

POOJYA DODDAPPA APPA COLLEGE OF ENGINEERING, KALABURAGI
Choice Based Credit System (CBCS)
Scheme of Teaching and Examination 2021 – 22 - (Effective from the academic year 2021 – 22)
INFORMATION SCIENCE AND ENGINEERING

V Semester

Sl. No.	Course and Course Code		Course Title	Teaching Department	Teaching Hours/Week				Examination			Credits	
					Theory Lecture	Tutorial	Practical/ Drawing	Self Study	Duration in hours	CIE Marks	SEE Marks		Total Marks
1.	PC	21IS51	Automata Theory and Computability	ISE	2	2	0		03	50	50	100	3
2.	IPCC	21IS52	Database Management System	ISE	3	0	2		03	50	50	100	4
3.	PC	21IS53	Operating System	ISE	2	2	0		03	50	50	100	3
4.	PC	21IS54	Software Engineering	ISE	2	2	0		03	50	50	100	3
5.	PCL	21ISL55	Operating System Lab	ISE	0	0	2		03	50	50	100	1
6.	AEC	21RMI56	Research Methodology & Intellectual Property Rights	HSMS	1	2	0		03	50	50	100	2
7.	HSMS	21CIV57	Environmental Studies	Civil	0	2	0		02	50	50	100	1
8.	AEC	21ISAE581	Ability Enhancement Course (Internet of things)	ISE	0	0	2		02	50	50	100	1
Total										400	400	800	18

Note: **HSMC: Humanity and Social Science & Management Courses: The course is made mandatory for the Non Circuit Branches during the ODD Cycle and for the Circuit Branches during the EVEN Cycle.** ., IPCC: Integrated Professional Core Course, AEC –Ability Enhancement Course ,INT –Internship, L –Lecture, T – Tutorial, P- Practical/ Drawing, S – Self Study Component, CIE: Continuous Internal Evaluation, SEE: Semester End Examination.

Integrated Professional Core Course (IPCC): refers to Professional Theory Core Course Integrated with Practical of the same course. Credit for IPCC can be 04 and its Teaching – Learning hours (L : T : P) can be considered as (3 : 0 : 2) or (2 : 2 : 2). Theory part of the IPCC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by CIE only and there shall be no SEE.

For more details the regulation governing the Degree of Bachelor of Engineering/Technology (BE/B.Tech.) 2021-22 may be referred.

Ability Enhancement Course

Sl. No.	Course code	Course Title
1	21ISAE581	Internet of Things

POOJYA DODDAPPA APPA COLLEGE OF ENGINEERING, KALABURAGI
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Scheme of Teaching and Examination 2021 – 22
(Effective from the academic year 2021 – 22)

VI Semester

Sl. No.	Course and Course Code		Course Title	Teaching Department	Teaching Hours/Week				Examination			Credits	
					Theory Lecture	Tutorial	Practical/ Drawing	Self Study	Duration in hours	CIE Marks	SEE Marks		Total Marks
1.	HSMC	21HU61	Entrepreneurship, Management and Finance	Respective Dept.	2	2	0		03	50	50	100	3
2.	IPCC	21IS62	Computer Networks	Respective Dept.	3	0	2		03	50	50	100	4
3.	PC	21IS63	Web Technology and J2EE		2	2	0		03	50	50	100	3
4.	PEC	21IS64X	Professional Elective-I		2	2	0		03	50	50	100	3
5.	OEC	21IS65OEX	Open Elective – I		2	2	0		03	50	50	100	3
6.	PCCL	21ISL66	Web Technology and J2EE Lab		0	0	2		03	50	50	100	1
7.	MP	21ISMP67	Mini Project		Two contact hours /week for interaction between the faculty and student					50		50	2
8.	INT	21INT68	Innovation/Entrepreneurship /Societal Internship		Completed during the intervening period of IV and V semesters.					50		50	3
Total										400	300	700	22

Professional Elective – I		
Sl. No.	Course code	Course Title
1.	21IS641	Cloud Computing
2.	21IS642	Digital Image Processing
3.	21IS643	Mobile Application Development

Open Elective – I		
Sl. No.	Course code	Course Title
1.	21IS65OE1	Introduction to Cyber Security



ಪಿ.ಡಿ.ಎ. ತಾಂತ್ರಿಕ ಮಹಾವಿದ್ಯಾಲಯ

ಎಐಸಿಟಿ ನವದೆಹಲಿ ಇಂದ ಮಾನ್ಯತೆ ಪಡೆದ - ಖ್ವಿಟಿಯು ಬೆಳಗಾವಿ ಸಂಯೋಜಿತ ಸ್ವಾಯತ್ತ ಸಂಸ್ಥೆ

PDA COLLEGE OF ENGINEERING

Autonomous Institute Affiliated to VTU Belagavi - Approved by AICTE New Delhi

AUTOMATA THEORY AND COMPUTABILITY		
Subject Code:	21IS51	Credits:3
CIE: 50 Marks	SEE: 50 Marks	SEE: 03 Hrs.
Hours/Week:03Hrs (Theory)		Total Hours:42 Hrs.
Prerequisite: The students should have good knowledge of discrete mathematical structures, data structures, programming principles and computer architecture.		
Course Learning Objectives To enable the students to obtain the knowledge of Automata Theory and Computability in the following topics:		
<ul style="list-style-type: none">• Introduce core concepts in Automata and Theory of Computation to design automata generating a certain language.• Design regular expression and identify different formal language Classes and their relationships• Design grammars and recognizers for different formal languages and translate between deterministic and non deterministic pushdown automata.• Define Turing machines performing simple tasks to prove or disprove theorems in automata theory using their properties• Determine the decidability and intractability of Computational problems		
Modules		Teaching Hours
Module 1 Why study the Theory of Computation, Languages and Strings: Strings, Languages. A Language Hierarchy, Computation, Finite State Machines (FSM): Deterministic FSM, Regular languages, Designing FSM, Nondeterministic FSMs, From FSMs to Operational Systems, Simulators for FSMs, Minimizing FSMs, Canonical form of Regular languages, Finite State Transducers, Bidirectional Transducers		8 Hrs.
Module 2 Regular Expressions (RE): what is a RE?, Kleene's theorem, Applications of REs, Manipulating and Simplifying REs. Regular Grammars: Definition, Regular Grammars and Regular languages. Regular Languages (RL) and Non regular Languages: How many RLs,		9 Hrs.

To show that a language is regular, Closure properties of RLs, to show some languages are not RLs.	
<p style="text-align: center;">Module 3</p> <p>Context-Free Grammars(CFG): Introduction to Rewrite Systems and Grammars, CFGs and languages, designing CFGs, simplifying CFGs, proving that a Grammar is correct, Derivation and Parse trees, Ambiguity, Normal Forms. Pushdown Automata (PDA): Definition of non-deterministic PDA, Deterministic and Non-deterministic PDAs, Non-determinism and Halting, alternative equivalent definitions of a PDA, alternatives that are not equivalent to PDA.</p>	8 Hrs.
<p style="text-align: center;">Module 4</p> <p>Context-Free and Non-Context-Free Languages: Where do the Context-Free Languages(CFL) fit, Showing a language is context-free, Pumping theorem for CFL, Important closure properties of CFLs, Deterministic CFLs. Algorithms and Decision Procedures for CFLs: Decidable questions, Un-decidable questions. Turing Machine: Turing machine model, Representation, Language acceptability by TM, design of TM, Techniques for TM construction</p>	8 Hrs.
<p style="text-align: center;">Module 5</p> <p>Variants of Turing Machines (TM), The model of Linear Bounded automata: Decidability: Definition of an algorithm, decidability, decidable languages, Undecidable languages, halting problem of TM, Post correspondence problem. Complexity: Growth rate of functions, the classes of P and NP, Quantum Computation: quantum computers, Church-Turing thesis</p>	9 Hrs.
<p>Question paper pattern:</p> <ol style="list-style-type: none"> 1. The question paper will have TEN questions. 2. There will be TWO questions in each module, covering all the topics. 3. The student need to answer FIVE full questions, selecting ONE full question from each module. 	
<p>Textbooks:</p> <ol style="list-style-type: none"> 1. Elaine Rich, Automata, Computability and Complexity, 1st Edition, Pearson Education,2012/2013 2. K L P Mishra, N Chandrasekaran , 3rd Edition, Theory of Computer Science, PHI, 2012. 	
<p>Reference:</p> <ol style="list-style-type: none"> 1. John E Hopcroft, Rajeev Motwani, Jeffery D Ullman, Introduction to Automata Theory, Languages, and Computation, 3rd Edition, Pearson Education, 2013 2. Michael Sipser : Introduction to the Theory of Computation, 3rd edition, Cengage learning,2013 3. John C Martin, Introduction to Languages and The Theory of Computation, 3rd Edition, Tata McGraw –Hill Publishing Company Limited, 2013 	

4. Peter Linz, "An Introduction to Formal Languages and Automata", 3rd Edition, Narosa Publishers, 1998	
5. Basavaraj S. Anami, Karibasappa K G, Formal Languages and Automata theory, Wiley India, 2012	
6. C K Nagpal, Formal Languages and Automata Theory, Oxford University press, 2012.	
Course Outcome	
At the end of the course the student will be able to:	
CO#	Course Outcome
CO1	Attain fundamental understanding of the core concepts in automata theory and theory of computation
CO2	Illustrate how to translate between different models of Computation
CO3	Design grammars and automata (recognizers) for different language classes and become familiar about restricted models of Computation and their relative powers.
CO4	Develop skills in formal reasoning and reduction of a problem to a formal model, with an emphasis on semantic precision and conciseness.
CO5	Categorize a problem with respect to different models of Computation.

DATABASE MANAGEMENT SYSTEM		
Subject Code:	21IS52	Credits:4
CIE: 50 Marks	SEE: 50 Marks	SEE: 03 Hrs.
Hours/Week:04(T+L)		Total hours:(40 +12)=52
Prerequisite:		
The students should have the knowledge of Data Structures, Computer Organization and C++Programming Principles.		
Course Learning Objectives		
To enable the students to obtain the knowledge of Data Base Management System in the following topics.		
<ul style="list-style-type: none"> • Understand the Data Base Management Principles and relational models. • Understand the relational algebraic approach and database implementation and interaction techniques using SQL. • Understand the functional dependency and Normalization Techniques. • Understand the online transaction processing and recovery methods. 		
Modules		Teaching Hours
Module 1		8 Hrs.
Introduction: Introduction; An example Characteristics of Database approach Actors on the screen; Workers behind the scenes; Advantages of using DBMS approach; A brief history of database applications; when not to use a DBMS. Data models, schemas and instances; Three-		

Schema architecture and data independence; Database languages and interfaces; The database system environment; Centralized and client-server architectures; Classification of Database Management systems.	
<p style="text-align: center;">Module 2</p> <p>Entity-Relationship Model: Using High-Level Conceptual Data Models For Database Design; An Example Database Application; Entity Types, Entity Sets, Attributes and Keys; Relationship types, Relationship Sets, Roles and Structural Constraints; Weak Entity Types; Refining the ER Design; ER Diagrams, Naming. Conventions and Design Issues; Relationship types of degree higher than two.</p>	8 Hrs.
<p style="text-align: center;">Module 3</p> <p>Relational Model and Relational Algebra: Relational Model Concepts; Relational Model Constraints and Relational Database Schemas; Update Operations, Transactions and dealing with constraint violations; Unary Relational Operations: SELECT and PROJECT; Relational Algebra Operations from Set Theory; Binary Relational. Operations: JOIN and DIVISION; Additional Relational Operations; Examples of Queries in Relational Algebra; Relational Database Design Using ER-to Relational Mapping. SQL: SQL Data Definition and Data Types; Specifying basic constraints in SQL; Schema change statements in SQL; Basic queries in SQL; More complex SQL Queries. Insert, Delete and Update statements in SQL; Specifying constraints as Assertion and Trigger; Views (Virtual Tables) in SQL.</p>	8 Hrs.
<p style="text-align: center;">Module 4</p> <p>Database Design: Informal Design Guidelines for Relation Schemas; Functional Dependencies; Normal Forms Based on Primary Keys; General Definitions of Second and Third Normal Forms; Boyce-Codd Normal Form. Properties of Relational Decompositions; Algorithms for Relational Database Schema Design; Multivalued Dependencies and Fourth Normal Form; Join Dependencies and Fifth Normal Form.</p>	8 Hrs.
<p style="text-align: center;">Module 5</p> <p>Transaction Management: The ACID Properties; Transactions and Schedules; Concurrent Execution of Transactions; Lock–Based Concurrency Control; Performance of locking; Transaction support in SQL. Introduction to Crash Recovery; 2PL, Serializability and Recoverability; Lock Management; Introduction to ARIES; The log; Other recovery-related structures; The write-ahead log protocol; Check pointing; Recovering from a System Crash.</p>	8 Hrs.
<p>Question paper pattern:</p> <ol style="list-style-type: none"> 1. The question paper will have TEN questions. 2. There will be TWO questions in each module, covering all the topics. 3. The student need to answer FIVE full questions, selecting ONE full question from each module. 	

Textbooks:

1. Fundamentals of Database Systems - Elmasri and Navathe, 5th Edition, Addison-Wesley, 2007
2. Database Management Systems- Raghu Ramakrishnan and Johannes Gehrke—3rd Edition. McGraw-Hill, 2014.

Reference:

1. Data Base System Concepts-Silberschatz, Korth and Sudharshan, 6th Edition, McGraw Hill, 2010.
2. An Introduction to Database Systems-C. J. Date, A. Kannan, S. Swamynatham, 8th Edition, Pearson Education, 2006.

Course Outcome

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

CO#	Course Outcome
CO1	Express the fundamentals and applications of data base management system.
CO2	Apply good database design principles for the design of ER diagram and relational models.
CO3	Implement and interact data base using SQL and relational algebra.
CO4	Design data base by applying the functional dependency and Normalization techniques.
CO5	Demonstrate the data base transaction and recovery management process.

DATABASE MANAGEMENT SYSTEMS LABORATORY

Prerequisite : The Students should have the knowledge of Data structure and C++

Course Objectives: To enable the students to obtain the knowledge of Databasemanagement systems in the following topics.

- Understand the Data Base Management System Environment
- Understand the techniques to design the data base and populate there cords
- Understand the DML operations.
- Understand the query optimization and error handling techniques.
- Understand the DCL and TCL statements

DATA BASE LABORATORY

PART-A

Consider the following relations :

Student (Stud_number: integer, class: integer,

major:char)Course (Course_name: Char,

Course_number: varchar, Credit_hours:int,

Department: char) Section(Secton_id:varchar,

Course_number:varchar, Semester:char, Year:int,

Instructor:char)

Grade_Report (Stud_number:varchar, Section_id:int, Grade:char)

Write the following queries in SQL. No duplicates should be printed in any of the answers.

- What are the referential integrity constraints that should hold on the schema.
- Retrieve the names of all senior students majoring in 'CS'
- Retrieve the names of all courses taught by particular professor in year 2017 and 2018
- For each section taught by particular professor, retrieve the course number, semester, year and number of students who took the section.
- Retrieve the names and major of all students who do not have a grade of A in any of their courses
- Insert a new student in the database
- Change the class of particular student.
- Insert a new course to the database
- Delete the record of the student whose name start with 'S'
- Delete the record of the students whose name contains 'a' and 'e'
- Delete the record of the students whose name ends with 'a'
- Count the total number of students with Grade and Major wise.
- Remove all the referential integrity constraints on the schema
- Delete all the rows from the tables

xv) Drop all the tables.

PART-B

1. Consider the following relations:

Student (snum: integer, sname: string, major: string, level: string, age: integer)
Class (name: string, meets at: string, room: string, d: integer)

Enrolled (snum: integer, cname: string)

Faculty (fid: integer, fname: string, deptid: integer) The meaning of these relations is straightforward; for example, Enrolled has one record per student-class pair such that the student is enrolled in the class. Level is a two character code with 4 different values (example: Junior: JR etc) Write the following queries in SQL. No duplicates should be printed in any of the answers. Find the names of all Juniors (level = JR) who are enrolled in a class taught by Prof. Harshith.

- i. Find the names of all classes that either meet in room R128 or have five or more Students enrolled.
- ii. Find the names of all students who are enrolled in two classes that meet at the same time.
- iii. Find the names of faculty members who teach in every room in which some class is taught.
- iv. Find the names of faculty members for whom the combined enrollment of the courses that they teach is less than five

2. The following relations keep track of airline flight information: Flights (no: integer, from: string, to: string, distance: integer, Departs: time, arrives: time, price: real)
Aircraft (aid: integer, name: string, cruising range:

Certified (eid: integer, aid: integer)

Employees (eid: integer, ename: string, salary: integer)

Note that the Employees relation describes pilots and other kinds of employees as well; bbnmbcf Every pilot is certified for some aircraft, and only pilots are certified to fly. Write each of the following queries in SQL.

- i. Find the names of aircraft such that all pilots certified to operate them have salaries more than Rs.80,000.
- ii. For each pilot who is certified for more than three aircrafts, find the eid and the maximum cruising range of the aircraft for which she or he is certified.
- iii. Find the names of pilots whose salary is less than the price of the cheapest route from Bengaluru to Frankfurt.
- iv. For all aircraft with cruising range over 1000 Kms, find the name of the aircraft and the average salary of all pilots certified for this aircraft.
- v. Find the names of pilots certified for some Boeing aircraft.
- vi. Find the aids of all aircraft that can be used on routes from Bengaluru to New Delhi.

3. Consider the following database of student enrollment in courses & books adopted for each course.

STUDENT (regno: string, name: string,
major: string, bdate:date) COURSE (course
#:int, cname:string, dept:string)

ENROLL (regno:string, course#:int,
sem:int, marks:int) BOOK _ ADOPTION
(course# :int, sem:int, book-ISBN:int)

TEXT (book-ISBN:int, book-title:string, publisher:string, author:string)

- i. Create the above tables by properly specifying the primary keys and the foreignkeys.
- ii. Enter at least five tuples for each relation.
- iii. Demonstrate how you add a new text book to the database and make this book be adopted by some department.
- iv. Produce a list of text books (include Course #, Book-ISBN, Book-title) in the alphabetical order for courses offered by the 'CS' department that use more than two books.
- v. List any department that has all its adopted books published by a specific publisher.
- vi. Generate suitable reports.

vii. Create suitable front end for querying and displaying the results

4. The following tables are maintained by a book dealer. AUTHOR (author-id:int, name:string, city:string, country:string)

PUBLISHER (publisher-id:int, name:string, city:string, country:string) CATALOG (book-id:int, title:string, author-id:int, publisher-id:int, category-id:int, year:int, price:int)

CATEGORY (category-id:int, description:string)

ORDER-DETAILS (order-no:int, book-id:int, quantity:int)

i. Create the above tables by properly specifying the primary keys and the foreign keys.

ii. Enter at least five tuples for each relation.

iii. Give the details of the authors who have 2 or more books in the catalog and the price of the books is greater than the average price of the books in the catalog and the year of publication is after 2000.

iv. Find the author of the book which has maximum sales.

v. Demonstrate how you increase the price of books published by a specific publisher by 10%.

vi. Generate suitable reports.

vii. Create suitable front end for querying and displaying the results.

5. Consider the following database for a banking enterprise BRANCH(branch-

name:string, branch-city:string, assets:real) ACCOUNT(accno:int, branch-name:string, balance:real) DEPOSITOR(customer-name:string, accno:int)

CUSTOMER(customer-name:string, customer-street:string, customer-city:string)

LOAN(loan-number:int, branch-name:string, amount:real)

BORROWER(customer-name:string, loan-number:int)

i. Create the above tables by properly specifying the primary keys and the foreign keys

- ii. Enter at least five tuples for each relation
- iii. Find all the customers who have at least two accounts at the Main branch.
- iv. Find all the customers who have an account at all the branches located in a specific city.
- v. Demonstrate how you delete all account tuples at every branch located in a specific city.
- vi. Generate suitable reports.
- vii. Create suitable front end for querying and displaying the results.

OPERATING SYSTEM		
Subject Code:	21IS53	Credits:3
CIE: 50 Marks	SEE: 50 Marks	SEE: 03 Hrs.
Hours/Week:03Hrs (Theory)		Total Hours:42 Hrs.
Prerequisite:		
The students should have the knowledge of Computer Organization, C, Programming Principles, Data Structure and Algorithms.		
Course Learning Objectives		
To enable the students to obtain the knowledge of Operating System in the following topics.		
<ul style="list-style-type: none"> • The basic components and fundamentals of Operating system. • The mechanisms to handle processes and threads and their communication. • To gain knowledge on scheduling, process synchronization, deadlock handling techniques. • To understand file handling, memory management, and OS mechanisms. 		
Modules		Teaching Hours
Module 1		8 Hrs.
Introduction to operating systems: What operating systems do;		

Operating System structure; Operating System operations. System Structures: Operating System Services; User -Operating System interface; System calls; Types of system calls; System programs; Operating System design and implementation; Operating System structure; Virtual machines; Process Management: Process concept; Process scheduling; Operations on processes; Inter-process communication. Multi-Threaded Programming: Overview; Multithreading models; Thread Libraries; Threading issues.	
Module 2 Process Scheduling: Basic concepts; Scheduling criteria; Scheduling algorithms; Multiple Processor scheduling; Thread scheduling. Process synchronization: Synchronization: The Critical section problem; Peterson's solution; Synchronization hardware; Semaphores; Classical problems of synchronization; Monitors. Deadlocks: System model; Dead lock characterization; Methods for handling deadlocks; Deadlock prevention; Deadlock avoidance; Deadlock detection and recovery from deadlock	9 Hrs.
Module 3 Memory Management: Memory Management Strategies: Background; Swapping; Contiguous memory allocation; Paging; Structure of page table; Segmentation. Virtual Memory Management: Background; Demand paging; Copy-on-write; Page replacement; Allocation of frames; Thrashing	8 Hrs.
Module 4 Storage Management: File system: File concept; Access methods; Directory structure; File system mounting; File sharing; Protection. Implementing File System: File system structure; File system implementation; Directory implementation; Allocation methods; Free space management. Secondary storage structures: Overview of Mass storage structures; Disk structure; Disk attachment, Disk scheduling; Disk management; Swap space management.	9 Hrs.
Module 5 System Protection: Goals of protection; Principles of protection; Domain of protection; Access matrix; Implementation of access matrix; Access control; Revocation of access rights; Capability-Based systems. Case Studies: The Linux System: Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, File Systems, Inter process Communication.	8 Hrs.
Question paper pattern:	
<ol style="list-style-type: none"> 1. The question paper will have TEN questions. 2. There will be TWO questions in each module, covering all the topics. 3. The student need to answer FIVE full questions, selecting ONE full question from each 	

module.	
Textbooks:	
1. Operating System Concepts - Abraham Silber Schatz, Peter Baer Galvin, Greg Gagne, 9 th edition, Wiley-India, 2013.	
Reference:	
1. Operating Systems: A Concept Based Approach - D.M. Dhamdhare, 9 th Edition, TataMcGraw-Hill,2012.	
2. Tanenbaum A. S., Modern Operating Systems, 3rd Edition, Pearson Education,2008.	
3. Operating Systems-P. C. P. Bhatt, 2nd Edition, PHI,2006	
Course Outcome	
At the end of the course the student will be able to:	
CO#	Course Outcome
CO1	Interpret the fundamental concepts of operating system and its functions
CO2	Analyze Scheduling algorithms and measure their performance
CO3	Implement the system model for accessing shared data and handling deadlock in process synchronization
CO4	Analyze the memory management strategies, file organizations and disk scheduling algorithms.
CO5	Analyze the information protection mechanisms in OS and illustrate the working of modern operating system.

SOFTWARE ENGINEERING		
Subject Code:	21IS54	Credits:3
CIE: 50 Marks	SEE: 50 Marks	SEE: 03 Hrs.
Hours/Week:03Hrs (Theory)		Total Hours:42 Hrs.
Prerequisite:		
The students should have the knowledge of Computer Organization, C, Programming Principles, Data Structure and Algorithms.		
Course Learning Objectives		
To enable the students to obtain the knowledge on.		
<ul style="list-style-type: none"> • Software engineering principles and activities involved in building large software programs. • Identify ethical and professional issues and explain why they are of concern to software engineers. • Recognize the importance of software maintenance and describe the intricacies Involved in software evolution. • Apply estimation techniques, schedule project activities and compute pricing. 		

Modules	Teaching Hours
<p align="center">Module 1</p> <p>Overview Introduction: FAQ's about software engineering, Professional and ethical responsibility. Socio-Technical systems: Emergent system properties; Systems engineering; Organizations, people, and computer systems. Critical System, Software Processes: Critical Systems: A simple safety-critical system; System depend on ability; Availability and reliability.</p>	9 Hrs.
<p align="center">Module 2</p> <p>Software Processes: Models, Process iteration, Process activities; The Rational Unified Process; Computer-Aided Software Engineering. Requirements: Software Requirements: Functional and Non-functional requirements; User requirements; System requirements; Interface specification; the software requirements document. Requirements Engineering Processes: Feasibility studies; Requirements elicitation and analysis; Requirements validation.</p>	8 Hrs.
<p align="center">Module 3</p> <p>System models, Project Management: System Models: Context models; Behavioral models; Data models; Object models; Structured methods. Project Management: Management activities; Project planning. Software Design: Architectural Design: Architectural design decisions; System organization; Modular decomposition styles; Control styles.</p>	8 Hrs.
<p align="center">Module 4</p> <p>Object-Oriented design: Objects and Object Classes; An Object-Oriented Design process. Development: Rapid Software Development: Agile methods; Extreme programming; Rapid application development. Software Evolution: Program evolution dynamics; Software maintenance; Evolution processes.</p>	8 Hrs.
<p align="center">Module 5</p> <p>Verification and Validation: Verification and Validation: Planning: Software inspections; Automated static analysis; Verification and formal methods. Software testing: System testing; Component testing. Management: Managing People: Selecting staff; Motivating people; Managing people; The People Capability Maturity Model. Software Cost Estimation: Productivity; Estimation techniques; Algorithmic cost modeling.</p>	9 Hrs.
<p>Question paper pattern:</p> <ol style="list-style-type: none"> 1. The question paper will have TEN questions. 2. There will be TWO questions in each module, covering all the topics. 3. The student need to answer FIVE full questions, selecting ONE full question from each 	

module.	
Textbooks: 1. Software Engineering by Ian Sommerville, 9th Edition, Pearson Education, 2012	
Reference: 1. Roger. S. Pressman: Software Engineering A Practitioners approach, 7 th Edition, Tata Mc Graw Hill. 2. Pankaj Jalote: An Integrated Approach to Software Engineering, Wiley India	
Course Outcome At the end of the course the student will be able to:	
CO#	Course Outcome
CO1	Describe software development life cycle processes.
CO2	Analyze software requirements and generate SRS.
CO3	Describe design concepts and develop design document.
CO4	Describe SQA tasks, goals, and metrics, and test strategies.
CO5	Demonstrate Project management concepts and metrics.

OPERATING SYSTEM LAB		
Subject Code:	21ISL55	Credits:1
CIE: 50 Marks	SEE: 50 Marks	SEE: 03 Hrs.
Hours/Week:02Hrs (Practical)		Total Hours:28 Hrs.
Prerequisite: Students should have the knowledge of C, Data Structure and Algorithm.		
Course Learning Objectives To enable the students to obtain the knowledge of Operating System laboratory in the following topics.		
<ul style="list-style-type: none"> • To implement CPU scheduling algorithms • To develop bankers algorithm used for deadlock avoidance and prevention. • To implement page replacement and memory management algorithms. 		
<ol style="list-style-type: none"> 1. Write a C program to compute average waiting time and average turn around time for First-Come First-Served (FCFS) Scheduling algorithm, the program should accept the arrival time and burst time as input. 2. Write a C program to compute average waiting time and average turn around time for Shortest-Job-First Scheduling algorithm, the program should accept the arrival time and burst time as input. 3. Write a C program to compute average waiting time and average turn around time for Priority Scheduling algorithm, the program should accept the arrival time and burst Time and priority as input. 4. Write a C program to compute average waiting time and average turn around time for Round- Robin Scheduling algorithm, the program should accept the arrival time and burst time and assume suitable time quantum as input. 5. Write a C program for Producer Consumer problem and hence demonstrate 		

multithreading process.

6. Write a C program to detect whether the system is in safe state, the program should accept allocation, max and available matrices. Generate the need matrix.
7. Write a C program that implements FIFO page replacement algorithm.
8. Write a C program that implements optimal page replacement algorithm.
9. Write a C program that implements LRU page replacement algorithm.
10. Write a C program to implement Disk Scheduling
11. Write a C program to implement thread synchronization using mutual exclusive lock.
12. Write a C program to implement thread synchronization using condition variable.

Question paper pattern:

In SEE, students will be asked to execute the program which may be related to the above list of programs.

Reference:

Lab Manual

Course Outcome

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

CO#	Course Outcome
CO1	Write a c program to implement process Scheduling algorithms.
CO2	Implement process synchronization techniques using C Program.
CO3	Write a c program to implement deadlock handling techniques.
CO4	Implement page replacement algorithms using C program.
CO5	Write a C program to implement disk scheduling techniques, Thread synchronization using mutual exclusion and condition variables..

RESEARCH METHODOLOGY & INTELLECTUAL PROPERTY RIGHTS

Subject Code:	21RMI56	Credits:2
CIE: 50 Marks	SEE: 50 Marks	SEE: 03 Hrs.
Hours/Week:03Hrs (1hr Theory + 2hr Tutorial)		Total Hours:28 Hrs.

Prerequisite:

Course Learning Objectives

- To Understand the knowledge on basics of research and its types.
- To Learn the concept of defining research problem and Literature Review, Technical Reading.
- To learn the concept of attributions and citation and research design.
- Concepts, classification, need for protection, International regime of IPRs - WIPO , TRIPS, Patent -
- Meaning, Types, surrender, revocation, restoration, Infringement , Procedure for obtaining Patent and Patent Agents.
- Meaning, essential requirements, procedure for registration and Infringement of Industrial Designs, Copyright.

Modules	Teaching Hours
<p align="center">Module 1</p> <p>Introduction: Meaning of Research, Objectives of Engineering Research, and Motivation in Engineering Research, Types of Engineering Research, Finding and Solving a Worthwhile Problem. Ethics in Engineering Research, Ethics in Engineering Research Practice, Types of Research Misconduct, Ethical Issues Related to Authorship.</p>	6 Hrs.
<p align="center">Module 2</p> <p>Defining the research problem - Selecting the problem. Necessity of defining the problem Techniques involved in defining the problem-Importance of literature review in defining a problem Literature Review and Technical Reading, New and Existing Knowledge, Analysis and Synthesis of Prior Art Bibliographic Databases, Web of Science, Google and Google Scholar, Effective Search: The Way Forward Introduction to Technical Reading Conceptualizing Research, Critical and Creative Reading, Taking Notes While Reading, Reading Mathematics and Algorithms, Reading a Datasheet.</p>	6 Hrs.
<p align="center">Module 3</p> <p>Research design and methods - Research design - Basic principles. Need of research design Features of good design- Important concepts relating to research design -Observation and Facts Attributions and Citations: Giving Credit Wherever Due, Citations: Functions and Attributes, Impact of Title and Keywords on Citations, Knowledge Flow through Citation, Citing Datasets, Styles for Citations, Acknowledgments and Attributions, What Should Be Acknowledged, Acknowledgments in, Books Dissertations, Dedication or Acknowledgments.</p>	6 Hrs.
<p align="center">Module 4</p> <p>Basic Concepts of Intellectual Property (IP), Classification of IP, Need for Protection of IP, International regime of IPRs - WIPO , TRIPS. Patents: Meaning of a Patent – Characteristics/ Features . Patentable and Non-Patentable Invention. Procedure for obtaining Patent. Surrender of Patent, revocation &restoration of Patents, Infringement of Patents and related remedies (penalties) . Different prescribed forms used in Patent Act. Patent agents qualifications and disqualifications Case studies on patents - Case study of Neem petent, Curcuma (Turmeric)patent and Basmati rice patent, Apple inc.v Samsung electronics co.Ltd</p>	5 Hrs.
<p align="center">Module 5</p> <p>Industrial Design: Introduction to Industrial Designs. Essential requirements of Registration. Designs which are not registrable, who is entitled to seek Registration, Procedure for Registration of Designs</p>	5 Hrs.

Copy Right Meaning of Copy Right. Characteristics of Copyright. Who is Author, various rights of owner of Copyright. Procedure for registration. Term of copyright, Infringement of Copyright and Its remedies. Software Copyright.

Question paper pattern:

Assessment Details(both CIE and SEE)

The weight age of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester end examination (SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE(Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

Three Unit Tests each of 20Marks(duration 01hour)

- 1.First test at the end of 5th week of the semester
- 2.Second test at the end of the 10th week of the semester
- 3.Third test at the end of the15th week of the semester

Two assignments each of 10Marks

- 4.First assignment at the end of 4th week of the semester
5. Second assignment at the end of 9th week of the semester Groupdiscussion/
Seminar/quizanyoneofthreesuitablyplannedtoattaintheCOsandPOsfor20 Marks (duration 01 hours)

6.At the end of the 13th week of the semester The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be scaled down to 50marks (to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

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

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (duration 03 hours)

1. The question paper will be set for 100marks.Marks scored shall be proportionally reduced to50 marks
2. The question paper will have ten questions. Each question is set for 20marks.
3. There will be 2questions from each module .Each of the two questions is under a module (with a maximum of 2 sub-questions).
4. The students have to answer 5 full questions, selecting one full question from each module.

Marks scored by the students will be proportionally scaled down to 50 marks

Textbooks:

1. Research Methodology: Methods and Techniques C.R.Kothari, Gaurav Garg New Age International 4th Edition, 2018
2. Dipankar Deb • Rajeeb Dey, Valentina E. Balas
“Engineering Research Methodology”, ISSN 1868- 4394
ISSN 1868-4408 (electronic), Intelligent Systems Reference Library, ISBN 978-981-13-2946-3
ISBN 978-981-13-2947-0 (eBook), <https://doi.org/10.1007/978-981-13-2947-0.3>
3. Dr. M.K. Bhandari “Law relating to Intellectual property” January 2017 (Publisher By Central Law Publications).
4. Dr. R Radha Krishna and Dr. S Balasubramanian “Text book of Intellectual Property Right”. First edition, New Delhi 2008. Excel books.
5. P Narayan “Text book of Intellectual Property Right”. 2017 ,Publisher: Eastern Law House

Reference:

1. David V. Thiel “Research Methods for Engineers” Cambridge University Press, 978-1-107-03488-4
2. Nishith Desai Associates - Intellectual property law in India – Legal, Regulatory & Tax
NPTEL:
INTELLECTUAL PROPERTY by PROF. FERUZ ALI , Department of Humanities and Social Sciences IIT Madras
https://nptel.ac.in/content/syllabus_pdf/109106137.pdf
www.wipo.int
www.ipindia.nic.in

Course Outcome

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

CO#	Course Outcome
CO1	To know the meaning of engineering research.
CO2	To know the defining of research problem and procedure of Literature Review.
CO3	To know the Attributions and Citations and research design.
CO4	Highlights the basic Concepts and types of IPRs and Patents.
CO5	Analyse and verify the procedure for Registration of Industrial Designs & Copyrights.

ENVIRONMENTAL STUDIES

Subject Code:	21CIV57	Credits:1
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CIE: 50 Marks	SEE: 50 Marks	SEE: 02 Hrs.
Hours/Week:03Hrs (2hr Tutorial)		Total Hours:28 Hrs.
Prerequisite:		
Course Learning Objectives		
<ul style="list-style-type: none"> To create environmental awareness among the students. To gain knowledge on different types of pollution in the environment. 		
Modules		Teaching Hours
Module 1 Ecosystems (Structure and Function): Forest, Desert, Wetlands, River, Oceanic and Lake. Biodiversity: Types, Value; Hot-spots; Threats and Conservation of biodiversity, Forest Wealth, and Deforestation.		5 Hrs.
Module 2 Advances in Energy Systems (Merits, Demerits, Global Status and Applications): Hydrogen, Solar, OTEC, Tidal and Wind. Natural Resource Management (Concept and case-studies): Disaster Management, Sustainable Mining, case studies ng, and Carbon Trading.		5 Hrs.
Module 3 Environmental Pollution (Sources, Impacts, Corrective and Preventive measures, Relevant Environmental Acts, Case-studies): Surface and Ground Water Pollution; Noise pollution; Soil Pollution and Air Pollution. Waste Management & Public Health Aspects: Bio-medical Wastes; Solid waste; Hazardous wastes; E-wastes; Industrial and Municipal Sludge.		6 Hrs.
Module 4 Global Environmental Concerns (Concept, policies and case-studies): Ground water depletion/recharging, Climate Change; Acid Rain; Ozone Depletion; Radon and Fluoride problem in drinking water; Resettlement and rehabilitation of people, Environmental Toxicology.		6 Hrs.
Module 5 Latest Developments in Environmental Pollution Mitigation Tools (Concept and Applications): G.I.S. & Remote Sensing, Environment Impact Assessment, Environmental Management Systems, ISO14001; Environmental Stewardship- NGOs. Field work: Visit to an Environmental Engineering Laboratory or Green Building or Water Treatment Plant or Waste water treatment Plant; ought to be Followed by understanding of process and its brief documentation.		6 Hrs.
Question paper pattern:		
Continuous Internal Evaluation:		
Three Unit Tests each of 20Marks (duration 01 hour)		

1. First test at the end of 5th week of the semester
2. Second test at the end of the 10th week of the semester
3. Third test at the end of the 15th week of the semester Two assignments each of 10 Marks
4. First assignment at the end of 4th week of the semester
5. Second assignment at the end of 9th week of the semester Group discussion/Seminar/quiz any one of three suitably planned to attain the Cos and Pos for 20 Marks (duration 01 hours)
6. At the end of the 13th week of the semester The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be Scaled down to 50 marks (to have less stresses CIE, the portion of the syllabus should not be common/repeated for any of the method of the CIE. Each method of CIE should have a different syllabus portion of the course).
CIE methods/question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (duration 01 hours)

Question paper pattern:

1. The Question paper will have 50 objective questions.
2. Each question will be before 01 marks
3. Students will have to answer all the questions on an OMR Sheet.
4. The Duration of the Exam will be 01 hour

Textbooks:

1. Environmental studies, Benny Joseph, Tata McGraw-Hill 2nd edition 2012
2. Environmental studies, S M Prakash, pristine publishing house, Mangalore 3rd edition-2018

Reference:

1. Benny Joseph, Environmental studies, Tata McGraw-Hill 2nd edition 2009
2. M.Ayi Reddy Textbook of environmental science and Technology, BS publications 2007.
3. Dr. B.S Chauhan, Environmental studies, university of science press 1st edition.

Course Outcome

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

CO#	Course Outcome
CO1	Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale,
CO2	Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment.
CO3	Demonstrate ecology knowledge of a complex relationship between biotic and a biotic component.
CO4	Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues.
CO5	Understand Latest Developments in Environmental Pollution Mitigation Tools Concept and Applications of G.I.S. & Remote Sensing.

INTERNET OF THINGS		
Subject Code:	21ISAE581	Credits:1
CIE: 50 Marks	SEE: 50 Marks	SEE: 03 Hrs.
Hours/Week:02Hrs (Practical)		Total Hours:28 Hrs.
Prerequisite:		
Course Learning Objectives		
<ul style="list-style-type: none"> • To impart necessary and practical knowledge of components of Internet of Things. • To develop skills required to build real life IoT based projects. 		
Sl. No	Experiments	
1.	To interface LED with Arduino and write a program to 'turn on' LED for 1 sec after every 2 second.	
2.	To interface push button with Arduino and write a program to 'turn on' LED when push button is pressed.	
3.	To interface LDR sensor with Arduino and write a program to 'turn on' LED when sensor is detected.	
4.	To interface DHT11 sensor with Arduino and write a program to print temperature and humidity readings.	
5.	To interface motor using relay with Arduino and write a program to turn on motor when push button is pressed.	
6.	To interface Bluetooth with Arduino and write a program to send sensor data to smartphone using Bluetooth.	
7.	To interface Bluetooth with Arduino and write a program to turn on LED ON/OFF when 1/0 is received from smartphone using Bluetooth.	
8.	Write a program on Arduino to upload temperature and humidity data to thinkspeak cloud.	
9.	Write a program on Arduino to publish temperature data to MQTT broker.	
10.	To install MySQL database on Raspberry pi and perform basic SQL queries.	
Question paper pattern:		
In SEE, students will be asked to execute the programs which may be related to the above topics.		
Course Outcome		
At the end of the course the student will be able to:		
CO#	Course Outcome	
CO1	Understanding internet of things and its hardware and software components.	
CO2	Interface I/O devices, sensors & communication module.	
CO3	Remotely monitor data and control devices.	
CO4	Demonstrate the processing in IoT.	
CO5	Develop real life IoT based projects.	

ENTREPRENEURSHIP, MANAGEMENT AND FINANCE		
Subject Code:	21HU61	Credits:3
CIE: 50 Marks	SEE: 50 Marks	SEE: 03 Hrs.
Hours/Week:03Hrs (Theory)		Total Hours:42 Hrs.
Prerequisite: (None)		
Course Learning Objectives		
To enable the students to obtain the knowledge of in the following topics.		
<ul style="list-style-type: none"> • The Meaning, Functions, Characteristics, Types, Role and Barriers of Entrepreneurship, Government Support for Entrepreneurship • Management–Meaning, nature, characteristics, scope, functions, role etc • Engineers social responsibility and ethics • Preparation of Project and Source of Finance • Fundamentals of Financial Accounting • Personnel and Material Management, Inventory Control 		
Modules		Teaching Hours
Module 1		8 Hrs.
ENTREPRENEUR: Meaning of Entrepreneur; Functions of an Entrepreneur; Characteristics of an entrepreneur, Types of Entrepreneur; Intrapreneurs–and emerging class; Role of Entrepreneurs in economic development; Barriers to entrepreneurship, Government Support for Innovation and Entrepreneurship in India -Startup-India, Make-in-India, PMMY, AIM, STEP, BIRAC, Stand-up India, TREAD		
Module 2		8 Hrs.
MANAGEMENT: Introduction–Meaning– nature and characteristics of Management, Scope and functional areas of management, Roles of Management, Levels of Management, Henry Fayol Principles to Management, Engineers Social responsibility, and Ethics.		
Module 3		8 Hrs.
PREPARATION OF PROJECT AND SOURCE OF FINANCE: PREPARATION OF PROJECT: Meaning of project; Project Identification; Project Selection; Project Report; Need and Significance of Report; Contents; SOURCE OF FINANCE: Long Term Sources(Equity, Preference, Debt Capital, Debentures, loan from Financial Institutions etc) and Short Term Source(Loan from commercial banks, Trade Credit, Customer Advances etc).		
Module 4		9 Hrs.
FUNDAMENTALS OF FINANCIAL ACCOUNTING: Definition, Scope and Functions of Accounting, Accounting Concepts and Conventions: Golden rules of Accounting, Final Accounts Trading and Profit and Loss Account, Balance sheet.		

Module 5	9 Hrs.
<p>PERSONNEL MANAGEMENT, MATERIAL MANAGEMENT AND INVENTORY CONTROL: PERSONNEL MANAGEMENT: Functions of Personnel Management, Recruitment, Selection and Training, Wages, Salary and Incentives MATERIAL MANAGEMENT AND INVENTORY CONTROL: Meaning, Scope and Objects of Material Management. Inventory Control Meaning and Functions of Inventory control ; Economic Order Quantity(EOQ) and various stock level (Reorder level, Minimum level, Maximum level, Average level and Danger level)</p>	
<p>Question paper pattern:</p> <ol style="list-style-type: none"> 1. The question paper will have TEN questions. 2. There will be TWO questions in each module, covering all the topics. 3. The student need to answer FIVE full questions, selecting ONE full question from each module. 	
<p>Textbooks:</p> <ol style="list-style-type: none"> 1. Industrial Organization & Engineering Economics-T R Banga & S C Sharma-Khanna Publishers, Dehli. 	
<p>Reference:</p>	
<p>Course Outcome At the end of the course the student will be able to:</p>	
CO#	Course Outcome
CO1	Develop Entrepreneurship skills
CO2	Apply the concepts of management and Engineers Social responsibility& Ethics practice.
CO3	Prepare project report & choose different Source of Finance.
CO4	Apply Fundamentals of Financial Accounting and interpret the final accounts.
CO5	Apply personnel management skills, Material, and inventory control techniques.

COMPUTER NETWORK		
Subject Code:	21IS62	Credits:4
CIE: 50 Marks	SEE: 50 Marks	SEE: 03 Hrs.
Hours/Week:04(T+L)		Total hours:(40 +12)=52
<p>Prerequisite: The students should have Basic knowledge of components, types of information and mode of data transmission, topology of computer networks.</p>		
<p>Course Learning Objectives To enable the students to obtain the knowledge of computer networking</p> <ul style="list-style-type: none"> • To develop an understanding of modern network architectures from a design and performance perspective. • To introduce the student to the major concepts involved in wide-area networks (WANs), 		

<p>local area networks (LANs) and Wireless LANs (WLANs).</p> <ul style="list-style-type: none"> • To clarify network terminology and to provide an opportunity to do network programming using TCP/IP. • To provide a WLAN measurement experience. • To expose students to emerging technologies and their potential impact. 	
Modules	Teaching Hours
<p style="text-align: center;">Module 1</p> <p>Packet Switching Networks: Network services and internal network operations; Packet network topology; Datagrams and virtual circuits Routing in packet networks; Shortest-path routing; ATM networks. Packet Switching Networks -2: TCP / IP - 1: Traffic management at the packet level; Traffic management at the flow level; Traffic management at the flow-aggregate level. The TCP /IP architecture; The Internet protocol.</p>	8 Hrs.
<p style="text-align: center;">Module 2</p> <p>TCP / IP - 2: IPv6: User datagram protocol; Transmission control protocol; Internet routing protocols; Multicast routing, DHCP, NAT, and Mobile IP. ATM Networks: Why ATM? BISDN reference model; ATM layer; ATM adaptation layer; ATM signaling; PNNI routing; classical IP over ATM.</p>	8 Hrs.
<p style="text-align: center;">Module 3</p> <p>Network Management Security: Network management overview; SNMP; Structure of Management information; MIB; Remote network monitoring. Security and cryptographic algorithms; Security protocols; Cryptographic algorithms.</p>	8 Hrs.
<p style="text-align: center;">Module 4</p> <p>QOS, Resource Allocation, VPNS, Tunneling, Overlay Networks: Overview of QoS; Integrated services QoS; Differentiated services QoS; Resource allocation. Virtual Private Networks; Multi-protocol Label switching; Overlay networks. Compression of Digital Voice and Video, VOIP, Multimedia Networking: Overview of data compression, digital voice, and compression, still images and jpeg compression, moving images and MPEG compression, limits of compression methods without loss, case study: FAX compression for transmission.</p>	8 Hrs.
<p style="text-align: center;">Module 5</p> <p>Mobile AD-HOC Networks , Wireless Sensor Networks :Overview of wireless adhoc networks; Routing in adhoc networks; Routing protocols for adhoc networks; security of adhoc networks, Sensor networks and protocol structures.</p>	8 Hrs.
<p>Question paper pattern:</p> <p>1. The question paper will have TEN questions.</p>	

2. There will be TWO questions in each module, covering all the topics.
3. The student need to answer FIVE full questions, selecting ONE full question from each module.

Textbooks:

1. Communication Networks-Fundamental Concepts and Key Architectures-Alberto Leon-Garcia and Indra Widjaja, 2nd Edition, Tata McGraw-Hill,2004.
2. Computer and Communication Networks-Nader F. Mir, Pearson Education,2007.

Reference:

1. Data Communications and Networking-Behrouz A. Forouzan,4th Edition, TataMcGraw-Hill,2006.
2. Data and Computer Communication - William Stallings, 8thEdition, Pearson Education, 2007.
3. Computer Networks a Systems Approach Larry L. Peterson and Bruce S. David, 4th Edition, Elsevier, 2007.
4. Introduction to Data Communications and Networking-Wayne Tomasi, Pearson Education, 2005.

Course Outcome

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

CO#	Course Outcome
CO1	Understand the organization of computer networks, factors influencing computer network development and the reasons for having variety of different types of networks switching networks.
CO2	Analyze the internals of different protocols such as TCP, UDP, IP, TCP/ IP and SNMP.
CO3	Analyze network management Issues.
CO4	Describe the contemporary issues in networking technologies like compression, QOS, Resource allocation.
CO5	Apply the wireless networking concepts and routing algorithms.

COMPUTER NETWORK LAB

Experiments	Teach ing Hours
<p>The following experiments shall be conducted using either NS / OPNET/ NCTUNES or any other suitable simulator.</p> <p>PART – A</p> <ol style="list-style-type: none"> 1. Simulate a three nodes point – to – point network with duplex links between them. Set the queue size and vary the bandwidth and find the number of packets dropped. 2. Simulate a four node point-to-point network with the links connected 	

as follows:

3. $n_0 - n_2$, $n_1 - n_2$ and $n_2 - n_3$. Apply TCP agent between n_0 - n_3 and UDP between n_1 - n_3 . Apply relevant applications over TCP and UDP agents changing the parameter and determine the number of packets sent by TCP / UDP.
4. Simulate the different types of Internet traffic such as FTP and TELNET over a network and analyze the throughput.
5. Simulate the transmission of ping messages over a network topology consisting of 6 nodes and find the number of packets dropped due to congestion.
6. Simulate an Ethernet LAN using n nodes and set multiple traffic nodes and determine collision across different nodes.
7. Simulate an Ethernet LAN using n nodes and set multiple traffic nodes and plot congestion window for different source / destination.
8. Simulate simple ESS and with transmitting nodes in wire-less LAN by simulation and determine the performance with respect to transmission of packets .

PART – B

Implement the following in C/C++:

1. Write a program for error detecting code using CRC-CCITT (16-bits).
2. Write a program for frame sorting technique used in buffers.
3. Write a program for distance vector algorithm to find suitable path for transmission.
4. Using TCP/IP sockets, write a client – server program to make the client send the file name and to make the server send back the contents of the requested file if present.
5. Implement the above program using as message queues or FIFOs as IPC channels.
6. Write a program for simple RSA algorithm to encrypt and decrypt the data.
7. Write a program for Hamming code generation for error detection and correction.
8. Write a program for congestion control using leaky bucket algorithm.

WEB TECHNOLOGY AND J2EE		
Subject Code:	21IS63	Credits:3
CIE: 50 Marks	SEE: 50 Marks	SEE: 03 Hrs.

Hours/Week:03Hrs	Total : Hours:42 Hrs.
Prerequisite: The students must have knowledge of network Protocols, Basic HTML Programming and Database concepts	
Course Learning Objectives To enable the students to obtain the knowledge of Web Technology & J2EE. <ul style="list-style-type: none"> • Understand the fundamentals of internet protocols and develop static webpages. • Create interactive Web Pages using stylesheets. • Learn the basics about Client-side scripts and Server-side scripts. and Understand database transactions on the server-side machines. • Create enterprise applications using session bean, Entity bean and message driven beans. 	
Modules	Teaching Hours
<p style="text-align: center;">Module 1</p> <p>Fundamentals of Web, XHTML: Internet, WWW, Web Browsers, and Web Servers; URLs; MIME; HTTP; Security; The Web Programmers Toolbox. XHTML: Origins and evolution of HTML and XHTML; Basic syntax; Standard XHTML document structure. Basic text markup. Images; Hypertext Links; Lists; Tables; Forms; Frames; Syntactic differences between HTML and XHTML.</p>	8 Hrs.
<p style="text-align: center;">Module 2</p> <p>CSS: Introduction; Levels of style sheets; Style specification formats; Select or forms; Property value forms; Font properties; List properties; Colour; Alignment of text; The Boxmodel; Back ground images, The and tags; conflict resolution. JAVA SCRIPT: Overview of JavaScript; Object orientation and JavaScript; General syntactic characteristics; Primitives, operations, and expressions; Screen out put and key board input; Control statements; Object creation and modification; Arrays; Functions; Constructor; pattern matching using regular expressions; errors in scripts, examples</p>	9 Hrs.
<p style="text-align: center;">Module 3</p> <p>Java 2 Enterprise Edition Overview, Database Access: Overview of J2EE and J2SE.The Concept of JDBC; JDBC Driver Types; J DBC Packages; A Brief Overview of the JDBC process; Database Connection; Associating the JDBC/ODBC Bridge with the Database; Statement Objects; Result Set; Transaction Processing; Meta data types; Exceptions.</p>	8 Hrs.
<p style="text-align: center;">Module 4</p> <p>Servlets: Background; The Life Cycle of a Servlet; Using Tomcat for Servlet Development; A simple Servlet; The Servlet API; The Javax servlet Package; Reading Servlet Parameter; The Javax servlet http package; Handling HTTP Requests and Responses; using Cookies; Session tracking.</p>	9 Hrs.
<p style="text-align: center;">Module 5</p> <p>JSP, EJB: Java Server Pages (JSP): JSP, JSP Tags, Tomcat, Request String, User Sessions, Cookies, Session Objects. Types of Enterprise</p>	8 Hrs.

Java beans, Session Bean & Entity Bean, Features of Session Bean, Lifecycle of Stateful Session Bean, Features of Entity Bean, Life cycle of Entity Bean, Container-managed Transactions & Bean-managed Transactions, Implementing a container-managed Entity Bean.	
Question paper pattern:	
<ol style="list-style-type: none"> 1. The question paper will have TEN questions. 2. There will be TWO questions in each module, covering all the topics. 3. The student need to answer FIVE full questions, selecting ONE full question from each module. 	
Textbooks:	
<ol style="list-style-type: none"> 1. Java The Complete Reference -HerbertSchildt,7th Edition, Tata McGrawHill,2007. 2. J2EE The Complete Reference -Jim Keogh, Tata McGrawHill,2007. 3. Programming the World Wide Web–RobertSebesta4thEditionPearson 	
Reference:	
<ol style="list-style-type: none"> 1. Introduction to JAVA Programming-Y. Daniel Liang, 6th Edition, Pearson Education,2007. 2. The J2EE Tutorial-Stephanie Bodoff et al,2nd Edition, Pearson Education,2004 	
Course Outcome	
At the end of the course the student will be able to:	
CO#	Course Outcome
CO1	Discuss the fundamentals of internet, web and identify the differences between XHTML and HTML.
CO2	Apply the concepts of Cascading style sheets for web development and XHTML documents.
CO3	Apply JDBC skills necessary to create database driven enterprise applications to access and manipulate information.
CO4	Implement Servlets, JSP and EJB concepts to control the request and responses from server side.
CO5	Develop enterprise applications using the knowledge of EJB container features.

CLOUD COMPUTING		
Subject Code:	21IS641	Credits:3
CIE: 50 Marks	SEE: 50 Marks	SEE: 03 Hrs.
Hours/Week:03Hrs		Total Hours:42 Hrs.
Prerequisite:		
Course Learning Objectives		
To enable the students to obtain the knowledge of Cloud Computing.		
<ul style="list-style-type: none"> • To understand the basics of cloud computing and different cloud computing services. • To understand cloud implementation, programming and mobile cloud computing. • To understand different phases of cloud migration. • To understand the best practices and Future of cloud computing. 		

Modules	Teaching Hours
<p align="center">Module 1</p> <p>Cloud Computing Basics Cloud Computing Overview, Applications, Intranets and the cloud, First Movers in the Cloud Organization and Cloud Computing-Scenarios to use and shouldn't use Cloud Computing Benefits, Limitations, Security Concerns and Regulations Issues.</p>	8 Hrs.
<p align="center">Module 2</p> <p>Cloud Computing with the Titans Google App Engine, Web Toolkit EMC Technologies, VMware Acquisition, Netapp offerings, Microsoft, Amazon, Salesforce.com, IBM, Partnerships. The Business Case for Going To the Cloud Cloud Computing Services, How those applications help your Business, Deleting Your Datacenter, salesforce.com, Thomson Reuters.</p>	9 Hrs.
<p align="center">Module 3</p> <p>Cloud Computing Technology Hardware and Infrastructure-Client, Security, Network and Services Accessing the Cloud Platforms, Web Applications, Web APIs, Web Browsers. Cloud Storage overview, Cloud storage providers, standards.</p>	8 Hrs.
<p align="center">Module 4</p> <p>Cloud computing at work Software as a service-overview, Driving forces, Company Offerings, industries. Software Plus Services - Overview, Mobile Device Integration, Providers, Microsoft online Migrating to the Cloud-Cloud Services for the individuals, Cloud Services aimed at Mid-Market, Enterprise -Class Cloud Offerings, Migration.</p>	9 Hrs.
<p align="center">Module 5</p> <p>Developing applications Google, Microsoft, Intuit Quick base, Cast Iron Cloud, Bungee Connect, Development Google App Engine, Salesforce.com, Microsoft Windows Azure, Troubleshooting, Application Management. Best Practices and the future of Cloud computing Analyze Your Service, Best Practices, How Cloud Computing Might Evolve.</p>	8 Hrs.
<p>Question paper pattern:</p> <ol style="list-style-type: none"> 1. The question paper will have TEN questions. 2. There will be TWO questions in each module, covering all the topics. 3. The student need to answer FIVE full questions, selecting ONE full question from each module. 	
<p>Textbooks:</p> <ol style="list-style-type: none"> 1. Cloud Computing: The Practical Approach, McGraw Hill, 2012. Anthony T. Volte, Toby J Volte, Robert Elsenpeter: 	
<p>Reference:</p> <ol style="list-style-type: none"> 1. Kai Hwang, Jack Dungaree, and Geoffrey Fox: Distributed and Cloud Computing, From Parallel Processing to the Internet of Things, M K Publishers, 2012. 	
<p>Course Outcome</p>	

At the end of the course the student will be able to:	
CO#	Course Outcome
CO1	Identify fundamental concepts of Cloud Computing and also analyze the importance of organizational concerns.
CO2	Illustrate cloud platform architecture over data centers and develop the business models that underlie the cloud computing technology
CO3	Design the systems hardware, infrastructure and services in accessing the cloud computing environment
CO4	Illustrate various cloud services and cloud offerings to manage development of cloud computing services.
CO5	Analyze applications over commercial cloud computing infrastructures and develop the best practices in the cloud computing.

DIGITAL IMAGE PROCESSING		
Subject Code:	21IS642	Credits:3
CIE: 50 Marks	SEE: 50 Marks	SEE: 03 Hrs.
Hours/Week:03Hrs		Total Hours:42 Hrs.
Prerequisite:		
Course Learning Objectives		
To enable the students to obtain the knowledge of Digital Image Processing.		
<ul style="list-style-type: none"> • Understand the fundamentals of digital image processing. • Explain the image transform techniques used in digital image processing. • Apply different image enhancement techniques on digital images. • Evaluate image restoration techniques and methods used in digital image processing. • Understand the Morphological Operations and Segmentation used in digital image processing. 		
Modules		Teaching Hours
Module 1		8 Hrs.
Digital Image Fundamentals: What is Digital Image Processing? Origins of Digital Image Processing, Examples of fields that use DIP, Fundamental Steps in Digital Image Processing, Components of an Image Processing System, Elements of Visual Perception, Image Sensing and Acquisition, Image Sampling and Quantization, Some Basic Relationships Between Pixels, Linear and Nonlinear Operations. Textbook 1: Chapter 1 and Chapter 2: Sections 2.1 to 2.5, 2.6.2		
Module 2		9 Hrs.
Spatial Domain: Some Basic Intensity Transformation Functions, Histogram Processing, Fundamentals of Spatial Filtering, Smoothing		

<p>Spatial Filters, Sharpening Spatial Filters Frequency Domain: Preliminary Concepts, The Discrete Fourier Transform (DFT) of Two Variables, Properties of the 2-D DFT, Filtering in the Frequency Domain, Image Smoothing and Image Sharpening Using Frequency Domain Filters, Selective Filtering. Textbook 1: Chapter 3: Sections 3.2 to 3.6 and Chapter 4: Sections 4.2, 4.5 to 4.10</p>		
<p align="center">Module 3</p> <p>Restoration: Noise models, Restoration in the Presence of Noise Only using Spatial Filtering and 03092022 Frequency Domain Filtering, Linear, Position-Invariant Degradations, Estimating the Degradation Function, Inverse Filtering, Minimum Mean Square Error (Wiener) Filtering, Constrained Least Squares Filtering. Textbook 1: Chapter 5: Sections 5.2, to 5.9</p>		8 Hrs.
<p align="center">Module 4</p> <p>Color Image Processing: Color Fundamentals, Color Models, Pseudo color Image Processing. Wavelets: Background, Multiresolution Expansions. Morphological Image Processing: Preliminaries, Erosion and Dilation, Opening and Closing, The Hit-or-Miss Transforms, Some Basic Morphological Algorithms. Text: Chapter 6: Sections 6.1 to 6.3, Chapter 7: Sections 7.1 and 7.2, Chapter 9: Sections 9.1 to 9.5</p>		9 Hrs.
<p align="center">Module 5</p> <p>Segmentation: Introduction, classification of image segmentation algorithms, Detection of Discontinuities, Edge Detection, Hough Transforms and Shape Detection, Corner Detection, Principles of Thresholding. Representation and Description: Representation, Boundary descriptors. Text2: Chapter 9: Sections 9.1, to 9.7 and Text 1: Chapter 11: Sections 11.1 and 11.2</p>		8 Hrs.
<p>Question paper pattern:</p> <ol style="list-style-type: none"> 1. The question paper will have TEN questions. 2. There will be TWO questions in each module, covering all the topics. 3. The student need to answer FIVE full questions, selecting ONE full question from each module. 		
<p>Textbooks:</p> <ol style="list-style-type: none"> 1. Rafael C. Gonzalez and Richard E. Woods, Digital Image Processing, Third Ed., Prentice Hall, 2008. 2. S. Sridhar, Digital Image Processing, Oxford University Press, 2ndEdition, 2016 		
<p>Reference:</p> <ol style="list-style-type: none"> 1. Digital Image Processing- S.Jayaraman, S.Esakkirajan, T.Veerakumar, TataMcGraw Hill 2014. 2. Fundamentals of Digital Image Processing-A. K. Jain, Pearson 2004. 		
<p>Course Outcome At the end of the course the student will be able to:</p>		
CO#	Course Outcome	
CO1	Understand the fundamentals of Digital Image Processing.	
CO2	Apply different Image transformation techniques.	

CO3	Analyze various image restoration techniques.
CO4	Understand colour image and morphological processing.
CO5	Design image analysis and segmentation techniques.

MOBILE APPLICATION DEVELOPMENT		
Subject Code:	21IS643	Credits:3
CIE: 50 Marks	SEE: 50 Marks	SEE: 03 Hrs.
Hours/Week:03Hrs		Total Hours:42 Hrs.
Prerequisite:		
<p>Course Learning Objectives: This course will enable students to</p> <ul style="list-style-type: none"> • Learn to setup Android application development environment • Illustrate user interfaces for interacting with apps and triggering actions • Interpret tasks used in handling multiple activities • Identify options to save persistent application data • Appraise the role of security and performance in Android applications 		
Modules		Teaching Hours
Module 1 Get started, Build your first app, Activities, Testing, debugging and using support libraries		8 Hrs.
Module 2 User Interaction, Delightful user experience, Testing your UI		9 Hrs.
Module 3 Background Tasks, Triggering, scheduling and optimizing background tasks		8 Hrs.
Module 4 All about data, Preferences and Settings, Storing data using SQLite, Sharing data with content providers, Loading data using Loaders		9 Hrs.
Module 5 Permissions, Performance and Security, Firebase and AdMob, Publish		8 Hrs.
Question paper pattern:		
<ol style="list-style-type: none"> 1. The question paper will have TEN questions. 2. There will be TWO questions in each module, covering all the topics. 3. The student need to answer FIVE full questions, selecting ONE full question from each module. 		
Textbooks:		
<ol style="list-style-type: none"> 1. Google Developer Training, "Android Developer Fundamentals Course – Concept Reference”, Google Developer Training Team, 2017. 		

<https://www.gitbook.com/book/google-developer-training/android-developerfundamentals-course-concepts/details> (Download pdf file from the above link)

Reference:

1. Erik Hellman, “Android Programming – Pushing the Limits”, 1st Edition, Wiley India Pvt Ltd, 2014.
2. Dawn Griffiths and David Griffiths, “Head First Android Development”, 1st Edition, O’Reilly SPD Publishers, 2015.
3. J F DiMarzio, “Beginning Android Programming with Android Studio”, 4th Edition, Wiley India Pvt Ltd, 2016. ISBN-13: 978-8126565580
4. Anubhav Pradhan, Anil V Deshpande, “ Composing Mobile Apps” using Android, Wiley 2014, ISBN: 978-81-265-4660-2

Course Outcome

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

CO#	Course Outcome
CO1	Create, test and debug Android application by setting up Android development environment
CO2	Implement adaptive, responsive user interfaces that work across a wide range of devices.
CO3	Infer long running tasks and background work in Android applications
CO4	Demonstrate methods in storing, sharing and retrieving data in Android applications
CO5	Describe the steps involved in publishing Android application to share with the world

INTRODUCTION TO CYBER SECURITY

Subject Code:	2IIS65OE1	Credits:3
CIE: 50 Marks	SEE: 50 Marks	SEE: 03 Hrs.
Hours/Week:03Hrs		Total Hours:42 Hrs.

Prerequisite:

Course Learning Objectives

- To familiarize cybercrime terminologies and perspectives.
- To understand Cyber Offenses and Botnets.
- To gain knowledge on tools and methods used in cybercrimes.
- To understand phishing and computer forensics.

Modules	Teaching Hours
Module 1 Cybercrime: Definition and Origins of the Word, Cybercrime and	9 Hrs.

Information Security, Who are Cybercriminals? Classifications of Cybercrimes, An Indian Perspective, Hacking and Indian Laws., Global Perspectives Textbook:1 Chapter 1 (1.1 to 1.5, 1.7-1.9)	
Module 2 Cyber Offenses: How Criminals Plan Them: Introduction, How criminals plan the attacks, Social Engineering, Cyber Stalking, Cybercaafe & cybercrimes. Botnets: The fuel for cybercrime, Attack Vector. Textbook:1 Chapter 2 (2.1 to 2.7)	9 Hrs.
Module 3 Tools and Methods used in Cybercrime: Introduction, Proxy Servers, Anonymizers, Phishing, Password Cracking, Key Loggers and Spyways, Virus and Worms, Trozen Horses and Backdoors, Steganography, DoS and DDOS Attacks, Attacks on Wireless networks. Textbook:1 Chapter 4 (4.1 to 4.9, 4.12)	8 Hrs.
Module 4 Phishing and Identity Theft: Introduction, methods of phishing, phishing, phising techniques, spear phishing, types of phishing scams, phishing toolkits and spy phishing, counter measures, Identity Theft Textbook:1 Chapter 5 (5.1. to 5.3)	8 Hrs.
Module 5 Understnading Computer Forensics: Introdcution, Historical Background of Cyberforensics, Digital Foresics, Science, Need for Computer Foresics, Cyber Forensics and Digital Evidence, Digital Forensic Life cycle, Chain of Custody Concepts, network forensics. Textbook:1 Chapter 7 (7.1. to 7.5, 7.7 to 7.9)	8 Hrs.
Question paper pattern: 1. The question paper will have TEN questions. 2. There will be TWO questions in each module, covering all the topics. 3. The student need to answer FIVE full questions, selecting ONE full question from each module.	
Textbooks: 1. Sunit Belapure and Nina Godbole, “Cyber Security: Understanding Cyber Crimes, Computer Forensics And Legal Perspectives”, Wiley India Pvt Ltd, ISBN: 978-81-265-21791, 2011, First Edition (Reprinted 2018)	
Reference: 1. Cyber Crime Impact in the New Millennium, by R. C Mishra , Auther Press. Edition 2010. 2. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011) Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver, Create Space Independent Publishing Platform. (Pearson , 13th November, 2001)	
Course Outcome At the end of the course the student will be able to:	
CO#	Course Outcome

CO1	Explain the cybercrime terminologies
CO2	Describe Cyber offenses and Botnets
CO3	Illustrate Tools and Methods used on Cybercrime
CO4	Explain Phishing and Identity Theft
CO5	Justify the need of computer forensics

WEB TECHNOLOGY AND J2EE LAB		
Subject Code:	21ISL66	Credits:1
CIE: 50 Marks	SEE: 50 Marks	SEE: 03 Hrs.
Hours/Week:02Hrs (Practical)		Total Hours:28 Hrs.
Prerequisite:		
The student should have prior basic knowledge on execution of C++ and OOP Concepts and also have some basic knowledge on installation of JDK1.5, Eclipse IDE and Tomcat5.		
Course Learning Objectives		
To enable the students to obtain the knowledge of web Technology and J2EE programming.		
<ul style="list-style-type: none"> • To acquire knowledge and skills for creation of web site. • To write applications using the Eclipse IDE. • To Create Web applications using server-side programming languages-servlets and jsp. • To Create Enterprise applications using EJB. 		
<ol style="list-style-type: none"> 1. Develop and demonstrate a XHTML document that illustrates the use external style sheet, ordered list, table, borders, padding, color, and the tag. 2. Develop and demonstrate a XHTML file that includes Javascript script for the following problems: <ol style="list-style-type: none"> a) Input: A number n obtained using prompt Output: The first n Fibonacci numbers b) Input: A number n obtained using prompt Output: A table of numbers from 1 to n and their squares using alert 3. Develop and demonstrate a XHTML file that includes Javascript script that uses functions for the following problems: <ol style="list-style-type: none"> a) Parameter: A string Output: The position in the string of the left-most vowel 		

b) Parameter: A number

Output: The number with its digits in the reverse order

4. a) Develop and demonstrate, using Javascript script, a XHTML document that collects the USN (the valid format is: A digit from 1 to 4 followed by two upper-case characters followed by two digits followed by two upper-case characters followed by three digits; no embedded spaces allowed) of the user. Event handler must be included for the form element that collects this information to validate the input. Messages in the alert windows must be produced when errors are detected.

b) Modify the above program to get the current semester also (restricted to be a number from 1 to 8)

Servlets:

5. a) Program to accept user name and display a greeting message.

b) Program to change the background color of the page based on the color selected by the user.

6. Program to display a greeting based on the access time of the server.

7. Program to create a session and display session information viz. Session ID, creation time and last accessed.

8. Program to request server information viz. Request method, URI, Protocol and Remote address.

9. Program to accept user name and address and display them in a web page by passing parameters.

JSP:

10. Write a JSP program which uses if, do-while, while-do, switch statements

11. Write a JSP program which uses HttpServletRequest class method

12. Write a JSP program which retrieves a cookie and sends the cookie name and cookie values to the browser and display these on the screen

13. Write a JSP program to assign information to a session attribute and read attributes

EJB :

14. Using eclipse create a package and then create enterprise java beans to perform the client test

Question paper pattern:

In SEE, students will be asked to execute the program which may be related to the above list of programs.

Reference:

Lab Manual

Course Outcome	
At the end of the course the student will be able to:	
CO#	Course Outcome
CO1	Understand the HTML, DHTML, CSS, JAVA SCRIPTS programming principles.
CO2	Analyze a web page and identify its elements and attributes.
CO3	Create web pages using HTML, DHTML and Cascading Styles sheets.
CO4	Create dynamic web pages using JavaScript.
CO5	Create interactive web applications using Servlets, JSP and EJB.

MINI - PROJECT		
Subject Code:	21ISMP67	Credits:2
CIE: 50 Marks	SEE: 50 Marks	SEE: 03 Hrs.
Hours/Week:02Hrs		Total Hours:28 Hrs.
Prerequisite:		
The students should have thorough knowledge of Software Engineering and Mastering any one programming language.		
Course Learning Objectives		
<ul style="list-style-type: none"> • To understand the current requirement of the industries. • To understand the different software development and testing methodologies. • To understand and apply architectural model, data flow and control flow diagrams. • To acquire good documentation, demonstration skills and impact of application on society. 		
Project comprises of:		
<ol style="list-style-type: none"> 1. Literature Survey 2. Requirement Analysis - S/w Requirement - H/w Requirements 3. Design Module presentation 4. Application 5. System Requirement Specification document SRS document contains synopsis, problem formulation and requirement analysis based on above factors. 		
Document should be submitted by the end of Semester		
Course Outcome		
At the end of the course the student will be able to:		
CO#	Course Outcome	
CO1	Demonstrate the skills of performing surveys on current industrial requirements.	
CO2	Analyze the requirements and apply appropriate software development methodology.	
CO3	Implement and validate the architectural model, dataflow and control flow structures.	
CO4	Demonstrate the documentation and presentation skills.	
CO5	Implement the Societal and Ethical systems.	