If attendance is less than 75% then display the message “Term not granted” and set the status in Student table as “D”. Otherwise display message “Term granted” and set the status in Student table as “ND”.

16. Write PL/SQL code block that raise a user defined exception when business rule is violated. Business Rule for client - master table specifies when the value of bal - due field is less than 0 handle the exception

17. The organization has decided to increase the salary of employees by 10% of existing salary, whose existing salary is less than Rs. 10000/- Write a PL/SQ block to update the



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

salary as per above requirement, display an appropriate message based on the no. of rows affected by this update (using implicit cursor status variables).

18. Consider following database :**Student (Roll_no, Name, Address),
Subject (Sub_code, Sub_name), Marks (Roll_no, Sub_code, marks)**

Write following queries in SQL :

- i) Find average marks of each student, along with the name of student.
- ii) Find how many students have failed in the subject “DBMS”.
- iii) Find the Address of students who have failed in TOC.

Unit 3

1. Explain what is normalization? Explain with example requirements of Third Normal Form.
2. Explain with example the concept of referential integrity constraint (e.g. Foreign key in SQL). Also discuss the situations when referential integrity constraint is getting violated by Insert, Update and delete operations on table.
3. One of the rule designed by codd’s for good relational database management system is integrity independence, which states that all integrity constraints can be independently modified without the need of any change in the application. Justify the significance of rule in relational database management system.
4. What is Normalization? Explain its advantages.
5. Explain 1,2,3,4 NF.
6. Write about Denormalization

Unit 4

1. What is Scheduler and explain its functions?
2. What is a transaction and explain its properties?
3. Explain about transaction log.
4. Explain concurrency control with locking method. Explain with examples.
5. What are the difference concurrent control problems? Explain with examples.
6. Explain the Concept of Conflict Serializability. Decide whether following schedule is conflict serializable or not. Justify your answer.



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

T1	T2
read (A) write (A)	
	read (A) write (A)
read (B) write (B)	
	read (B) write (B)

7. Explain Data Replication and Data Fragmentation in Distributed Data Storage.
8. State and explain in brief the ACID Properties. During execution of transaction, a transaction passes through several states, until it finally commits or aborts. List all possible sequences of states through which a transaction may pass. Explain why each state transition occurs.
9. Explain the Two Phase lock Protocol for concurrency control. Also explain its two versions: strict two phase lock protocol and rigorous two phase lock protocol.
10. Explain in details two important issues Speedup and Scaleup in Parallel Databases. Also explain which factors work against efficient parallel operation and can diminish both speedup and scale up.
11. To ensure atomicity despite failures we use Recovery Methods, Explain in detail Log-Based Recovery method.
12. What benefit does rigorous two-phase locking provide? How does it compare with other forms of two - phase locking?
13. Suppose a transaction T_i issues a read command on data item Q. How time - stamp based protocol decides whether to allow the operation to be executed or not using time - stamp based protocol of concurrency control.
14. Transaction during its execution should be in one of the different states at anypointoftime, explainthedifferentstatesoftransactionsduringitsexecution.
15. A transaction may be waiting for more time for an Exclusive (X)lock on an item, while a sequence of other transactions request and are granted as Shared (S) lock on the same item. What is this problem? How it is solved by two phase lock protocol?
16. In both, Shared nothing parallel architecture and distributed system architecture resources are not shared, then how shared nothing parallel systems are different than distributed systems?Also explain in briefother parallelsystemarchitecture



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

17. How two phase commit protocol to ensure the atomicity in distributed transaction, handles the following failures:
- Failure of participating site
 - Failure of coordinator
 - Failure due to network partition
18. What are different Parallel Database Architectures? Explain with their advantageous and disadvantageous.

Unit 5 & 6

1. Explain the difference SQL Vs NoSQL.
2. Enlist and explain any three NoSQL Database types.(examples expected)
3. Explain the HDFS and MapReduce in HADOOP with example.
4. Explain the concept of NoSQL Database and state its advantages over RDBMS.
5. State and Explain:
 - i) CAP Theorem
 - ii) BASE properties
6. Analyze the use of NoSQL databases in current social networking environment also explain need of NoSQL databases in social networking environment over RDBMS.
7. Analyze the use of NoSQL databases in current social networking environment also explain need of NoSQL databases in social networking environment over RDBMS.
8. BASE Transactions ensures the properties like Basically Available, Soft State, and Eventual Consistency. Explain each property with its significance. How soft state of system is depend on Eventual consistency property.
- 9 Explain Aggregation pipelining in mongodb



Curriculum

Name of the Subject – Theory of Computation

Weekly Work Load(in Hrs)	Lecture	Tutorial	Practical
	3	-	-

In-Sem	Theory	Total Marks	Credit
30	70	100	3

1.1 Course Objectives

- To introduce the students to basics of Theory of Computation.
- To study abstract computing models to provide a formal connection between algorithmic problem solving and the theory of languages.
- To understand Grammar, Pushdown Automata and Turing Machine for language processing and algorithm design.
- To learn about the theory of computability and complexity for algorithm design.

1.2 Course Outcomes

- Understand formal language, translation logic, essentials of translation, alphabets, language representation and apply it to design Finite Automata and its variants.
- Construct regular expression to present regular language and understand pumping lemma for RE
- Design Context Free Grammars and learn to simplify the grammar
- Construct Pushdown Automaton model for the Context Free Language
- Devise Turing Machine for the different requirements outlined by theoretical computer science.
- Analyze different classes of problems, and study concepts of NP completeness



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

1.3 Syllabus

Unit	<u>Course Contents</u>	<u>Hours</u>
I	Topics –Formal Language Theory and Finite Automata	07
	<p>Topics – Finite Automata (FA): An informal picture of FA, Finite State Machine (FSM), Language accepted by FA, Definition of Regular Language.</p> <p>FA without output: Deterministic and Nondeterministic FA (DFA and NFA), epsilon- NFA and inter-conversion. Minimization of DFAs.</p> <p>FA with output: Moore and Mealy machines -Definition, models, inter-conversion.</p>	
II	Topics – Regular Expressions (RE)	07
	<p>Topics – Introduction, Operators of RE, Precedence of operators, Algebraic laws for RE, Language to Regular Expressions, Equivalence of two REs. Conversions: RE to NFA, DFA, DFA to RE using Arden’s theorem, Pumping Lemma for Regular languages, Closure and Decision properties of Regular languages. Myhill-Nerode theorem.</p>	
III	Topics –Context Free Grammar and Context Free Language	07
	<p>Basic Elements of Grammar, Formal Definition of Context Free Grammar, Sentential form, Derivation and Derivation Tree/ Parse Tree, Context Free Language (CFL), Ambiguous Grammar, writing grammar for language. Simplification of CFG: Eliminating ϵ-productions, unit productions, useless production, and useless symbols. Normal Forms: Chomsky Normal Form, Greibach Normal Form, Pumping Lemma for CFG, Closure properties of CFL, Decision properties of CFL, Chomsky Hierarchy, Cock-Younger-Kasami Algorithm.</p>	
IV	Topics –Pushdown Automata(PDA)	07
	<p>Introduction, Formal definition of PDA, Equivalence of Acceptance by Final State and Empty stack, Non-deterministic PDA (NPDA), PDA and Context Free Language, Equivalence of PDA and CFG, PDA vs CFLs. Deterministic CFLs.</p>	
V	Topics – Turing Machines (TM)	07
	<p>Turing Machine Model, Formal definition of Turing Machines, Language Acceptability by Turing Machines, Design of TM, Description of TM, Techniques for TM Construction, Computing function with Turing Machine, Variants of Turing Machines, Halting Problem of TM, Halting vs Looping, A Turing-unrecognizable language, Reducibility, Recursion Theorem. The Model of Linear Bounded Automata.</p>	



Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING

VI	Topics –Computability and Complexity Theory	07
	<p>Computability Theory: Decidable Problems and Un-decidable Problems, Church-Turing Thesis. Reducibility: Undecidable Problems that is recursively enumerable, A Simple Un-decidableproblem.</p> <p>Complexity Classes: Time and Space Measures, The Class P, Examples of problems in P, The Class NP, Examples of problems in NP, P Problem Versus NP Problem, NP-completeness and NP-hard Problems.</p>	

1.4 Text Books

1. John E. Hopcroft, Rajeev Motwani, Jeffrey D.Ullman, “Introduction to Automata Theory Languages and Computation”, Addison-Wesley, ISBN 0-201-44124-1
2. Daniel Cohen, “Introduction to Computer Theory”, Wiley & Sons, ISBN 9788126513345

1.5 Reference Books

1. Sanjeev Arora and Boaz Barak, “Computational Complexity: A Modern Approach”, Cambridge University Press, ISBN: 0521424267 97805214242643
2. John Martin, “Introduction to Languages and The Theory of Computation”, 2nd Edition, McGrawHill Education, ISBN-13: 978-1-25-900558-9, ISBN-10: 1-25-900558
3. J.Carroll & D Long, “Theory of Finite Automata”, Prentice Hall, ISBN 0-13-913708-45
4. Kavi Mahesh, “Theory of Computation: A Problem-Solving Approach”, Wiley India, ISBN1081265331106
5. Michael Sipser, “Introduction to the Theory of Computation”, Cengage Learning, ISBN-13: 97811331878137
6. Vivek Kulkarni, “Theory of Computation”, Oxford University Press, ISBN 0-19-808458



1.6 Reference Links

<https://nptel.ac.in/courses/106104028/>

<http://www.jflap.org/>

<http://automatonsimulator.com/>

1.7 Teaching Plan

Sr. No.	Unit	Broad Topic to be Covered	Books Referred	Total Lectures Planned	Mode of Delivery
1	I	Formal Language Theory and Finite Automata	T1, R2, R3, R5	7	Discussion, Presentations Problem Solving
2	II	Regular Expression	T1, R2, R3, R5	7	Discussion, Problem Solving and Board Activity
3	III	Context Free Grammar and Context Free Language	T1, R2, R3, R5	7	Discussion, Problem Solving and Board Activity
4	IV	Pushdown Automata	T1, R3, R5, R6	7	Discussion, Problem Solving and Board Activity
5	V	Turing Machines	T1, R4, R3, R5	7	Discussion, Problem Solving and Board Activity
6	VI	Computability and Complexity Theory	T1, R4, R3, R6	7	Discussion, Presentations, Board Activity, and Problem Solving

1.8 Assessment Tools Details

Sr. No.	Assessment Tool	Marks	Marks scale down to
1	Test (T1, T2 and T3)	Each of 20 Marks	60
2	Problem Solving	20 Marks	20
Total			80

1.9 Question Bank

UNIT I

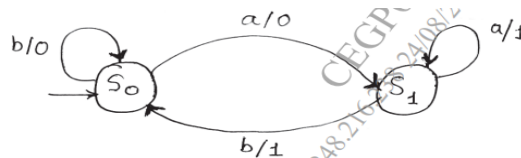
Formal Language Theory and Finite Automata

1. Define the following terms with example
 - a. Symbol
 - b. Alphabet
 - c. DFA
 - d. NFA
 - e. Word.
2. Construct DFA for $L = \{w \mid w \in (a+b)^* \mid n_a(w) \bmod 3 = 0 \text{ and } n_b(w) \bmod 2 = 0\}$
3. Construct a DFA over the alphabets $\{0, 1\}$ for accepting the string having number of 1's as multiple of 3?
4. Differentiate between NFA and DFA?
5. Design DFA for a language of string 0 and 1 that
 - I) Ending with 10
 - II) Ending with 11
 - III) Ending with 1
6. Give formal definitions for the following
 - i. Deterministic finite automata
 - ii. Moore machine
 - iii. Reachable states of P
 - iv. Acceptance of a string by FA
7. Construct DFA in which 2nd last symbol is 1 always.
8. Construct DFA, which accept ternary no divisible by 4.
9. Construct DFA such that, every 'a' is never by followed by 'bb'.
10. Design Finite Automata (FA) for accepting strings over $\Sigma = \{0,1\}$ with even numbers of 0's and odd number of 1's.

11. Construct NFA with ϵ moves which accepts a language consisting the strings of any number of a's followed by any number of b's, followed by any number of c's.
12. Construct DFA for $L = \{a^n b^m \mid n, m \geq 0\}$
13. Construct Melay Machine & Moore machine ending in '00' and '11'.
14. Design a moore machine for computing the 2's complement of binary number. Convert it into its equivalent Mealy Machine?
15. Construct Melay Machine & Moore machine ending bab.
16. Give difference between moore & mealy machine.
17. Construct a moore machine to the mealy machine M given below

	a=0		a=1	
q1	q1	1	q2	0
q2	q4	1	q4	1
q3	q3	1	q3	1
q4	q2	0	q1	1

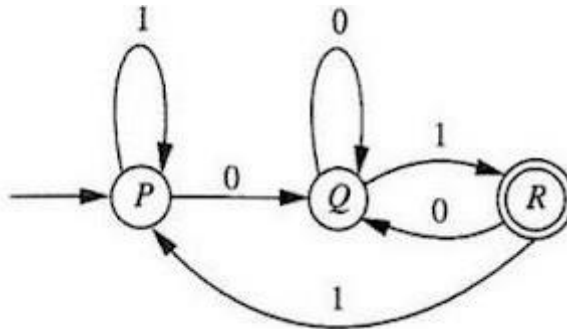
18. Construct a Mealy Machine which can output EVEN/ODD if the total number of 1's in the input is even or odd. The input symbols are 0 and 1.
19. Convert the following Mealy Machine to Moore machine



20. Construct melay machine which can o/p EVEN/ODD if total no of 1's in the input is even or odd. The input symbols are 0 & 1. Convert to into moore machine.

Q.1 (a)

10

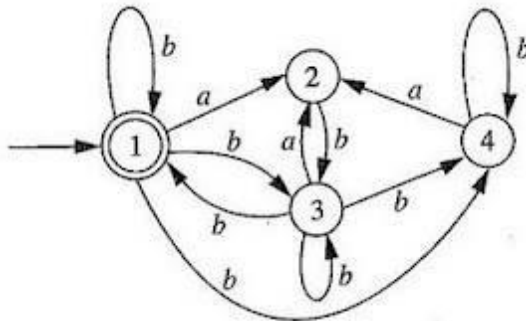


Find out Regular Expression for Given Finite Automaton.

Q.2 (a)

Give the Recursive Definition of δ^* for an NFA.

5

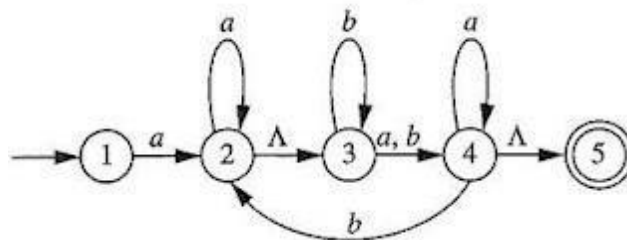


Using Subset Construction Draw FA for Given.

(b) If L subset of Σ^* is a Language that is accepted by the NFA $M = (Q, \Sigma, q_0, A, \delta)$, then there is an NFA $M_1 = (Q_1, \Sigma, q_1, A_1, \delta_1)$ that also accepts L. **5**

(b) Define Acceptance by an NFA.

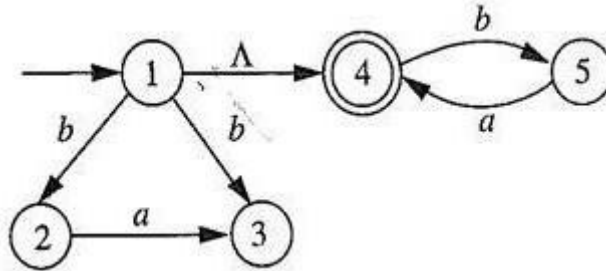
5



Check Whether the following strings are accepted by NFA or not.

(1) abab (2) aaabbb

- Q.1 (a)** Do as Directed.
- (i) Explain Relationship between DFA and NFA. 2
 - (ii) Write down Statement & Application of Kleene's Theorem Part - I. 2
 - (iii) Non Recursive Definition of δ^* for an NFA. 1
- (b) Prove that The Language accepted by any Finite Automata is Regular. 5
- Q.2 (a)** Define δ^* for an NFA- Λ Recursively. 5



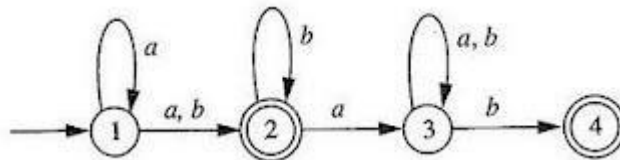
Using Algorithm Draw an NFA accepting the same Language.

- (b) Define Λ - Closure of a Set of States for NFA- Λ . 5
A Transition table is given for an NFA- Λ with Seven States.

q	$\delta(q, a)$	$\delta(q, b)$	$\delta(q, \Lambda)$
1	\emptyset	\emptyset	{ 2 }
2	{ 3 }	\emptyset	{ 5 }
3	\emptyset	{ 4 }	\emptyset
4	{ 4 }	\emptyset	{ 1 }
5	\emptyset	{ 6, 7 }	\emptyset
6	{ 5 }	\emptyset	\emptyset
7	\emptyset	\emptyset	{ 1 }

Find: (i) $\Lambda(\{3,4\})$ (ii) $\delta^*(1, ab)$

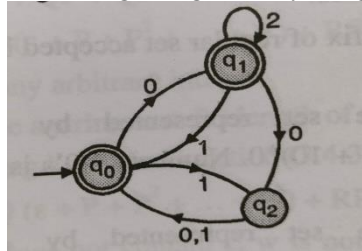
- (b) Convert Given NFA in to Equivalent DFA Using Subset Construction Method. 5



Unit – II

Regular Expressions (RE)

1. Describe in English the language represented by following expressions:
 - a. $(a+ab)^*$
 - b. $(a+b)^*a(a+b)^*$
 - c. $(a^*ab^*ab^*)+b^*$
 - d. $a+b^*c^+$
2. Illustrate in English the language of the following regular expression: $(1+\epsilon)(00^*1)^*0^*$
3. Explain in brief, applications of regular expressions
4. for each of the following draw DFA of following regular expression:
 - a) $(11+00)^*$ b) $(111+100)^*0$ c) $0+10^*+01^*0$
5. Find the regular expressions for the set string recognized by the given FA. Use Arden's Theorem



6. Determine a regular expression over the alphabet $\{x, y\}$ for the following:
 - i) all string containing exactly two x's
 - ii) all string that do not end with xy
 - ii) all string starting with yy
7. Determine a regular expression over the alphabet $\Sigma = \{a,b\}$.
 - i) All strings that contain an even number of 'b's
 - ii) All strings that do not end with 'aa'
8. Construct DFA for the regular expression
 - a. $(a+b)^*abb$
 - b. $(11)^*010(11)^*$
9. Prove the identity given below
 $(a^*ab+ba)^* a^* = (a+ab+ba)^*$
10. Explain Arden's theorem with example.
11. Define Pumping Lemma?
12. Construct minimized DFA accepting language represented by regular expression $0^*1^*2^*$. Convert given regular expression to NFA with ϵ moves.
13. Using pumping lemma for regular sets prove that the language
 $L = \{0^m 1^n 0^{m+n} \mid m \geq 1 \text{ and } n \geq 1\}$ is not regular
14. Explain the application of regular expression in lexical analysis phase of compiler?



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

UNIT III

- Q.1 (a)** Do as Directed. 2
- (i) Define CFG. What is Meaning of Context Free? 2
 - (ii) List out steps to convert CFG in to CNF 2
 - (iii) Define Inherently Ambiguous. 1
- (b)** Find out What Language is Generated by following CFG. 5
- (i) $S \rightarrow aT \mid bT \mid \Lambda$. $T \rightarrow aS \mid bS$.
 - (ii) $S \rightarrow aA \mid bC \mid b$. $A \rightarrow aS \mid bB$. $B \rightarrow aC \mid bA \mid a$. $C \rightarrow aB \mid bS$
- Q.2 (a)** Define Derivation Tree or Parse Tree. 5
- Show that following grammar is Ambiguous and Find out Unambiguous grammar for same.
- $S \rightarrow aaaaS \mid aaaaaaS \mid \Lambda$.
- (b)** Prove that The Context Free Grammar G1 with Productions 5
- $S1 \rightarrow S1 + T \mid T$
 $T \rightarrow T * F \mid F$
 $F \rightarrow (S1) \mid a$
is Ambiguous.
- (b)** Find out CFG for $L = \{ x \in \{0, 1\}^* \mid n_0(x) = n_1(x) \}$ 5
- (a)** Do as Directed.
- Q.1**
- (i) List out Applications of CFG. 2
 - (ii) Find out CFG for Regular Expression : $(011 + 1)^* (01)^*$ 2
 - (iii) Define Linear Grammar. 1
- (b)** Find out CFG for given Language. 5
- (i) The Set of Odd-Length string in $\{a, b\}^*$ with middle Symbol a.
 - (ii) The Set of Odd-Length string in $\{a, b\}^*$ whose first, middle, and last Symbols are all the same.
- Q.2 (a)** Define Leftmost and Rightmost Derivation. 5
- Show that following grammar is Ambiguous and Find out Unambiguous grammar for same.
- $S \rightarrow A \mid B$. $A \rightarrow aAb \mid ab$. $B \rightarrow abB \mid \Lambda$
- (b)** Define Nullable Variable and Unit Production. 5
- Find out CFG with no Λ - Productions and no Unit Productions.
- $S \rightarrow A \mid B \mid C$
 $A \rightarrow aAa \mid B$
 $B \rightarrow bB \mid bb$
 $C \rightarrow aCaa \mid D$
 $D \rightarrow baD \mid abD \mid aa$
- 5



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

- (i) Define Balanced Strings of Parentheses. 2
(ii) Define CFL. List out Application of CFL. 3
- (b) Find out CFG for 5**
-[if !supportLists]-->(1) <!--[endif]--> $L = \{ a^i b^j c^k \mid j=i \text{ or } j=k \}$
-[if !supportLists]-->(2) <!--[endif]--> $L = \{ a^i b^j \mid i < 2j \}$
- Q.2 (a) Define An Ambiguous Grammar. 5**
Show that following grammar is Ambiguous and Find out Unambiguous grammar for same.
 $S \rightarrow ABA. \quad A \rightarrow aA \mid \Lambda. \quad B \rightarrow bB \mid \Lambda$
- (b) Let G be the Context Free Grammar with Productions 5**
 $S \rightarrow S + S \mid S * S \mid (S) \mid a$
and Let G1 be the Context Free Grammar with Productions
 $S1 \rightarrow S1 + T \mid T$
 $T \rightarrow T * F \mid F$
 $F \rightarrow (S1) \mid a$
Then $L(G) = L(G1)$.
- (b) Define CNF. Convert following CFG in to CNF. 5**
 $S \rightarrow AACD.$
 $A \rightarrow aAb \mid \Lambda$
 $C \rightarrow aC \mid a$
 $D \rightarrow aDa \mid bDb \mid \Lambda$



UNIT IV

Pushdown Automata (PDA)

1. Construct PDA to accept language $L = \{a^{2n} b^n \mid n \geq 1\}$. Draw transition table?
2. Construct a context free grammar which accepts $N(A)$, where
 $A = (\{q_0, q_1\}, \{0, 1\}, \{z_0, z\}, \delta, q_0, z_0, \varphi)$ where δ is given by
 $\Delta(q_0, 1, z_0) = \{(q_0, zz_0)\}$
 $\Delta(q_0, \epsilon, z_0) = \{(q_0, \epsilon)\}$
 $\Delta(q_0, 1, z) = \{(q_0, zz)\}$
 $\Delta(q_0, 0, z) = \{(q_1, z)\}$
 $\Delta(q_1, 1, z) = \{(q_1, \epsilon)\}$
 $\Delta(q_1, 0, z_0) = \{(q_0, z_0)\}$
3. Construct NPDA to accept language string to check ODD length palindrome.
4. Design PDA for language $L = \{a^i b^j c^k \mid i \geq 1 \text{ and } i+j = k\}$ accepts language via
 - i) Final state
 - ii) Empty stack?
5. What is PDA? What are different types of PDA? Give its application?
6. Construct NPDA to accept language ww^R over $\{a, b\}$?
7. Construct PDA that accepts the language by the following CFG.
 $S \rightarrow SS \mid (S) \mid ()$
8. Construct PDA that accepts following language $L = \{a^n b^n \mid n \geq 0\}$ Write simulation for string 'aaabbb'?
9. Design a PDA for accepting a language $L = \{a^n b^m c^n \mid m, n \geq 1\}$?
10. Explain the acceptance of language by PDA –
 - i) By Final State
 - ii) By Empty Stack
11. Design a PDA for accepting a language
 $L = \{WcW^T \mid W \in \{a, b\}^*\}$
12. Construct PDA for the following regular grammar
 $S \rightarrow 0A \mid 1B \mid 0 \quad A \rightarrow A0 \mid B \quad B \rightarrow c \mid d$
13. Design a PDF for detection of even palindrome over $\{a, b\}$?



14. Application of PDA?
15. Construct PDA for the following CFG

$S \rightarrow aAB$

$A \rightarrow bA \mid b$

$B \rightarrow aB \mid bA \mid a$

Turing Machines (TM)

1. Construct TM to check even length palindrome? Draw transition table?
2. Construct a two tape turning machine to convert an input w into ww^R ?
3. Write note on Universal Turing Machine?
4. Construct TM to accept string divisible by 4 given $\{0,1,2\}$? Draw transition table?
5. Construct NDTM to recognize words of the form WW over alphabet $\{a,b\}$?
6. Write note on extension of Turing Machine?
7. Design a TM that multiplies two unary numbers over $\Sigma = \{1\}$. Write simulation for the string $11&111$?
8. Design TM to accept the set L of all strings formed with 0&1 and having substring '000'?
9. Design TM to accept all string of the form $a^n b^n$ for $n \geq 1$ and rejects all other string?
10. Design a TM which recognizes words of the form $a^n b^n c^n \mid n \geq 1$?
11. Differentiate between FA & TM?
12. Design a TM that replaces every occurrence of abb by baa ?
13. Design TM for the language $L = \{02n\}$ over $\Sigma = \{0,1\}$?
14. Design a PDA for accepting language $L = \{ W c W^R \mid W \in (a,b)^* \}$?
15. Construct a TM to compute $L = \{a^n b^n \mid n > 0\}$ Write simulation for the string.
i) abb ii) $aabbbb$
16. Design TM to accept a language $L = \{0^n 1^n 0^n \mid n \geq 1\}$?
17. Construct a two tape Turing machine to convert an input ω into $\omega\omega^R$
18. Write a short note on universal Turing machine along with example?



UNIT-VI
Computability and Complexity Theory

1. What is clique problem? Show that it is NP-complete Problem?
2. Write a short a note undecidable?
3. What do you mean by NP-Problem? Justify why traveling salesman problem is a NP-complete?
4. Define recursive and recursively enumerable language along with example?
5. Prove that $ATM = \{ \langle m, w \rangle \mid M \text{ is a TM and Accept } w \}$ undecidable?
6. What do you mean by polynomial-time reductions? Describe any problem in details that is solvable through polynomial time reduction?
7. Differentiate between P-class problems and NP-class problems?
8. Explain class P with two examples?
9. What is the difference between an undecidable problem and an intractable problem?
10. What is the difference between intractable and tractable problems?
11. What is The Church-Turing Thesis?



Curriculum

3. Systems Programming and Operating System

Name of the Subject – 310243: Systems Programming and Operating System

Weekly Work Load(in Hrs)	Lecture	Tutorial	Practical
3		-	-

In-Sem	Theory	Total Marks	Credit
30	70	100	3

1.1 Course Objectives

1. To get acquainted with the basics of System Programming
2. To acquire knowledge of data structures used in the design of System Software
3. To be familiar with the format of object modules, the functions of linking, relocation, and loading
4. To comprehend the structures and functions of Operating Systems and process management.
5. To deal with concurrency and deadlock in the Operating System
6. To learn and understand memory management of Operating System

1.2 Course Outcomes

- CO1: Analyze and synthesize basic System Software and its functionality.
- CO2: Identify suitable data structures and Design & Implement various System Software
- CO3: Compare different loading schemes and analyze the performance of linker and loader
- CO4: Implement and Analyze the performance of process scheduling algorithms
- CO5: Identify the mechanism to deal with deadlock and concurrency issues
- CO6: Demonstrate memory organization and memory management policies.



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

1.3 Syllabus

Unit	<u>Course Contents</u>	<u>Hours</u>
I	Introduction	08
	Introduction to Systems Programming, Need of systems programming, Software Hierarchy, Types of software: system software and application software, Machine structure. Evolution of components of systems programming: Text Editors, Assembler, Macros, Compiler, Interpreter, Loader, Linker, Debugger, Device Drivers, Operating System. Elements of Assembly Language Programming: Assembly Language statements, Benefits of Assembly Language, A simple Assembly scheme, Pass Structure of Assembler. Design of two pass assembler: Processing of declaration statements, Assembler Directives and imperative statements, Advanced Assembler Directives, Intermediate code forms, Pass I and Pass II of two pass Assembler.	
II	Macro Processor and Compilers	06
	Introduction, Features of a Macro facility: Macro instruction arguments, Conditional Macro expansion, Macro calls within Macros, Macro instructions, Defining Macro, Design of two pass Macro processor, Concept of single pass Macro processor. Introduction to Compilers: Phases of Compiler with one example, Comparison of compiler and Interpreter	
III	Linkers and Loaders	07
	Introduction, Loader schemes: Compile and Go, General Loader Scheme, Absolute Loaders, Subroutine Linkages, Relocating Loaders, Direct linking Loaders, Overlay structure, Design of an Absolute Loader, Design of Direct linking Loader, Self-relocating programs, Static and Dynamic linking.	
IV	Operating System	07
	Introduction: Evolution of OS, Operating System Services, Functions of Operating System. Process Management: Process, Process States: 5 and 7 state model, process control block, Threads, Thread lifecycle, Multithreading Model, process control system calls. Process Scheduling: Uni-processor Scheduling, Scheduling: Preemptive, Non-preemptive, Longterm, Medium-term, Short term scheduling. Scheduling Algorithms: FCFS, SJF, RR, and Priority.	
V	Synchronization and Concurrency Control	07
	Concurrency: principle and issues with concurrency, Mutual Exclusion, Hardware approach, Software approach, Semaphore, Mutex and monitor, Reader writer problem, producer Consumer problem, Dining Philosopher problem. Deadlocks: Principle of deadlock, Deadlock prevention, deadlock avoidance, deadlock detection, deadlock recovery.	
VI	Memory Management	07



**Progressive Education Society's
Modern College of Engineering**

DEPARTMENT OF COMPUTER ENGINEERING

	<p>Introduction: Memory Management concepts, Memory Management requirements. Memory Partitioning: Fixed Partitioning, Dynamic Partitioning, Buddy Systems Fragmentation, Paging, Segmentation, Address translation. Placement Strategies: First Fit, Best Fit, Next Fit and Worst Fit. Virtual Memory (VM): Concepts, Swapping, VM with Paging, Page Table Structure, Inverted Page Table, Translation Lookaside Buffer, Page Size, VM with Segmentation, VM with Combined paging and segmentation. Page Replacement Policies: First In First Out (FIFO), Last Recently Used (LRU), Optimal, Thrashing.</p>	
--	---	--



1.4 TEXT Books

1. John Donovan, "System Programming", McGraw Hill, ISBN 978-0--07-460482-3.
2. Dhamdhare D., "Systems Programming and Operating Systems", McGraw Hill,
ISBN 0 - 07 - 463579 – 4
3. Silberschatz, Galvin, Gagne, "Operating System Principles", 9th Edition, Wiley,
ISBN 978- 1-118-06333-0

1.5 Reference Books

2. Leland Beck, "System Software: An Introduction to systems programming", Pearson
2. John R. Levine, Tony Mason, Doug Brown, "Lex & Yacc", 1st Edition, O'REILLY,
ISBN 81- 7366-062-X.
3. Alfred V. Aho, Ravi Sethi, Reffrey D. Ullman, "Compilers Principles, Techniques,
and Tools", Addison Wesley, ISBN 981-235-885-4



Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING

1.6 Teaching Plan

Sr. No.	Unit	Broad Topic to be covered	Books Referred	Total Lectures Planned	Mode of Delivery
1	I	Introduction	[T1,R1]	08	Discussion, Board Activity
2	II	Macro Processor and Compilers	[T1,R2]	06	Think Pair share, Board Activity
3	III	Linkers and Loaders	[T1,R2,R3]	07	Think Pair share, Board Activity
4	iv	Operating System	[T1,R2]	07	Discussion, Board Activity
5	V	Synchronization and Concurrency Control	[T1,R2]	07	Discussion, Board Activity
6	VI	Memory Management.	[T1,R2,R3]	07	Think Pair share, Board Activity



1.7 Assessment Tools Details

Sr. No.	Assessment Tool	Marks	Marks scale down to
1	Assignments (A1 to A2)	Each 20 marks	40
2	Tests (T1 to T3)	Each 20 marks	60
3	MCQ Test	20 marks	20
Total			120

Assessment Tools: A1 to A2 Each 20 Marks

Tests: T1 To T3 Each 20 Marks

MCQ Test : 20 Marks



1.8 Question Bank

Unit-1

Q.No Question

- 1) Explain components of system softwares.
- 2) Explain machine structure, assembly language and machine language.
- 3) Illustrate the functioning of two pass assembler.
- 4) Explain in brief imperative statements, declaration statements and assembler directives with examples for assembly language programming.
- 5) Explain different assembly language statements with examples.
- 6) Explain Compilers and Interpreters.
- 7) What is interpreter? Explain the role of interpreter with suitable example.
- 8) Explain in details design of Text editor.
- 9) Explain in brief assembler directives with example
- 10) Write an sample assembly code and process that code using Pass-I of assembler.
- 11) What is forward reference problem in assembler. How Pass-II overcome forward reference problem.
- 12) Draw & explain flow chart of PASS-I and PASS-II of TWO Pass Assembler.
- 13) Construct MOT,POT,ST,LT,POOL Table,BT for ANY ALP(Assembly language Program) EXAMPLE FORM PREVIOUS Q.P,SOLVED EXAMPLE IN CLASS.



Unit-2

Q.No Question

- 1 Explain the role of Macro processor.
- 2 Illustrate functioning of Linker.
- 3 Explain working of Loader.
- 4 What are the data structures used for the design of macro processing?
- 5 Explain the nested macros with example.
- 6 Explain the process of alteration of flow of control during macro expansion.
- 7 Explain expansion time variables with example
- 8 What are the data structures used for the design of macro processing?
- 9 Explain in brief different loader scheme.
- 10 Explain use of call back function.
- 11 Construct PNTAB,EVTAB,SSTAB,MDT,MNT,KPDTAB,APTAB
considering any MACRO DEFINATION EXAMPLE.

Unit 3

Q.No Question

- 1 Explain the role and functioning of the Compiler and Interpreter.
- 2 Utilize LEX and YACC utilities.
- 3 Compare Compiler and Interpreter.
- 4 Explain the term linker
- 5 Explain the need of program relocatability.



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

- 6 Explain dynamic loading and linking
- 7 Explain MS-DOS linker in detail.
- 8 Explain functions of a loader.
- 9 List and explain different loader schemes in brief.
- 10 Explain the working of lex and Yacc.
- 11 Write Short note on Phases of Compiler and Show the Output of each phase of compiler considering input as $\text{Price} := \text{Amount} + \text{Rate} * 50$
- 12 Difference between Static Linking and Dynamic Linking

Unit 4

Q.No Question

- 1 Explain process management and process sub system.
- 2 Apply process scheduling algorithms to schedule processes.
- 3 Explain and Analyze Deadlock mechanism.
- 4 What is an operating system? Explain its functions.
- 5 List the different categories of system calls and explain in brief.
- 6 Draw and explain process control block
- 7 Explain different modes of thread.
- 8 Explain scheduling criteria? Explain different types of scheduling algorithms in brief
- 9 Write short note on: Round Robbin Scheduling
- 10 Explain inter process communication.



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING
Unit 5**

Q.No Question

- 1 Explain paging and segmentation mechanisms.
- 2 Explain concepts of virtual memory
- 3 Explain how memory management is achieved in operating system.
- 4 Explain the concept of segmentation.
- 5 What is internal fragmentation?
- 6 What is external fragmentation?
- 7 Explain demand paging with advantages.
- 8 Explain page fault for first in first out.
- 9 Explain page fault for least recently used.
- 10 Explain how LRU page replacement algorithm is simulated in software

Unit 6

Q.No Question

- 1 Explain I/O management.
- 2 Explain file management.
- 3 Explain in detail file systems and its implementations.
- 4 Write short note on file, management under UNIX
- 5 Explain the directories
- 6 Write short notes on: File management.
- 7 Draw and briefly explain the file structure
- 9 Explain the directory system with diagram.
- 10 Explain interrupt processing is managed for input and output



5.A. Internet of Things and Embedded Systems

Weekly Work Load(in Hrs)	Lecture	Tutorial	Practical
	3 hrs	--	4hrs

Online/ In-sem	Theory	Practical	Oral	Term- work	Total Marks	Credit
30	70	--	--	--	100	03

Course Objective

- To understand fundamentals of Internet of Things (IoT) and Embedded Systems
- To learn advances in Embedded Systems and IoT
- To learn methodologies for IoT application development
- To learn the IoT protocols, cloud platforms and security issues in IoT
- To learn real world application scenarios of IoT along with its societal and economic impact using case studies and real time examples

Course Outcomes

- Understand the fundamentals and need of Embedded Systems for the Internet of Things
- Apply IoT enabling technologies for developing IoT systems
- Apply design methodology for designing and implementing IoT applications
- Analyze IoT protocols for making IoT devices communication
- Design cloud based IoT systems
- Design and Develop secured IoT applications



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING
Syllabus**

Unit	<u>Course Contents</u>	<u>Hours</u>
I	Introduction to Embedded Systems	07
	Definition, Characteristics of Embedded System, Real time systems, Real time tasks. Processor basics: General Processors in Computer Vs Embedded Processors, Microcontrollers, Microcontroller Properties, Components of Microcontrollers, System-On-Chip and its examples, Components of Embedded Systems, Introduction to embedded processor.	
II	Internet of Things : Concepts	07
	Introduction to Internet of Things (IoT): Definition, Characteristics of IoT, Vision, Trends in Adoption of IoT, IoT Devices, IoT Devices Vs Computers, Societal Benefits of IoT, Technical Building Blocks. Physical Design of IoT: Things in IoT, Interoperability of IoT Devices, Sensors and Actuators, Need of Analog / Digital Conversion. Logical Design of IoT: IoT functional blocks, IoT enabling technologies, IoT levels and deployment templates, Applications in IoT.	
III	IoT: Design Methodology	06
	IoT Design Methodology: Steps, Basics of IoT Networking, Networking Components, Internet Structure, Connectivity Technologies, IoT Communication Models and IoT Communication APIs, Sensor Networks, Four pillars of IoT: M2M, SCADA, WSN, RFID.	
IV	IoT Protocols	06
	Protocol Standardization for IoT, M2M and WSN Protocols, RFID Protocol, Modbus Protocol, Zigbee Architecture. IP based Protocols: MQTT (Secure), 6LoWPAN, LoRa.	
V	Cloud Platforms for IoT	07
	Software Defined Networking, Introduction to Cloud Storage Models, Communication API. WAMP: Auto Bahn for IoT, Xively Cloud for IoT. Python Web Application Framework: Django Architecture and application development with Django, Amazon Web Services for IoT, Sky Net IoT Messaging Platform, RESTful Web Service, GRPC, SOAP.	
VI	Security in IoT	07
	Introduction, Vulnerabilities of IoT, Security Requirements, Challenges for Secure IoT, Threat Modeling. Key elements of IoT Security: Identity establishment, Access control, Data and message security, Non-repudiation and availability, Security model for IoT, Challenges in designing IOT applications, Lightweight cryptography.	



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

Text Books

Sr.No		Text Books
1	T1	Arshdeep Bahga, Vijay Madiseti, “Internet of Things – A hands-on Approach”, Universities Press, ISBN: 0: 0996025510, 13: 978-0996025515
2	T2	Olivier Hersent, David Boswarthick, Omar Elloumi, “The Internet of Things: Key Applications and Protocols”, 2nd Edition, Wiley Publication, ISBN: 978-1-119-99435-0

s Reference Books

Sr.No		Text Books
1	R1	Dawoud Shenouda Dawoud, Peter Dawoud, “Microcontroller and Smart Home Networks”, ISBN: 9788770221566, e-ISBN: 9788770221559
2	R2	Charles Crowell, “IoT-Internet of Things for Beginners: An Easy-to-Understand Introduction to IoT”, ISBN-13 : 979-8613100194
3	R3	David Hanes, Gonzalo Salgueiro, Robert Barton, Jerome Henry, “IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things”, Cisco Press, ISBN-13: 978-1-58714-456-1 ISBN-10: 1-58714-456-5
4	R4	David Etter, “IoT Security: Practical guide book”, amazon kindle Page numbers, source ISBN: 1540335011.
5	R5	Brian Russell, Drew Van Duren, “Practical Internet of Things Security”, Second Edition,

**Reference Web Links/ Research Paper/ Referred Book other than
Mention in Syllabus:**

- | |
|---|
| <ul style="list-style-type: none">• https://www.iotforall.com/ebooks/an-introduction-to-iot• https://www.qorvo.com/design-hub/ebooks/internet-of-things-for-dummies |
|---|



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

Teaching Plan

Sr. No.	Unit	Broad Topics to be Covered	Total Lecture Planned	
1	I	Introduction to Embedded Systems	07	
2	II	Internet of Things : Concepts	07	
3	III	IoT: Design Methodology	07	
4	IV	IoT Protocols	07	
5	V	Cloud Platforms for IoT	07	
6	VI	Security in IoT	07	
Total Lectures			42	

Assessment Tool Planner

Units	Co No.	Assessment Tool	Marks	Schedule
I	C301.1	Assignment-1	10	4 th week august
II	C301.2	Theory Test -I	20	1 st week September
III	C301.3	Assignment-2	10	2 nd week September
IV	C301.4	Theory Test -II	20	3 rd week September
V	C301.5	Assignment-3	10	4 th week September
VI	C301.5 C301.6	Theory Test -II	20	1 st week October
VII	C301.5	Assignment-4	10	
Total			100	



Question Bank

Unit 1

Q.No	<u>Question</u>
1	What is embedded Systems?
2	Explain applications of embedded systems.
3	What are real time systems? Explain with examples.
4	What are the types of real time tasks? Explain in details.
5	Explain following terms regarding real time scheduling: Arrival time, Ready time, waiting time, deadline, scheduling time, burst time.
6	Explain the concept of Real Time Scheduling Algorithms with example.
7	What is a processor? Explain system on chip.
8	Explain ARM SoC.
9	Describe advanced features of ARM.
10	Differentiate between RISC and CISC.

Unit 2

Q.No	<u>Question</u>
1	Explain purpose and requirement specification in IoT design methodology?
2	Explain process model specification for home automation system.
3	Write Domain model specification for smart home automation system.
4	Define “on-device Resources” and “Network Resources”
5	Explain service specification step in IoT system design methodology.
6	Write note on : i. Mode service ii. State service iii. Controller service
7	State different IoT deployment levels. Explain IoT level specification for smart home automation system.
8	Explain functional view specification step in IoT design methodology.
9	Explain operational view specification step from IoT design methodology.
10	Describe device and component integration for IoT based home automation system.

Unit 3

Q.No	<u>Question</u>
------	-----------------



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

1	What are horizontal and verticals of IoT applications?
2	Explain M2M communication in details.
3	Explain RFID communication in details.
4	Explain WSN communication in details.
5	Explain SCADA communication in details.
6	What is with reference to IoT?
7	What do you mean by “Things that talk” in IoT?
8	What type of connections are available in IoT based systems.
9	What is an IoT device?
10	Explain Raspberry Pi in brief/in details.

Unit 4

Q.No	Question
1	What are some protocol standardization efforts taken for IoT?
2	Explain M2M protocol standardization.
3	Explain SCADA protocol standardization.
4	Explain the issues with IoT standardization.
5	Explain various data standards used in IoT data exchange.
6	Explain IEEE 802.15.4 protocols in details,
7	Explain BACNet protocols in details.
8	Explain lifecycle of an IoT device.
9	What are some misuse cases in IoT security?
10	Explain security model for IoT.

Unit 5

Q.No	Question
1	What is Web of Things (WOT)?
2	What are two pillars of the web? Explain in brief.
3	Explain M2M Middleware Standards in brief.
4	Explain WSN Middleware Standards in brief.
5	Explain SCADA Middleware Standards in brief.
6	Explain RFID Middleware Standards in brief.
7	Explain unified multitier WoT Architecture in details.
8	Give examples of some WoT Portals.
9	Explain Cloud Middleware Architecture.
10	Explain cloud standards.



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

Unit 6

Q.No	<u>Question</u>
1	Give a brief overview of cloud computing and IoT cloud storage models.
2	Give a brief overview of communication API.
3	Describe the AutoBehn framework in brief.
4	Explain the Python Web Application Framework – Django.
5	Explain the different cloud based services offered by Amazon for IoT.
6	Explain the SkyNet IoT messaging platform.
7	Provide an IoT solution for home intrusion detection system.
8	Provide an IoT solution for weather monitoring system.
9	Provide an IoT solution for air pollution monitoring.
10	Provide an IoT solution for smart irrigation system.



5.D Elective I: Subject – Software Project Management

Weekly Work Load(in Hrs)	Lecture	Tutorial	Practical
	3 hrs	- -	4hrs

Online/ In-sem	Theory	Practical	Oral	Term-work	Total Marks	Credit
30	70	NA	NA	NA	100	03

Course Objectives:

1. To understand the fundamentals of Software Project Management
2. To investigate software project planning and management tools
3. To learn software project scheduling and tracking
4. To discuss about the agile project management
5. To know people management in software project

Course Outcomes:

On completion of the course, learners should be able to

CO1: Comprehend Project Management Concepts

CO2: Use various tools of Software Project Management

CO3: Schedule various activities in software projects

CO4: Track a project and manage changes

CO5: Apply Agile Project Management

CO6: Analyse staffing process for team building and decision making in Software Projects and Management .

Syllabus

Unit	<u>Course Contents</u>	<u>Hours</u>
I	Introduction to Software Project Management	07
	Project Definition, Project versus Flow type work, Project Lifecycle, Processes and Knowledge Areas in Project Management (PM), Build or Buy decision, Work Breakdown Structure (WBS) and its types, Introduction to PMBOK, Program and Portfolio Management	
II	Project Planning and Project Management Tools	07
	Project Planning: Steps for Project Planning, PERT and Gantt Charts, Gantt Project, Microsoft Project and Primavera Project Management Software, Objectives of Activity planning, Project Schedules, Activities, Sequencing and Scheduling, Network Planning Models, Formulating Network Model.	
III	Activity based Scheduling	07
	Introduction, Objectives of Activity Planning, Project Schedules. Activities: Sequencing and Scheduling, Network Planning Models, Formulating Network Model, Activity relationships (FS,SF,SS,FF), Forward Pass and Backward Pass techniques, Critical Path concept and remedies.	
IV	Project Tracking and Control	07
	Introduction, Collection of Project data, Visualizing progress, Cost monitoring, Earned Value Analysis, Project tracking, Change Control, Software Configuration Management, Managing contracts, Contract Management.	
V	Agile Project Management	07
	Predictive versus Empirical Management, Comparison between Non-Agile and Agile Project, Three stages of Agile Project, Estimation, Scope Management, Roles and Responsibilities, Scheduling and Tracking	
VI	Staffing in Software Projects	07



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

	Managing People, Organizational behaviour, Best methods of Staff Selection, Motivation, The Oldham, Hackman job characteristic Model, Stress, Health and Safety, Ethical and Professional concerns, Working in Teams, Decision Making, Organizational structures, Dispersed and Virtual Teams, Communications Genres, Communication Plans.	
--	--	--



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

Teaching Plan

Unit No.-I: Introduction to Software Project Management

Lecture No.	Details of the Topic to be covered	Mode of Delivery
1	Project Definition	Chalk and Talk, PPT
2	Project versus Flow type work	Chalk and Talk, PPT
3	Project Lifecycle	Chalk and Talk, PPT
4	Processes and Knowledge Areas in Project Management (PM)	Chalk and Talk, PPT
5	Build or Buy decision, Work Breakdown Structure (WBS) and its types	Chalk and Talk, PPT
6	Introduction to PMBOK	Chalk and Talk, PPT
7	Program and Portfolio Management	Chalk and Talk, PPT



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

Teaching Plan

Unit No.-II: Project Planning and Project Management Tools

Lecture No.	Details of the Topic to be covered	Mode of Delivery
1	Steps for Project Planning, PERT charts	Chalk and Talk, PPT
2	Gantt Charts, Gantt Project	Chalk and Talk, PPT
3	Microsoft Project	Chalk and Talk, PPT
4	Primavera Project Management Software	Chalk and Talk, PPT
5	Objectives of Activity planning, Project Schedules Activities,	Chalk and Talk
6	Sequencing and Scheduling, Network Planning Models	Chalk and Talk
7	Formulating Network Model.	Chalk and Talk ,PPT



Unit No.-III: Activity based Scheduling

Lecture No.	Details of the Topic to be covered	Mode of Delivery
1	Introduction, Objectives of Activity Planning, Project Schedules	Chalk and Talk
2	Activities: Sequencing and Scheduling.	Chalk and Talk
3	Network Planning Models	Chalk and Talk
4	Activity relationships (FS,SF,SS,FF)	Chalk and Talk
5	Forward Pass and Backward Pass techniques	Chalk and Talk
6	Formulating Network Model	Chalk and Talk
7	Critical Path concept and remedies	Chalk and Talk

Unit No.-IV: Project Tracking and Control

Lecture No.	Details of the Topic to be covered	Mode of Delivery
1	Introduction, Collection of Project data	Board and chalk
2	Visualizing progress, Cost monitoring	Board and chalk



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

3	Earned Value Analysis	Board and chalk
4	Project tracking, Change Control	Board and chalk
5	Software Configuration Management	Board and chalk
6	Managing contracts	Board and chalk
7	Contract Management	Board and chalk

Unit No.-V: Agile Project Management

Lecture No.	Details of the Topic to be covered	Mode of Delivery
1	Predictive versus Empirical Management	Board and chalk
2	Comparison between Non-Agile and Agile Project	Board and chalk
3	Three stages of Agile Project	Board and chalk
4	Estimation	Board and chalk
5	Scope Management	Board and chalk
6	Roles and Responsibilities.	Board and chalk



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

7	Scheduling and Tracking.	Board and chalk
---	--------------------------	-----------------

Unit No.-VI: Staffing in Software Projects

Lecture No.	Details of the Topic to be covered	Mode of Delivery
1	Managing People, Organizational behaviour	Board and chalk
2	Best methods of Staff Selection, Motivation, The Oldham.	Board and chalk
3	Ethical and Professional concerns, Working in Teams	Board and chalk
4	Hackman job characteristic Model, Stress, Health and Safety	Board and chalk
5	Decision Making, Organizational structures	Board and chalk
6	Dispersed and Virtual Teams	Board and chalk
7	Communications Genres, Communication Plans	Board and chalk



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

3.4 Assessment Tools Details

Sr. No.	Assessment Tool	Total in number	Marks scale down to
1	Test T1 to T3	(Each of 10 marks)	30
2	Assignment A1 to A2	(Each of 20 marks)	40
3	MCQ	(Each of 10 marks)	20
4	Case Study	(Each of 20 marks)	10
Total			100

Detail Schedule/Plan of conduction of assessment tool.

Sr. No.	Units	Co No.	Assessment Tool	Marks	Schedule
1	1,2	CO1, CO2	Theory Test 1	10	First week of Sep
2	3,4	CO3, CO4	Theory Test 2	10	First week of Oct
3	5,6	CO5, CO6	Theory Test 3	10	First week of Nov
4	1-6	CO1-CO6	MCQ	20	1 st week of Nov
5	2	CO2	Assignment 1	20	2 nd week of September
6	4	CO4	Assignment2	20	2 nd week of October
7	6	CO6	Case Study	10	4 th week of October



Question Bank

UNIT I

1. Define Project definition.
2. Explain Project versus Flow type work.
3. Write a note on Project lifecycle.
4. What are Processes and Knowledge areas in Project Management.
5. Write a note on Build vs. buy decision.
6. What do you understand by WBS(Work breakdown structure)? Explain with neat diagram.
7. Write a note on PMBOK.
8. Explain Program and Portfolio management.
9. Explain the evolving role of software.
10. Define software and explain the various characteristics of software
11. Explain “Software myth”? Discuss on various types of software myths and the true aspects of these myths.
12. Discuss about software Engineering? Explain the software engineering layers?
13. Explain in detail the capability Maturity Model Integration (CMMI)
14. Describe with the help of the diagram discuss in detail waterfall model. Give certain reasons for its failure.
15. Explain briefly on (a) the incremental model (b) The RAD Model
16. Explain the Spiral model in detail.
17. Describe With the help of the diagram explain the concurrent development model.
18. Explain unified process? Elaborate on the unified process work products.
19. Explain specialized process models.
20. Explain different software applications.
21. Explain the paradigms do you think would be most effective? Why?
22. Explain product and process are related.
23. Explain personal and team process models.
24. Explain process frame work activities.



25. Explain the purpose of process assessment
26. Explain changing nature of software in detail
27. Explain and contrast perspective process models and iterative process models
28. Explain about the evolutionary process models
29. Describe the law of conservation of familiarity in your own words. Suggest a few ways to build software to stop deterioration due to change.
30. Try to develop a task set for the communication activity
31. Which of the software engineering paradigms presented in this chapter do you think would be most effective? Why?
32. Define software engineering. Explain the failure curve of software. Explain in detail the following software myths: Management myths, Customer myths.
33. Explain software spiral process model.
34. Explain in detail extreme programming.
35. Explain the umbrella activities of software process in detail.
36. The RAD model is often tied to CASE tools. Research the literature and provide a summary of a typical CASE tool that supports RAD.
37. Propose a specific software project that would be amenable to the incremental model. Present a scenario for applying the model to the software.
38. As you move outward along the process flow path of the spiral model, what can you say about the software that is being developed or maintained?
39. Describe the concurrent development model in your own words.
40. Which is more important—the product or the process?
41. Define software engineering. Explain the failure curve of software.
42. Explain in detail extreme programming.
43. Explain the umbrella activities of software process in detail.



UNIT II

1. Explain the steps for project planning.
2. Write a note on PERT chart and Gantt chart. Explain with the help of neat diagram.
3. Explain Gantt project in detail.
4. Explain Microsoft project in detail.
5. Explain Primavera project management software in detail.
6. Explain the objectives of Activity planning.
7. What do you understand by Project scheduling and Sequencing?
8. Explain network planning model.
9. Write a note on formulating network model.
10. Write short notes on user requirements.
11. Compare functional requirements with non-functional requirements
 1. Discuss system requirements in a detail manner
 2. Explain requirement engineering process.
 3. Discuss briefly how requirement validation is done?
 4. Discuss your knowledge of how an ATM is used , develop a set of
 5. use-cases that could serve as a basis for understanding the
 6. requirements for an ATM system.
 7. Describe four types of non-functional requirements that may be placed on a system.
Give examples of each of these types of requirement.
 8. Explain the kinds of system requirements
 9. Explain functional requirement.
 10. Explain non-functional requirement.
 11. Explain domain requirements.
 12. What are kinds of non-functional requirements.
 13. Explain example of functional requirement.
 14. Explain user requirements in detail.
 15. Explain system requirement in detail
 16. Explain the term stake holder
 17. Explain requirement validation.
 18. Explain requirement review.
 19. Explain SRS document and explain along with its contents.
 20. Explain interface specification in detail.
 21. Discuss how requirements are elicited and validated in software project?
 22. Discuss how feasibility studies are important in requirement engineering process.



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

23. Identify and briefly describe four types of requirements that may be defined for computer based system.
24. List out plausible user requirements for the following functions
25. a) cash dispensing function in a bank ATM
26. b) spelling check and correcting function in a word processor
27. What is requirement analysis? Explain requirement analysis tasks and principles.
28. Mention any two non-functional requirements on software to be developed.
29. What is known as SRS review? How is it conducted?
30. Distinguish between expected requirements and excited requirements.
31. What is meant by software prototyping?
32. What are the non-functional requirements of software?
33. Requirement elicitation with an example.
34. What is software specification? Write down the software requirement specification document for online railway ticket booking system.
35. What minimum features are required to be present in a good SRS?
36. How is SRS for a development project arrived at?
37. Narrate the importance of software specification of requirements. Explain a typical SRS structure and its parts.

UNIT III

1. Write a note on objectives of activity planning and project Schedules.
2. Explain the objectives of Activity planning.
3. What do you understand by Project scheduling and Sequencing?
4. Explain network planning model.
5. Write a note on formulating network model.
6. Write a note on Activity relationships(FS,SF,SS,FF)
7. Explain Forward pass and Backward pass techniques.
8. Write a note on Critical path concept and remedies.
9. Define the meaning of software design. Explain design fundamentals for software design.
10. Explain the quality attributes, considered in software design.



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

11. Explain why design is important in design engineering.
 12. Discuss analysis and design model.
 13. Describe quality attributes and its guidelines.
 14. List the design concepts.
-
15. Justify the importance of refactoring.
 16. Give short notes on low coupling.
 17. Define software architecture with its importance.
 18. Explain taxonomy of architectural styles.
 19. Write short notes on architecture patterns.
 20. Define component.
 21. Write short notes on coupling.
 22. List out the steps for conducting component level design.
 23. Write a short notes on cohesion.
 24. Design the class based components.
 25. List out the golden rules for interface design.
 26. Write a short notes on interface design steps.
 27. Describe design evaluation.
 28. List out all the design issues.
 29. Explain process in user interface design.
 30. Explain a two level process? Why should system design be finished before the detailed design, rather starting the detailed design after the requirements specification? Explain with the help of a suitable example.
 31. Discuss briefly the following fundamental concepts of software design:
 - a. Abstraction ii) Modularity iii) Information hiding.
 32. Explain briefly the following:
 - a. Coupling between the modules
 - b. The internal Cohesion of a module.
 33. Discuss the fundamental principles of structured design. Write notes on transform analysis.
 34. Explain software architecture in a detail manner.
 35. Explain software design? Explain data flow oriented design
 36. What are the goals of the user interface design.
 37. Discuss briefly about the golden rules for the user interface design
 38. Discuss interface design steps in a brief manner.
 39. Explain how the design is evaluated.
 40. Explain design processing along with its quality.



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

41. What are the design concepts in software engineering?
 42. Explain pattern based software design in a detail manner.
 43. Elaborate model for the design.
-
44. Discuss architectural styles and patterns.
 45. Explain with a neat diagram of architectural design.
 46. Elaborate modeling component level design.
 47. Describe mapping data flow into a software architecture.
 48. Explain the guide lines of component level design.
 49. Describe the way of conducting a component level design.
 50. State how do we assess quality of a software design?
 51. Suggest a design pattern that you encounter in a category of everyday things.
 52. Provide examples of three data abstractions and the procedural abstractions that can be used to manipulate them.
 53. Explain design concept:
 54. Architecture,
 55. Modularity,
 56. Pattern.
 57. What do you mean by the term Cohesion and Coupling in the context of software design? How are these concepts useful in arriving at good design of a system?
 - a. Explain design concept: Refinement.
 58. What do you understand by refactoring? Explain Refactoring.
 59. Give the importance of refactoring in improving quality of software.
 60. Differentiate between abstraction and refinement.
 61. Discuss Architectural patterns in details.
 62. What do you mean by software architecture? Explain in details.
 63. Explain Object oriented view, conventional view and process related view in detail.
 64. Write a note on: Designing class based components.
 65. What do you understand by Interface Design? Explain Interface Design.
 66. What are the types of User Interface? Explain in detail.
 67. Write down the characteristics of good user interface.
 68. What are the design principles and guidelines?
 69. Write a note on: Golden Rules.
 70. What are the design principles for reducing the user's memory load in user interface



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

design?

71. What is the necessity of a good User Interface?



72. What are the rules that keep in mind while designing a User Interface?
73. Explain the User Interface design process?
74. Justify “The analysis and design process for User Interface is iterative”.
75. Describe the User Interface analysis and design process with diagram and explain interface design element.
76. Explain the User Interface design steps.
77. What do you mean by application accessibility and internationalization in User Interface design?
78. Explain in detail user interface design issues.
79. Highlights the principles specific to the design of a Web Application Interface.
80. Enlist and explain the Web Application Interface principles in detail.

UNIT IV

1. Explain how you will track and control a project on the basis of project data?
2. What do you understand by cost monitoring? Explain.
3. Write a note on Project tracking and Change control.
4. Write a note on Earned value Analysis.
5. What do understand by Software Configuration management? Explain.
6. Write a note on Contract Management.
7. Explain the role of People, Product and Process in project management.
8. Explain the term People in project management spectrum.
9. Explain the term in brief: Stakeholders.
10. What are the categories of stakeholders? What are the characteristics of effective project manager?
11. What is W5HH principle? Explain in detail.
12. Explain in detail software process and project metrics.
13. Explain Size oriented metrics. What are the software quality factors? Explain in detail.
14. Explain any four quality measures of software.
15. What is the need of software quality?
16. What is software quality?
17. Explain different McCall’s quality factors.
18. Explain the following quality factors:
 19. Maintainability
 20. Reusability.



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

21. Explain ISO 9126 Quality Factors.
22. What is the concept of Software Reusability?
23. Explain different measures of software reliability and availability.
24. Explain in detail the concept of Software Sizing.
25. Explain: problem based estimation.
26. Explain with an example LOC Based Estimation.
27. Explain with an example Process Based Estimation.
28. Explain with an example Use Case Based Estimation.
29. Explain the quality attributes considered in software design.
30. Write a note on:
31. Human Resources
32. Reusable Resources
33. Environmental Resources.
34. What is mean by the term “Software Project Estimation”? Explain in detail.
35. Write a note on:
36. Problem Decomposition
37. Process Decomposition
38. Explain in detail the Empirical Estimation models and structure of Empirical Estimation models.
39. Explain with an example The COCMO II Model.
40. Explain with an example The Software Equation.
41. Explain the concept “Estimation of object oriented projects” in detail.
42. Explain in detail Estimation for Agile Development.
43. Explain in detail Estimation for Web Engineering Projects.
44. What is project scheduling? What are basic principles of project scheduling?
45. What is time line chart? How it is used in scheduling of software project?
46. Explain the Earn value analysis in project scheduling.

UNIT V

1. Explain Predictive versus Empirical management.
2. Write a note on comparison between Non Agile and Agile project.
3. Explain the three stages of Agile project.
4. Write a detailed note on project estimation and scope management.
5. Write a note on Project roles and responsibilities.



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

6. Define reactive and proactive risk strategies.
7. List out the generic subcategories of predictable risks.
8. Define risk components
9. List out the conditions for risk refinement
10. Demonstrate quality concepts
11. Give a short notes on formal technical reviews
12. List out review guidelines
13. Describe six sigma for software
14. Define SQA plan
15. Write a short notes on ISO 9000 quality standards
16. Give the formulae for measures of reliability and availability
17. Define software safety
18. Define risk projection
19. Define software risks and what are the types of software risks
20. Describe risk components and drivers
21. Define risk refinement
22. What does RMMM stands in RMMM plan
23. Define software reliability
24. Define quality and quality control in quality management
25. Give a short notes on risk identification
26. Define software reliability along with its terms.
27. Explain risk projection in detail
28. Explain seven principals of risk management
29. Explain software reviews in brief. Explain six sigma for software engineering
30. Explain quality management with their terms.
31. Demonstrate risk identification



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

32. Describe developing a risk table.
33. Quality and reliability are related concepts but are fundamentally different in number of ways. Discuss them.
34. Explain you have been given the responsibility for improving quality of software across your organization. What is the first thing that you should do? what's next
35. Some people argue that an FTR should assess programming style as well as correctness is this a good idea? Discuss why?
36. Demonstrate is it possible to assess the quality of software if the customer keeps changing what it is supposed to do?
37. Create a risk table for the project that if you are the project manager for a major software company. you have been asked to lead a team that's developing "next generation" word- processing software.
38. Explain about software risks?
39. Elaborate the concepts of Risk management Reactive vs Proactive Risk strategies
40. Explain about RMMM Plan?
41. Explain about Quality concepts?
42. Explain software quality assurance
43. Explain about formal technical reviews
44. Explain in detail ISO 9000 quality standards
45. Discuss risk refinement?
46. Compare reactive with proactive risk strategies
47. Discuss software reliability?
48. Briefly explain about formal approaches to SQA
49. Demonstrate statistical SQA
50. What are the types of risks? Explain in brief.
51. Explain the principles of risk management in detail.
52. What are the different categories of risk .Explain risk management process in detail.
53. Write short note on : Risk Identification.



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

54. Explain the risk identification and assessment process for software project.
55. What is risk identification? What are the different categories of risks?
56. Explain the concept Risk Table in detail with an example.
57. Explain the concept Risk refinement.
58. What is Risk Mitigation Monitoring and Management (RMMM) ? Write note on it.
59. Write short note on: RMMM.
60. Explain the RMMM plan for WMITS.
61. Describe the Risks for WMITS.
62. Describe Risk Mitigation, Monitoring and Management for WMTS.
63. Define SCM.
64. What is software configuration management?
65. What do you mean by software configuration? What is mean by software configuration management?
66. What are the configuration management system elements?
67. What is SCI's? Explain in detail.
68. What are the contents of SCM repository?
69. Explain the following in brief: SCM Repository.
70. What is SCM Repository?
71. Explain functions performed by SCM Repository.
72. Explain the contents of SCM Repository.
73. Explain the contents of SCM features.
74. Explain the following repository features with respect to software configuration management.
75. Versioning,
76. Dependency tracking,
77. Requirement tracing,
78. Configuration management,



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

79. Audit trails.
80. What are the layers of SCM process? Explain each in detail.
81. Write note on: Software Configuration process.
82. Explain the configuration management process.
83. What are the roles of Software Maintenance in Software Product?
84. Write short note on “Identification of objects in the software configuration”.
85. Explain Version control with respect to software configuration management.
86. Write short note on Configuration Audit.
87. Write short note on Status Reporting.
88. Explain Configuration Management process for WebApp.
89. Explain CVS and SVN Tools.
90. Comparison between CVS and SVN Tools.
91. What is the role of Software Maintenance in Software Product?
92. Define Modifiability. What are the types of maintenance?
93. What are the types of maintenance? Explain each in brief.
94. Write short note on: Reengineering.



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

UNIT VI

1. Write a note on Organizational behavior and managing people.
2. Explain how to select the right person for right job
3. Explain the recruitment process in detail
4. Describe the Oldham-Hackman job characteristic model.
5. What is motivation? Explain the importance of motivation in a company.
6. Briefly write on health and safety of employees in an organization.
7. Write a short note on stress. How to deal with the stress?
8. Write a note on Ethical and Professional Concerns.
9. Write short notes Decision Making.
10. Name and explain salient features of the various organizational structures used in software projects.
11. Write a note on working in dispersed and virtual teams.
12. What do you understand by communication Genres? Explain the importance of Communication Plans.
13. Explain the role of decision making while working in teams.
14. Compare verification and validation.
15. Write short notes on unit testing.
16. Describe smoke testing.
17. List out the steps for bottom-up integration.
18. List out the steps for top-down integration.
19. Write short note on integration testing.
20. Define alpha testing.
21. Define beta testing.
22. Write short notes on validation testing.
23. Explain art of debugging.
24. Describe regression testing.
25. List out the steps for integration step documentation.
26. Describe performance testing.
27. Write a short note on glass box testing.
28. Explain behavioral testing.
29. Explain about the importance of test strategies for conventional software



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

30. Discuss black box testing in a detailed view.
31. Compare black box testing with white box testing
32. Compare validation testing and system testing.
33. Discuss software quality factors? Discuss their relative importance.
34. Discuss an overview of quality metrics.
35. Explain should we perform the Validation test – the software developer or the software user? Justify your answer.
36. Explain strategic approach to software testing.
37. Describe test strategies for conventional software.
38. Describe validation testing.
39. Write a long note on system testing.
40. Demonstrate art of debugging.
41. Discuss a framework for product metrics.
42. Demonstrate metrics for analysis model.
43. Briefly list the metrics for the design model.
44. Describe metrics for source code and for testing.
45. Provide a few examples that illustrate why response time variability can be an issue.



4. Name of the Subject – Information Systems & Engineering Economics

Weekly Work Load(in Hrs)	Lecture	Tutorial	Practical
	4	-	-

In-Sem	Theory	Total Marks	Credit
30	70	100	4

4.1

Course Objectives

- 1.To prepare the students to various forms of the Information Systems and its application in organizations.
- 2.To expose the students to the managerial issues relating to information systems.
- 3.To help student to identify and evaluate various options in Information Systems.
- 4.To prepare engineering students to analyze cost / revenue data.
- 5.To prepare students for doing economic analysis in the decision making process to justify or reject alternatives / projects on an economic basis for an organization.

4.2 Course Outcomes

- Explain various forms of information systems & its applications in an organization.
- Explain the role of the major types of information systems in a business environment and their relationship to each other.
- Solve problems on time value of money.
- Apply the appropriate engineering economics and analyze the software enterprises from similar domains.
- Explain the effects of depreciation, income taxes, inflation and price change in engineering economics.



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

4.3 Syllabus

Unit	<u>Course Contents</u>	<u>Hours</u>
I	Basic of Management Theory & Practices	09
	Role of Information Systems in Organizations, The Information System Manager and his challenges, Concepts of Information Systems, Information Systems and Management Strategy Case Studies - Information Systems in the Indian Railways, Information Systems in an e-Commerce Organization.	
II	Management Information System (MIS)	09
	Managing Information Systems, Ethical and Social Issues, Information Technology Infrastructure and Choices, Information Systems Security and Control, Case Studies -Information Technology Infrastructure in a Bank, Information Technology Infrastructure in a manufacturing / process industry.	
III	Leveraging Information Systems	09
	Information Systems Development and Project Management, Managing Data Resources, Business Process Integration and Enterprise Systems, ICT for Development and E-Governance, Case Studies - in-house or cloud based ERP implementation, UIDAI Unique Identification Authority of India.	
IV	Money and Economic Value	09
	Engineering Economic Decisions, Time Value of Money, Understanding Money Management, Case Studies- Economic decisions done in Multi-national companies.	
V	Economics and Management	09
	Equivalence Calculations under Inflation, Present-Worth Analysis, Annual-Equivalence Analysis. Case Studies -comparative analysis of software enterprises from relevant domains.	
VI	Understanding Cash Flow and Taxes	09
	Accounting for Depreciation and Income Taxes, Project Cash-Flow Analysis, Understanding Financial Statements, Case Studies - cash flow analysis done in start-up companies.	



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

4.4 TEXT Books

1. Rahul De, "MIS: Management Information Systems in Business, Government and Society", Wiley India, ISBN: 13: 978-81-265-2019-0.
2. Chan S. Park , "Fundamentals of Engineering Economics", 3rd Edition, Pearson Education, ISBN 13: 978-02-737-7291-0

1

4.5

Reference Books

1. Turban and Wali, "Information Technology on Management", Willey India, ISBN:9788126558711
2. William G. Sullivan, Elin M. Wicks, C. Patrick Koelling, Engineering Economy, Pearson Education, ISBN13: 978-01-334-3927-4

4.6

Teaching Plan

	Unit No.	Date	Main Topic to be Covered	Sub Topics to be Covered	Mode of Delivery
1		26/6/18	Basic of Management Theory & Practices	Role of Information Systems in Organizations,	Chalk and Board,PPT
2		27/6/18		The Information System Manager and his challenges,	Chalk and Board,PPT
3		28/6/18		Concepts of Information Systems, Information Systems and Management Strategy	Chalk and Board,PPT
4		29/6/18		Concepts of Information Systems, Information Systems and Management Strategy	Chalk and Board,PPT
5		3/7/18		Concepts of Information Systems, Information Systems and Management Strategy	Chalk and Board,PPT
6		3/7/18		Case Studies - Information Systems in the Indian Railways,	Chalk and Board,PPT
7		4/7/18		Information Systems in an e-Commerce Organization.	Chalk and Board,PPT
8	II	5/7/18	Management Information System (MIS)	Managing Information Systems,	Chalk and Board,PPT
9		10/7/18		Ethical and Social Issues,	Chalk and Board,PPT
10		10/7/18		Information Technology Infrastructure and Choices,	Chalk and Board,PPT
11		12/7/18		Information Technology Infrastructure and Choices,	Chalk and Board,PPT
12		12/7/18		Information Systems Security and Control,	Chalk and Board,PPT



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

13		17/7/18		Case Studies -Information Technology Infrastructure in a Bank,	Chalk and Board,PPT
14		18/7/18		Information Technology Infrastructure in a manufacturing / process industry	Chalk and Board,PPT
15	III	19/7/18	Leveraging Information Systems	Information Systems Development and Project Management,	Chalk and Board,PPT
16		24/7/18		Managing Data Resources	Chalk and Board,PPT
17		24/7/18		, Business Process Integration and Enterprise Systems,	Chalk and Board,PPT
18		25/7/18		ICT for Development and E-Governance,	Chalk and Board,PPT
19	III	31/7/18	Leveraging Information Systems	ICT for Development and E-Governance,	Chalk and Board,PPT
20		31/7/18		Case Studies - in-house or cloud based ERP implementation,	Chalk and Board,PPT
21		16/8/18		UIDAI Unique Identification Authority of India.	Chalk and Board,PPT
22		16/8/18		UIDAI Unique Identification Authority of India.	Chalk and Board,PPT
23	IV	21/8/18	Money and Economic Value	Engineering Economic Decisions	Chalk and Board,PPT
24		21/8/18		Engineering Economic Decisions	Chalk and Board,PPT
25		23/8/18		Time Value of Money	Chalk and Board,PPT
26		25/8/18		Time Value of Money	Chalk and Board,PPT
27		28/8/18		Understanding Money Management	Chalk and Board,PPT
28		29/8/18		Understanding Money Management	Chalk and Board,PPT
29		29/8/18		Understanding Money Management	Chalk and Board,PPT
30		30/8/18		Case Studies- Economic decisions done in Multi-national companies.	Chalk and Board,PPT
31		4/9/18		Equivalence Calculations under Inflation,	Chalk and Board,PPT



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

32	V	5/9/18	Economics and Management	Equivalence Calculations under Inflation,	Chalk and Board,PPT
33		6/9/18		Equivalence Calculations under Inflation,	Chalk and Board,PPT
34		7/9/18		Present-Worth Analysis, Annual-Equivalence Analysis	Chalk and Board,PPT
35		7/9/18		Present-Worth Analysis, Annual-Equivalence Analysis	Chalk and Board,PPT
36		14/9/18		Present-Worth Analysis, Annual-Equivalence Analysis	Chalk and Board,PPT
37		/9/18		Case Studies -comparative analysis of software enterprises from relevant domains.	Chalk and Board,PPT
	VI	/9/18	Understanding Cash Flow and Taxes	Accounting for Depreciation and Income Taxes,	Chalk and Board,PPT
39		/9/18		Accounting for Depreciation and Income Taxes,	Chalk and Board,PPT
40		/9/18		Project Cash-Flow Analysis,	Chalk and Board,PPT
41		/9/18		Project Cash-Flow Analysis,	Chalk and Board,PPT
42		/9/18		Project Cash-Flow Analysis,	Chalk and Board,PPT
43		/9/18		Understanding Financial Statements ,	Chalk and Board,PPT
44		/9/18		Understanding Financial Statements	Chalk and Board,PPT
45		/9/18		Case Studies - cash flow analysis done in start-up companies.	Chalk and Board,PPT

4.7 Assessment Tools Details

Units	Co No.	Assessment Tool	Marks	Schedule
I	304.1	Assignment A1	10	1 st week of July 2018
		PRE1	10	4 th week of July 2018
II&III	304.2	Class Test T1	10	2 nd week of July 2018
		Quiz Q1	10	1 st week of Aug 2018
IV	304.3	Class Test T2	10	1 st week of Sept 2018
		Assignment A2	10	2 nd week of Aug 2018
V	304.4	Quiz Q2	10	3 rd week of Sept 2018
		Study Report SR	10	2 th week of Sept 2018
VI	304.5	Assignment A3	10	4 th week of Sept 2018
		Mind Map	10	4 th week of Sept 2018
		Course Exit Survey	--	1 st week of October 2018

CO No.	ASSESSMENT TOOLS USED	Total Weightage
C304.1	A1(10), PRE1(10)	20
C304.2	M1(10), T1(10)	20
C304.3	A2(10), T2(10)	20
C304.4	SR(10), M2(10)	20
C304.5	Mind Map(10),A3(10)	20
TOTAL		100

4.8

Question Bank

Unit No.-I

1. List the various challenges of IS Manager.
2. State role of information system in an organization.
3. Describe the components and resources of an information system.
4. Explain Transaction Processing System and List detailed set of transactions for purchasing a railway ticket.
5. Explain Transaction Processing System and List detailed set of transactions for purchasing a product in online shopping.
6. Explain importance (& responsibilities) of management.
7. Indicate three levels of management.
8. Explain the major function of management.
9. Enumerate the top ten IT-IS related business applications.
10. Describe the activities of an information system.
11. Write short note on:
 - a). Transaction Processing System.
 - b). Management Information system.
12. Write short note on:
 - a). Local Area network
 - b). Metropolitan area network



Unit No. II

1. Explain evolution of MIS.
2. Define MIS and state its role in an organization.
3. State and explain primary function of MIS.
4. Explain the benefit provided by MIS
5. Describe ethical issues in information society.
6. Enumerate and explain the various modes of committing cyber crime.
7. What is hacking? Describe the different types of hackers.
8. Explain concept of MIS.
9. Explain ethical and social issue related to system.
10. What are the reasons for cyber crime?
11. Give classification of cyber crime.
12. Explain client server Era in detail.

Multiple Choice Questions(MCQ)

MCQ Test

Sub: ISEE
Class: T.E. (A)

DATE:
Max.marks:10

1. _____ expressly designed for the support of individual and collective decision making.

- A. MIS
- B. DSS
- C. TPS
- D. OIS

ANSWER: B

2. _____ is formal social units devoted to the attainment of specific goals.

- A. Management
- B. Organization
- C. Decision support system
- D. None of these



ANSWER: B

3. _____ technology includes computers hardware, software, database management systems and data communication system.

- A. Information
- B. Computer
- C. Marketing
- D. All of the above

ANSWER: A

4. Which factor ensure that performance meets established standards that worker's activities occurs as planned and that the organization process.

- A. Controlling
- B. Planning
- C. Leading
- D. Organizing

ANSWER: A

5. Newspaper, magazine, radio, television are example of _____.

- A. Storing information
- B. Retrieving information
- C. Communication information
- D. Acquiring information

ANSWER: D

6. Which systems are interactive information systems that assist a decision maker in approaching ill-structured problems by offering analytical models and access to database.

- A. Decision making
- B. Systematic



C. Cognitive

D. Decision support systems

ANSWER: D

7. The components of DSS –

A. Data management sub systems

B. Model management sub system

C. Dialog management sub system

D. All of the above

ANSWER: D

8. _____ systems help to analyze historical and current data either on demand or periodically.

A. Data access system

B. Data analysis system

C. Forecast-oriented data analysis system

D. System based on accounting models

ANSWER: B

9. Buying a cinema ticket on a mobile phone is an example of what?

A. Decision-making

B. B2B e-commerce

C. M-commerce

D. C2C e-commerce

ANSWER: C

10. Which of the following is not a means of measuring the value of an IS?

A. Earnings growth



- B. Market share
- C. Customer satisfaction
- D. Systems analysis

ANSWER: D

Multiple Choice Questions(MCQ)

MCQ Test

DATE:
Max.marks:10

Sub: ISEE
Class: T.E.(A)

The concept of supply curve as used in economic theory is relevant only for the case of

- A. Oligopoly competition
- B. Perfect or pure competition
- C. Monopolistic competition
- D. Monopoly

ANSWER: B

Direct regulation of business has the potential to yield economic benefits to society when

- A. diseconomies of scale exist
- B. barriers to entry are absent
- C. there are no good substitutes for a product
- D. many firms serve a given market

ANSWER: C

Managerial economics generally refers to the integration of economic theory with business

- A. Ethics
- B. Management
- C. Practice
- D. All of the above

ANSWER: C

When a firm's average revenue is equal to its average cost, it gets.....

- A. Super profit
- B. Normal profit
- C. Sub normal profit
- D. None of the above

ANSWER: B

Which property the paper money does not possess

- A. Acceptability



- B. Divisibility
 - C. Durability
 - D. Portability
- ANSWER: C

Other things being equal, an increase in supply can be caused by

- A. A rise in the income of the consumer
- B. An improvement in the techniques of production
- C. A rise in the price of the commodity
- D. An increase in the income of the seller

ANSWER: B

Managerial economics cannot be used to identify

- A. microeconomic consequences of managerial behavior.
- B. how macroeconomic forces affect the organization.
- C. goals of the organization.
- D. ways to efficiently achieve the organization's goals.

ANSWER: C

Which is the best definition of the marginal firm?

- A. The firm with lowest costs
- B. The firm with the large profit
- C. The firm which makes only normal profit
- D. The firm which equates its marginal costs with marginal revenue.

ANSWER: C

Which is NOT a desirable characteristic of money?

- A. Portable
- B. Uniform
- C. Easily recognized
- D. Easily duplicated

ANSWER: D

A Ten rupee note is

- A. Token money
- B. Credit money
- C. Legal money
- D. (a) and (c) of above

ANSWER: D



5. Subject – Computer Networks and Security

Weekly Work Load(in Hrs)	Lecture	Tutorial	Practical
	3hrs	-----	2hrs

In-sem	Theory	Practical	Oral	Term-work	Total Marks	Credit
30	70	--	25	25	150	4

5.1 Course Objectives

- To understand the fundamental concepts of networking standards, protocols and technologies
- To learn different techniques for framing, error control, flow control and routing
- To learn different layer protocols in the protocol stacks
- To understand modern network architectures with respect to design and performance
- To learn the fundamental concepts of Network Security

5.2 Course Outcomes

- Summarize fundamental concepts of Computer Networks, architectures, protocols and technologies
- Illustrate the working and functions of data link layer
- Analyze the working of different routing protocols and mechanisms
- Implement client-server applications using sockets
- Illustrate role of application layer with its protocols, client-server architectures
- Comprehend the basics of Network Security.

5.3 Syllabus

Unit No.	Contents	Hours
I	Introduction To Computer Networks Definition, Types of Networks: Local area networks (LAN), Metropolitan area networks (MAN), Wide area networks (WAN), Wireless networks, Networks Software, Protocol, Design issues for the Network layers. Network Models: The OSI Reference Model, TCP/IP Model, Network Topologies, Types of Transmission Medium. Network Architectures: Client-Server, Peer To Peer, Hybrid. Network Devices: Bridge, Switch, Router, Gateway, Access Point. Line Coding Schemes: Manchester and Differential Manchester Encodings, Frequency Hopping (FHSS) and Direct Sequence Spread Spectrum (DSSS).	06
II	Data Link Layer Introduction, functions. Design Issues: Services to Network Layer, Framing. ARQ strategies: Error detection and correction, Parity Bits, Hamming Codes (11/12-bits) and CRC. Flow Control Protocols: Unrestricted Simplex, Stop and Wait, Sliding Window Protocol. WAN Connectivity: PPP and HDLC. MAC Sub layer: Multiple Access Protocols: Pure and Slotted ALOHA, CSMA, WDMA, CSMA/CD, CSMA/CA, Binary Exponential Back-off algorithm, Introduction to Ethernet IEEE 802.3, IEEE 802.11 a/b/g/n, IEEE 802.15 and IEEE 802.16 Standards.	08
III	Network Layer Introduction: Functions of Network layer. Switching Techniques: Circuit switching, Message Switching, Packet Switching. IP Protocol: Classes of IP (Network addressing), IPv4, IPv6, Network Address Translation, Sub-netting, CIDR. Network layer Protocols: ARP, RARP, ICMP, IGMP. Network Routing and Algorithms: Static Routing, Dynamic Routing, Distance Vector Routing, Link State Routing, Path Vector. Routing Protocols: RIP, OSPF, BGP, MPLS. Routing in MANET: AODV, DSR, Mobile IP.	08
IV	Transport Layer Process to Process Delivery, Services, Socket Programming. Elements of Transport Layer Protocols: Addressing, Connection establishment, Connection release, Flow control and buffering, Multiplexing, Congestion Control. Transport Layer Protocols: TCP and UDP, SCTP, RTP, Congestion control and Quality of Service (QoS), Differentiated services, TCP and UDP for Wireless networks.	07



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

V	Application Layer Introduction, Web and HTTP, Web Caching, DNS, Email: SMTP, MIME, POP3, Webmail, FTP, TELNET, DHCP, SNMP.	06
VI	Security Introduction, Security services, Need of Security, Key Principles of Security, Threats and Vulnerabilities, Types of Attacks, ITU-T X.800 Security Architecture for OSI, Security Policy and mechanisms, Operational Model of Network Security, Symmetric and Asymmetric Key Cryptography. Security in Network, Transport and Application: Introduction of IPSec, SSL, HTTPS, S/MIME, Overview of IDS and Firewalls.	07

5.4 Text Books:

T1	FourauzanB., "Data Communications and Networking", 5 th Edition, TataMcGraw-Hill, Publications, ISBN:0-07 - 058408 - 7
T2	Andrew S. Tanenbaum, "Computer Networks", 5th Edition, Pearson India, 2012.

5.5 Reference Books:

R1	Kurose, Ross, "Computer Networking a Top Down Approach Featuring the Internet", Pearson, ISBN-10: 0132856204
R2	L. Peterson and B.Davie, "Computer Networks:A Systems Approach", 5th Edition, Morgan-Kaufmann, 2012.
R3	Douglas E. Comer & M.S Narayanan, "Computer Network & Internet", Pearson Education
R4	William Stallings, "Cryptography and Network Security: Principles and Practice", 4th Edition
R5	Pachghare V. K., "Cryptography and Information Security", 3 rd Edition, PHI,

5.7 Teaching Plan

Sr. No.	Unit	Broad Topic to be covered	Books Referred	Total Lectures Planned
1	I	Introduction To Computer Networks	T1 &T2	6
2	II	Data Link Layer	T1 &T2	8
3	III	Network Layer	T1 &T2	8
4	IV	Transport Layer	T1 &T2	7
5	V	Application Layer	T1 &T2	6
6	VI	Security	T1 &T2	7

5.8 Assessment Tools Details

Sr. No.	Assessment Tool	Total in number	Marks
1	Class Test (T1 to T3)	Each of 20 marks	60
2	Assignment I	20 marks	20
3	Knowledge Survey	20 marks	20
Total			100

5.9 Assessment Tool Planner

Units	Co No.	Assessment Tool	Marks	Schedule
I	C305.1	TEST-I	20	4 th week of August 2022
II, III	C305.2	KNOWLEDGE SURVEY	20	3 rd week of October 2022
IV	C305.3	ASSIGNMENT	20	3 rd week of August 2022
V	C305.4	TEST-II	20	4 th week of September 2022
VI	C305.5	TEST-III	20	3 rd week of October 2022

5.10 Question Bank

Question Bank – Module 1

Subject: Computer Network & Security

Year/Sem: Third Year(2019-20)/V Sem

Q.1) What are the design issues of layer? Explain it. (Aug 17)

Q.2) What are the different network devices? Explain difference between switch and hub.
(Aug 17, Dec 17)

Q.3) What is encoding? Give the Manchester line code and differential Manchester code for the bit sequence : 1100110. (Aug 17)

Q.4) Differentiate between OSI and TCP/IP reference model. (Dec 17, May 18)

Q.5) Represent 101011100 using Manchester and differential Manchester line coding technique. (Dec 17)

Q.6) Explain in brief FHSS and DSSS. (Dec 17, May 18, Dec 18)



Q.7) What are different type of topology? Explain any one. (Dec 18)

Q.8) For the bit sequence 10000101111 draw the waveform for (i) Manchester Encoding (ii) Differential Manchester Encoding. (Dec 18)

Question Bank – Module 2

Q.1) Compare and contrast the Go Back N ARQ protocol with Selective Repeat ARQ. (Aug 17, Dec 17, May 18, Dec 18)

Q.2) Explain control field of HDLC w.r.t. I-frame, S-frame and U-frame. (Aug 17, Dec 17, May 18)

Q.3) The data word 1101011011 is to be sent using generator polynomial $x^4 + x + 1$. Use CRC to compute the codeword at the sender side. (Aug 17)

Q.4) A bit stream 1001101 is transmitted using an hamming code. Show the actual bit string transmitted. Suppose 7th bit from left is inverted during transmission, show that this error is detected and corrected at the receivers end. (Dec 17)

Q.5) Explain the working of cyclic redundancy check (CRC) using the following example (show the complete steps of division). Data Bit: 1101110110 Generator polynomial : $x^3 + x + 1$. Write the redundant bits that will be sent along with the data bits. (Dec 18)

Q.6) In a stop-and-wait system, the b/w of the line is 2 Mbps and 1 bit takes 20 milliseconds to make a round trip. What is the b/w delay product? If the system data packets are 2000 bits in length, What is the utilization percentage of the link? (Dec 17, May 18)

Q.7) Calculate the throughput for stop and wait protocol, If the frame size is 4800 bits, bit rate is 9600bps, within distance 2000km with speed of propagation 200000 km/s. (May 18)

Q.8) In a stop-and-wait system, the b/w of the line is 1 Mbps and 1 bit takes 10 milliseconds to make a round trip. What is the b/w delay product? If the system data packets are 1000 bits in length, What is the utilization percentage of the link? (Dec 18)

Question Bank – Module 3

Q.1) Explain working of CSMA/CD. (Aug 17, May 18)

Q.2) Draw flowchart of CSMA/CA. (Dec 17)

Q.3) Explain in brief: FHSS and DSSS. (Dec 17, May 18, Dec 18)

Q.4) Draw and explain frame format of 802.16. (Aug 17)

Q.5) Explain Bluetooth 802.15 frame format. (May 18)

Q.6) Explain 802.11 wireless frame format. (Dec 18)



6. Subject – Skill Development Lab

COURSE DETAILS DOCUMENT

Class – TE

Course Name – Skill Development Lab

Course Code – 310246

Course No. – 306

Teaching Scheme

TUT- 02 Hour/Week

Practical – 4 Hrs./wk.

Marking Scheme

TW: 50 marks

Oral: 50 marks

Course Objectives

1. To adapt the usage of modern tools and recent software.
2. To evaluate problems and analyze data using current technologies
3. To learn the process of creation of data-driven web applications using current technologies
4. To understand how to incorporate best practices for building enterprise applications
5. To learn how to employ Integrated Development Environment(IDE) for implementing and testing of software solution
6. To construct software solutions by evaluating alternate architectural patterns.

Course Outcomes

CO No.	Year of study 2017-18	Bloom's taxonomy	Bloom's Level
At the end of the course students will be able to -			
C306.1	Make use of data structures and collection framework to develop a system.	Apply and create	L3,L6
C306.2	Apply socket programming, JDBC, multithreading concept to develop a system.	Apply and create	L3,L6
C306.3	Develop a real-time application in team and demonstrate it.	Create	L6
C306.4	Solve problems of critical thinking, logical ability and vocabulary skills	Apply	L3



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

List of Assignments

Sr. No.	Title	Bloom's Level
LA1	Design a system with the help of advance data structures in Java and enhance the system using collections and generics.	L3,L6
LA2	Enhance the above system with the help of socket programming use client server architecture.	L6
LA3	Enhance above system by using JDBC, Multithreading, concurrency, synchronous and asynchronous callbacks, ThreadPools using ExecutorService.	L6
LA4	Transform the above system from command line system to GUI based application	L6
LA5	Download Install and Configure Android Studio on Linux/windows platform.	L6
LA6	Design a mobile app for media player.	L6
LA7	Design a mobile app to store data using internal or external storage.	L6
LA8	Design a mobile app using Google Map and GPS to trace the location.	L6

COURSE ASSESMENT

Sr. No.	Type	Weightage
1	Direct Assessment (Internal + External)	80%
2	Indirect Assessment (Course Exit Survey)	20%
TOTAL		100%



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

DIRECT ASSESMENT (80% Weightage)

Activities planned / assessment tools to be used to achieve Course Outcomes

Internal Assessment Tools (20% Weightage)

Sr. No.	Assessment Tool	Total in number	Marks scale down to
1	Lab Assignments (LA1 to LA8)	Each of 10 marks	80
2	Assignment(A1)	Each of 10 marks	10
3	Mock Oral (MO)	01	50
4	Mini Project(MP)	01	10
5	MCQ(M1)	01	10
Total			160

Rubrics for evaluation of Practical Assignment of 10 Marks Each .

Problem Solving Ability and logic	Basic Concept: Knowledge Understanding	Execution of assignment & Inference Drawn	On time Submission
2	2	4	2

External Assessment Tools (80% Weightage)

Sr. No.	Assessment Tool	Marks scale down to
1	TW	50
2	Oral	50
Total		100

Internal Assessment tools to CO mapping

CO No.	ASSESSMENT TOOLS USED	Total Weightage
C306.1	LA1, MO	10
C306.2	LA2, LA3, LA4, MO	30
C306.3	LA5, LA6, LA7, LA8,MP, MO	50



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

C306.4	A1,M1	20
TOTAL		110(Except mock)

External Assessment tools to CO mapping

CO No.	ASSESSMENT TOOLS USED	
C306.1	TW (50)	ORAL (50)
C306.2		
C306.3		
C306.4		
Marks	50	50
Total Marks	100	

INDIRECT ASSESMENT (20% Weightage)

- **Course Exit Survey (to be submitted at the end of the course)**



6. Subject – DBMS Lab

COURSE DETAILS DOCUMENT

Class – TE (2019 Course)

Course Name – Database Management System Lab

Course Code –310246

Teaching Scheme

Lab–4Hrs/wk

Course No. -306

Marking Scheme

Term work: 25 Marks

Practical: 25 Marks

Companion Course Database Management System (310241)

Course Objectives:

- To develop Database programming skills
- To develop basic Database administration skills
- To develop skills to handle NoSQL database
- To learn, understand and execute process of software application development

Course Outcomes

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

CO No.	Year of study 2021-22	Mapping to POs/PSOs		
		Substantial	Moderate	Low
CO1	Design E-R Model for given requirements and convert the same into database tables	3,5,9,15	13	2,6,7,8,10,12,
CO2	Design schema in appropriate normal form considering actual requirements	3,9	1,2,5,13,15	7,11,14
CO3	Implement SQL queries for given requirements, using different SQL concepts	9,15	3,5,12,13	2,6,8,14
CO4	Implement PL/SQL Code block for given requirements	9,15	3,5,10,13,14	2,11
CO5	Implement NoSQL queries using MongoDB	9,15	3,5,7,13,14	2,10,12
CO6	Design and develop application considering actual requirements and using database concepts	3,5,9,15	1,2,11,13,14	6,12

List of Assignments

Course	Sr. No.	Title
--------	---------	-------



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

No.		
C306	LA1	<p>ER Modeling and Normalization: Decide a case study related to real time application in group of 2-3 students and formulate a problem statement for application to be developed. Propose a Conceptual Design using ER features using tools like ERD plus, ER Win etc. (Identifying entities, relationships between entities, attributes, keys, cardinalities, generalization, specialization etc.) Convert the ER diagram into relational tables and normalize Relational data model.</p>
	LA2	<p>SQL Queries: a. Design and Develop SQL DDL statements which demonstrate the use of SQL objects such as Table, View, Index, Sequence, Synonym, different constraints etc. b. Write at least 10 SQL queries on the suitable database application using SQL DML statements.</p>
	LA3	<p>SQL Queries - all types of Join, Sub-Query and View: Write at least 10 SQL queries for suitable database application using SQL DML statements.</p>
	LA4	<p>Unnamed PL/SQL code block: Use of Control structure and Exception handling is mandatory. Suggested Problem statement: Consider Tables: 1. Borrower(Roll_no, Name, DateofIssue, NameofBook, Status) 2. Fine(Roll_no, Date, Amt) Accept Roll_no and NameofBook from user.</p> <ul style="list-style-type: none"> • Check the number of days (from date of issue). • If days are between 15 to 30 then fine amount will be Rs 5per day. • If no. of days>30, per day fine will be Rs 50 per day and for days less than 30, Rs. 5 perday. • After submitting the book, status will change from I to R. • If condition of fine is true, then details will be stored into fine table. • Also handles the exception by named exception handler or user define exception handler. <p style="text-align: center;">OR</p> <p>Write a PL/SQL code block to calculate the area of a circle for a value of radius varying from 5 to 9. Store the radius and the corresponding values of calculated area in an empty table named areas, consisting of two columns, radius and area.</p>
	LA5	<p>Named PL/SQL Block: PL/SQL Stored Procedure and Stored Function. Write a Stored Procedure namely proc_Grade for the categorization of student. If marks scored by students in examination is ≤ 1500 and $\text{marks} \geq 990$ then student will be placed in distinction category if marks</p>



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

	<p>scored are between 989 and 900 category is first class, if marks 899 and 825 category is Higher Second Class.</p> <p>Write a PL/SQL block to use procedure created with above requirement. Stud_Marks(name, total_marks) Result(Roll, Name, Class)</p>
LA6	<p>Cursors: (All types: Implicit, Explicit, Cursor FOR Loop, Parameterized Cursor) Write a PL/SQL block of code using parameterized Cursor that will merge the data available in the newly created table N_RollCall with the data available in the table O_RollCall. If the data in the first table already exist in the second table then that data should be skipped.</p>
LA7	<p>Database Trigger (All Types: Row level and Statement level triggers, Before and After Triggers). Write a database trigger on Library table. The System should keep track of the records that are being updated or deleted. The old value of updated or deleted records should be added in Library_Audit table.</p>
LA8	<p>Database Connectivity: Write a program to implement MySQL/Oracle database connectivity with any front end language to implement Database navigation operations (add, delete, edit etc.)</p>
LA9	<p>MongoDB Queries: Design and Develop MongoDB Queries using CRUD operations. (Use CRUD operations, SAVE method, logical operators etc).</p>
LA10	<p>MongoDB - Aggregation and Indexing: Design and Develop MongoDB Queries using aggregation and indexing with suitable example using MongoDB.</p>
LA11	<p>MongoDB - Map reduces operations: Implement Map reduces operation with suitable example using MongoDB.</p>
LA12	<p>Database Connectivity: Write a program to implement MongoDB database connectivity with any front end language to implement Database navigation operations (add, delete, edit etc.).</p>
LA13	<p>MongoDB Queries: Design and Develop MongoDB Queries using CRUD operations. (Use CRUD operations, SAVE method, logical operators etc).</p>
Mini project	<p>Using the database concepts covered in Group A and Group B, develop an application with following details:</p> <ol style="list-style-type: none"> 1. Follow the same problem statement decided in Assignment -1 of Group A. 2. Follow the Software Development Life cycle and other concepts learnt in Software Engineering Course throughout the implementation. 3. Develop application considering: <ul style="list-style-type: none"> • Front End : Java/Perl/PHP/Python/Ruby/.net/any other language



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

		<ul style="list-style-type: none"> • Backend : MongoDB/MySQL/Oracle <p>4. Test and validate application using Manual/Automation testing.</p> <p>5. Student should develop application in group of 2-3 students and submit the Project Report which will consist of documentation related to</p> <p>different phases of Software DevelopmentLife Cycle:</p> <ul style="list-style-type: none"> • Title of the Project, Abstract, Introduction • Software Requirement Specification • Conceptual Design using ER features, Relational Model in appropriate Normalize form • Graphical User Interface, Source Code • Testing document • Conclusion.
--	--	---

DIRECT ASSESMENT (100% Weightage)

Activities planned / assessment tools to be used to achieve Course Outcomes

Internal Assessment Tools (20% Weightage)

Sr. No.	Assessment Tool	Marks	Marks scale down to
1	Lab Assignments (LA1-LA13)	5 marks each	65
2	Mini Project	15 marks	15
3	Mock Practical(MP)	20 marks	20
Total			100

Rubrics for evaluation of Practical Assignment of 10 Marks Each.

Problem Solving Ability and logic	Basic Concept: Knowledge Understanding	Execution of assignment & Inference Drawn	On time Submission	Total
1	1	2	1	5

Rubrics for Evaluation of Mini Project

Planning of Project Work	Implementation	Technical Knowledge and Awareness related to the Project	Regularity and Attendance	Total
3	5	5	2	15



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

Rubrics for Mock Practical

Rubrics for Mock Practical		
Implementation	Oral	Total
10	10	20

External Assessment Tools (80% Weightage)

Sr. No.	Assessment Tool	Marks scale down to
1	TW	25
2	Practical	25
Total		50



Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING

7. Subject – Audit Course-III (Cyber Security)

COURSE DETAILS DOCUMENT

Class – TE – B

Course Name – Computer Network Lab

Course Code – 310248

Teaching Scheme

Practical – 2 Hrs/wk

Course No. – 308

Marking Scheme

Practical: 50 marks

Course Objectives

1. To establish communication among the computing nodes in various network architecture.
2. Configure the computing nodes with understanding of protocols and technologies.
3. Use different communicating modes and standards for communication.
4. Use modern tools for network traffic analysis

Course Outcomes

Related Course No	CO No.	Year of study 2017-18	Bloom's taxonomy	Bloom's Level
At the end of the course students will be able to -				
C308	C308.1	Assess the network for data transfer, error control and flow control.	Evaluating	L5
	C308.2	Construct routing algorithm with the help of modern tools.	Applying	L3
	C308.3	Analyze socket programming at transport layer.	Analyzing	L4
	C308.4	Elaborate the services provided by application layer across the network.	Creating	L6



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

List of Assignments

Course No.	Sr. No.	Title	Bloom's Level
C308	LA1	Using Layer 2 Switch of minimum four computers setup a wired LAN test it with PING utility and demonstrate the PING packets captured traces using Wireshark Packet Analyzer Tool. Extend the same Assignment for Wireless using Access Point	L5
	LA2	Write a Program with following four options to transfer- a. Characters separated by space b. One Strings at a time c. One Sentence at a time d. file between two RS 232D or USB ports using C/C++. (To demonstrate Framing, Flow control, Error control).	L5
	LA3	Write a program for error detection and correction for 7/8 bits ASCII codes using Hamming Codes or CRC. Demonstrate the packets captured traces using Wireshark Packet Analyzer Tool for peer to peer mode.(50% students will perform Hamming Code and others will perform CRC)	L5
	LA4	Write a program to simulate Go back N and Selective Repeat Modes of Sliding Window Protocol in peer to peer mode and demonstrate the packets captured traces using Wireshark Packet Analyzer Tool for peer to peer mode.	L5
	LA5	Write a program to demonstrate subnetting and find the subnet masks.	L3
	LA6	Write a program to simulate the behavior of link state routing protocol to find suitable path for transmission.	L3
	LA7	Write a program using TCP socket for wired network for following a. Say Hello to Each other (For all students) b. File transfer (For all students) c. Calculator (Arithmetic) (50% students) d. Calculator (Trigonometry) (50% students) Analyze the packets captured traces using Wireshark Packet Analyzer Tool for peer to peer mode.	L4
	LA8	Write a program using UDP Sockets to enable file transfer (Script, Text, Audio and Video one file each) between two machines. Analyze the packets captured traces using Wireshark Packet Analyzer Tool for peer to peer mode.	L4
	LA9	Write a program to analyze following packet formats captured through Wireshark for wired network. 1. Ethernet 2. IP 3.TCP 4. UDP	L4
	LA10	Write a program to simulate the behavior of Slow Start and AIMD (Additive Increase and Multiplicative Decrease) congestion control protocols. (Use JAVA/PYTHON)	L4
	LA11	Write a program for DNS lookup. Given an IP address input, it should return URL and vice-versa.	L6
	LA12	Write a program for DNS lookup. Given an IP address input, it should return URL and vice-versa.	L6
	LB1	Write a Program to transfer- By using Bluetooth a. Characters separated by space b. One Strings at a time c. One Sentence at a time d. File	L5
	LB2	Using any network simulation tools create a network with three nodes and establish a TCP connection between node 0 and node 1 such that node 0 will send TCP packet to node 2 via node 1	L4



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

	LB3	Write a program using TCP sockets for wired network to implement a. Peer to Peer Chat b. Multiuser Chat Demonstrate the packets captured traces using Wireshark Packet Analyzer Tool for peer to peer mode.	L4
	LB4	Write a program using UDP sockets for wired network to implement a. Peer to Peer Chat b. Multiuser Chat Demonstrate the packets captured traces using Wireshark Packet Analyzer Tool for peer to peer mode.	L4
	LB5	Write a program to prepare TCP and UDP packets using header files and send the packets to destination machine in peer to peer mode. Demonstrate the packets captured traces using Wireshark Packet Analyzer Tool for peer to peer mode.	L4
	LB6	Use network simulator NS2 to implement: a. Monitoring traffic for the given topology b. Analysis of CSMA and Ethernet protocols c. Network Routing: Shortest path routing, AODV. d. Analysis of congestion control (TCP and UDP).	L3
	LB7	Using packet Tracer, configure RIP/OSPF/BGP.	L3

COURSE ASSESMENT

Sr. No.	Type	Weightage
1	Direct Assessment (Internal + External)	80%
2	Indirect Assessment (Course Exit Survey)	20%
TOTAL		100%

DIRECT ASSESMENT (80% Weightage)

Activities planned / assessment tools to be used to achieve Course Outcomes

Internal Assessment Tools (20% Weightage)

Sr. No.	Assessment Tool	Total in number	Marks scale down to
1	Lab Assignments (LA1 to LA12) (Out of 12 Implement and Submit 8 – (LA1, LA7, LA8, LA9 any 4 from (LA2 to LA6)) and (LA10 to LA12)).	8 (each of 10 marks)	80
	Lab Assignments (LB1 to LB7) (Out of 7 Implement and Submit 4 – (LB6, LB7 any2 from (LB1 to LB5)).	4 (each of 10 marks)	40
2	Mock Practical (MP)	01	25
Total			145

Rubrics for evaluation of Practical Assignment of 10 Marks Each.

Problem Solving Ability and logic	Basic Concept: Knowledge Understanding	Execution of assignment & Inference Drawn	Presentation
2	2	4	2

Rubrics for Mock Practical (MPR)

Implementation	Presentation (Logic Explanation)	Algorithm or flow chart
----------------	----------------------------------	-------------------------



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

15	5	5
----	---	---

External Assessment Tools (80% Weightage)

Sr. No.	Assessment Tool	Marks scale down to
1	Practical	50
2	TW	25
Total		75

Internal Assessment tools to CO mapping

CO No.	ASSESSMENT TOOLS USED	Total Weightage
C308.1	(LA1 to LA4) , (LB1), MP	55
C308.2	(LA5, LA6, LB6, LB7) , MP	50
C308.3	(LA7 to LA10, LB3 to LB5), MP	75
C308.4	(LA11, LA12) , MP	25
TOTAL		205

External Assessment tools to CO mapping

CO No.	ASSESSMENT TOOLS USED	
C308.1	PRACTICAL (50)	TW(25)
C308.2		
C308.3		
C308.4		
Marks	50	25
Total Marks	75	



9. Subject – Audit Course-III (Cyber Security)

COURSE DETAILS DOCUMENT

Class – TE

Course Name – Audit Course-III (Cyber Security)

Course Code – 310249

Course No. – C309

Teaching Scheme

Marking Scheme

Lab – 2 Hrs/week

Grade – AP

Prerequisite course: Discrete Mathematics, Computer Network.

Companion Course: Information and Cyber Security.

Course Objectives

- To assess the current security landscape, the general status of common vulnerabilities, and the likely consequences of security failures.
- To critique and assess the strengths and weaknesses of general cyber security models.
- To appraise the interrelationships among elements that comprises a modern security system.
- To assess how all domains of security interact to achieve effective system-wide security at the enterprise level.

Course Outcomes

CO No.	Year of study 2020-21	Mapping to POs/PSOs		
		Substantial	Moderate	Low
At the end of the course students will be able to -				
C309.1	Explain the elements of Information security and models of N/W security.		1	12, 13, 15
C309.2	Classify different authentication methods, protocols and standards for electronic mail security.		1	2, 12, 13
C309.3	Explain intrusion detection system, firewall and hacking.		1	12, 13,14, 15



**Progressive Education Society's
Modern College of Engineering
DEPARTMENT OF COMPUTER ENGINEERING**

DIRECT ASSESMENT (100%)

Activities planned / assessment tools to be used to achieve Course Outcomes

Internal Assessment Tools (20% Weightage)

Sr. No.	Assessment Tool	Total in number	Marks scale down to
1	Presentation(P1)	01- 10 marks	10
2	Test (MCQ1-2)	Each of 10 marks	20
Total			30

External Assessment Tools (80% Weightage)

Sr. No.	Assessment Tool	Total in number	Marks scale down to
1	Grade	01	PP
Total			PP