



# IDHAYA ENGINEERING COLLEGE FOR WOMEN

CHINNASALEM-606 201, KALLAKURICHI DISTRICT, TAMIL NADU, INDIA.

Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai.

2(f) Status of UGC, An ISO 9001: 2015 Certified Institution

A Christian Minority Institution run by the Franciscan Sisters of the Immaculate Heart of Mary Society, Puducherry.

Phone: 04151-258325, 258326

Website: [www.iecw.edu.in](http://www.iecw.edu.in)

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## 1.3.2 Average percentage of courses that include experiential learning through project work/field work/ internship during last five years

### ACADEMIC YEAR 2020-21

S.No	Name of the Programme	No. of Courses
1.	B.E - Computer Science and Engineering	21
2.	B.E - Electrical and Electronics Engineering	17
3.	B.E - Electronics and Communication Engineering	22
4.	B.Tech - Information Technology	6
5.	M.E - Computer Science and Engineering	7
6.	M.E – Communication Systems	7
	Total	80



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S.No	Program Name	Program Code	Course Code	Course Name	Project Work	Field Work	Internship
1.	B.E-CSE	104	GE8151	Problem Solving and Python Programming	√		
2.	B.E-CSE	104	CS8251	Programming in C	√		
3.	B.E-CSE	104	CS8351	Digital Principles and System Design	√		
4.	B.E-CSE	104	CS8391	Data Structures	√		
5.	B.E-CSE	104	CS8392	Object Oriented Programming	√		
6.	B.E-CSE	104	CS8491	Computer Architecture	√		
7.	B.E-CSE	104	CS8492	Database Management Systems	√		
8.	B.E-CSE	104	CS8451	Design and Analysis of Algorithms	√		
9.	B.E-CSE	104	CS8493	Operating Systems	√		√
10.	B.E-CSE	104	CS8494	Software Engineering	√		
11.	B.E-CSE	104	CS8591	Computer Networks	√		
12.	B.E-CSE	104	CS8501	Theory of Computation	√		
13.	B.E-CSE	104	CS8592	Object Oriented Analysis and Design	√		
14.	B.E-CSE	104	CS8651	Internet Programming	√		
15.	B.E-CSE	104	CS8691	Artificial Intelligence	√		
16.	B.E-CSE	104	CS8601	Mobile Computing	√		√
17.	B.E-CSE	104	CS8602	Compiler Design	√		
18.	B.E-CSE	104	CS8603	Distributed Systems	√		
19.	B.E-CSE	104	IT8076	Software Testing	√		
20.	B.E-CSE	104	CS8791	Cloud Computing	√		
21.	B.E-CSE	104	CS8079	Human Computer Interaction	√		
22.	B.E-EEE	105	EE8351	Digital Logic Circuits	√		
23.	B.E-EEE	105	EE8391	Electromagnetic Theory	√		
24.	B.E-EEE	105	EE8301	Electrical Machines - I	√		
25.	B.E-EEE	105	EE8401	Electrical Machines - II	√		
26.	B.E-EEE	105	EE8402	Transmission and Distribution	√		
27.	B.E-EEE	105	EE8403	Measurements and Instrumentation	√		
28.	B.E-EEE	105	IC8451	Control Systems	√		√
29.	B.E-EEE	105	EE8501	Power System Analysis	√		
30.	B.E-EEE	105	EE8552	Power Electronics	√		
31.	B.E-EEE	105	EE8602	Protection and Switchgear	√		
32.	B.E-EEE	105	EE8691	Embedded Systems	√		
33.	B.E-EEE	105	EE8006	Power Quality	√		
34.	B.E-EEE	105	EE8702	Power System Operation and	√		

*Dr. R. Gurumani*  
**Dr. R. GURUMANI, M.E., Ph.D., M.B.A., M.ISTE., F.I.E.,**  
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				Control			
35.	B.E-EEE	105	EE8703	Renewable Energy Systems	√		
36.	B.E-EEE	105	EE8010	Power Systems Transients	√		
37.	B.E-EEE	105	EE8015	Electric Energy Generation, Utilization and Conservation	√		
38.	B.E-EEE	105	EE8017	High Voltage Direct Current Transmission	√		
39.	B.E-ECE	106	EC8252	Electronic Devices	√		
40.	B.E-ECE	106	EC8351	Electronic Circuits- I	√		
41.	B.E-ECE	106	EC8352	Signals and Systems	√		
42.	B.E-ECE	106	EC8392	Digital Electronics	√		
43.	B.E-ECE	106	EC8391	Control Systems Engineering	√		
44.	B.E-ECE	106	EC8452	Electronic Circuits II	√		
45.	B.E-ECE	106	EC8491	Communication Theory	√		
46.	B.E-ECE	106	EC8451	Electromagnetic Fields	√		
47.	B.E-ECE	106	EC8453	Linear Integrated Circuits	√		
48.	B.E-ECE	106	EC8501	Digital Communication	√		
49.	B.E-ECE	106	EC8553	Discrete-Time Signal Processing	√		
50.	B.E-ECE	106	EC8552	Computer Architecture and Organization	√		
51.	B.E-ECE	106	EC8551	Communication Networks	√		
52.	B.E-ECE	106	EC8095	VLSI Design	√		
53.	B.E-ECE	106	EC8652	Wireless Communication	√		
54.	B.E-ECE	106	EC8651	Transmission Lines and RF Systems	√		
55.	B.E-ECE	106	EC8004	Wireless Networks	√		
56.	B.E-ECE	106	EC8701	Antennas and Microwave Engineering	√		
57.	B.E-ECE	106	EC8751	Optical Communication	√		
58.	B.E-ECE	106	EC8791	Embedded and Real Time Systems	√		√
59.	B.E-ECE	106	EC8702	Ad hoc and Wireless Sensor Networks	√		
60.	B.E-ECE	106	EC8092	Advanced Wireless Communication	√		
61.	B.Tech-IT	205	IT8201	Information Technology Essentials	√		
62.	B.Tech-IT	205	IT8501	Web Technology	√		√
63.	B.Tech-IT	205	IT8601	Computational Intelligence	√		
64.	B.Tech-IT	205	IT8602	Mobile Communication	√		
65.	B.Tech-IT	205	CS8091	Big Data Analytics	√		
66.	B.Tech-IT	205	CS8092	Computer Graphics Multimedia	√		
67.	M.E-CSE	405	CP5151	Advanced Data Structures and Algorithms	√		

*Ramesh*  
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68.	M.E-CSE	405	CP5191	Machine Learning Techniques	√		
69.	M.E-CSE	405	CP5292	Internet of Things	√		
70.	M.E-CSE	405	CP5293	Big Data Analytics	√		
71.	M.E-CSE	405	CP5092	Cloud Computing Technologies	√		
72.	M.E-CSE	405	CP5073	Embedded Software Development	√		
73.	M.E-CSE	405	CP5097	Mobile Application Development	√		
74.	M.E-CS	403	CU5191	Advanced Radiation Systems	√		
75.	M.E-CS	403	CU5151	Advanced Digital Communication Techniques	√		
76.	M.E-CS	403	AP5152	Advanced Digital Signal Processing	√		
77.	M.E-CS	403	CU5192	Optical Networks	√		
78.	M.E-CS	403	CU5091	Advanced Satellite Communication and Navigation Systems	√		
79.	M.E-CS	403	DS5291	Advanced Digital Image processing	√		
80.	M.E-CS	403	NC5291	Communication Network Security	√		

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**DEPARTMENT OF COMPUTER SCIENCE  
ENGINEERING**

**OBJECTIVES:**

- To know the basics of algorithmic problem solving
- To read and write simple Python programs.
- To develop Python programs with conditionals and loops.
- To define Python functions and call them.
- To use Python data structures — lists, tuples, dictionaries.
- To do input/output with files in Python.

**UNIT I ALGORITHMIC PROBLEM SOLVING 9**

Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative problems: find minimum in a list, insert a card in a list of sorted cards, guess an integer number in a range, Towers of Hanoi.

**UNIT II DATA, EXPRESSIONS, STATEMENTS 9**

Python interpreter and interactive mode; values and types: int, float, boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; modules and functions, function definition and use, flow of execution, parameters and arguments; Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points.

**UNIT III CONTROL FLOW, FUNCTIONS 9**

Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, linear search, binary search.

**UNIT IV LISTS, TUPLES, DICTIONARIES 9**

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension; Illustrative programs: selection sort, insertion sort, merge sort, histogram.

**UNIT V FILES, MODULES, PACKAGES 9**

Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages; Illustrative programs: word count, copy file.

**TOTAL: 45 PERIODS****OUTCOMES:****Upon completion of the course, students will be able to**

- Develop algorithmic solutions to simple computational problems
- Read, write, execute by hand simple Python programs..
- Decompose a Python program into functions.
- Represent compound data using Python lists, tuples, dictionaries.
- Read and write data from/to files in Python Programs.

**TEXT BOOKS:**

1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2<sup>nd</sup> edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016 (<http://greenteapress.com/wp/think-python/>)
2. Guido van Rossum and Fred L. Drake Jr, —An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.

**REFERENCES:**

1. John V Guttag, —Introduction to Computation and Programming Using Python", Revised and expanded Edition, MIT Press, 2013
2. Robert Sedgewick, Kevin Wayne, Robert Dondero, —Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.
3. Timothy A. Budd, —Exploring Python, Mc-Graw Hill Education (India) Private Ltd., 2015.
4. Kenneth A. Lambert, —Fundamentals of Python: First Programs, CENGAGE Learning, 2012.
5. Charles Dierbach, —Introduction to Computer Science using Python: A Computational Problem-Solving Focus, Wiley India Edition, 2013.
6. Paul Gries, Jennifer Campbell and Jason Montojo, Practical Programming: An Introduction to Computer Science using Python 3, Second edition, Pragmatic Programmers, LLC, 2013.

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**OBJECTIVES:**

- To understand the protocol layering and physical level communication.
- To analyze the performance of a network.
- To understand the various components required to build different networks.
- To learn the functions of network layer and the various routing protocols.
- To familiarize the functions and protocols of the Transport layer.

<b>UNIT I</b>	<b>INTRODUCTION AND PHYSICAL LAYER</b>	<b>9</b>
Networks – Network Types – Protocol Layering – TCP/IP Protocol suite – OSI Model – Physical Layer: Performance – Transmission media – Switching – Circuit-switched Networks – Packet Switching.		
<b>UNIT II</b>	<b>DATA-LINK LAYER &amp; MEDIA ACCESS</b>	<b>9</b>
Introduction – Link-Layer Addressing – DLC Services – Data-Link Layer Protocols – HDLC – PPP - Media Access Control - Wired LANs: Ethernet - Wireless LANs – Introduction –IEEE 802.11, Bluetooth – Connecting Devices.		
<b>UNIT III</b>	<b>NETWORK LAYER</b>	<b>9</b>
Network Layer Services – Packet switching – Performance – IPV4 Addresses – Forwarding of IP Packets - Network Layer Protocols: IP, ICMP v4 – Unicast Routing Algorithms – Protocols – Multicasting Basics – IPV6 Addressing – IPV6 Protocol.		
<b>UNIT IV</b>	<b>TRANSPORT LAYER</b>	<b>9</b>
Introduction – Transport Layer Protocols – Services – Port Numbers – User Datagram Protocol – Transmission Control Protocol – SCTP.		
<b>UNIT V</b>	<b>APPLICATION LAYER</b>	<b>9</b>
WWW and HTTP – FTP – Email – Telnet – SSH – DNS – SNMP.		
<b>TOTAL :</b>		<b>45 PERIODS</b>

**OUTCOMES:****On Completion of the course, the students should be able to:**

- Understand the basic layers and its functions in computer networks.
- Evaluate the performance of a network.
- Understand the basics of how data flows from one node to another.
- Analyze and design routing algorithms.
- Design protocols for various functions in the network.
- Understand the working of various application layer protocols.

**TEXT BOOK:**

1. Behrouz A. Forouzan, Data Communications and Networking, Fifth Edition TMH, 2013.

**REFERENCES**

1. Larry L. Peterson, Bruce S. Davie, Computer Networks: A Systems Approach, Fifth Edition, Morgan Kaufmann Publishers Inc., 2012.
2. William Stallings, Data and Computer Communications, Tenth Edition, Pearson Education, 2013.
3. Nader F. Mir, Computer and Communication Networks, Second Edition, Prentice Hall, 2014.
4. Ying-Dar Lin, Ren-Hung Hwang and Fred Baker, Computer Networks: An Open Source Approach, McGraw Hill Publisher, 2011.
5. James F. Kurose, Keith W. Ross, Computer Networking, A Top-Down Approach Featuring the Internet, Sixth Edition, Pearson Education, 2013.

**REFERENCES:**

1. Douglas V. Hall, —Microprocessors and Interfacing, Programming and Hardware, TMH, 2012
2. A.K. Ray, K.M. Bhurchandi, Advanced Microprocessors and Peripherals —3<sup>rd</sup> edition, Tata McGraw Hill, 2012

*mevi*  
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**OBJECTIVES:**

- To learn the criteria for test cases.
- To learn the design of test cases.
- To understand test management and test automation techniques.
- To apply test metrics and measurements.

**UNIT I INTRODUCTION**

9

Testing as an Engineering Activity – Testing as a Process – Testing Maturity Model- Testing axioms – Basic definitions – Software Testing Principles – The Tester's Role in a Software Development Organization – Origins of Defects – Cost of defects – Defect Classes – The Defect Repository and Test Design – Defect Examples- Developer/Tester Support of Developing a Defect Repository.

**UNIT II TEST CASE DESIGN STRATEGIES**

9

Test case Design Strategies – Using Black Box Approach to Test Case Design – Boundary Value Analysis – Equivalence Class Partitioning – State based testing – Cause-effect graphing – Compatibility testing – user documentation testing – domain testing – Random Testing – Requirements based testing – Using White Box Approach to Test design – Test Adequacy Criteria – static testing vs. structural testing – code functional testing – Coverage and Control Flow Graphs – Covering Code Logic – Paths – code complexity testing – Additional White box testing approaches- Evaluating Test Adequacy Criteria.

**UNIT III LEVELS OF TESTING**

9

The need for Levels of Testing – Unit Test – Unit Test Planning – Designing the Unit Tests – The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests – Integration Test Planning – Scenario testing – Defect bash elimination System Testing – Acceptance testing – Performance testing – Regression Testing – Internationalization testing – Ad-hoc testing – Alpha, Beta Tests – Testing OO systems – Usability and Accessibility testing – Configuration testing – Compatibility testing – Testing the documentation – Website testing.

**UNIT IV TEST MANAGEMENT**

9

People and organizational issues in testing – Organization structures for testing teams – testing services – Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items – test management – test process – Reporting Test Results – Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group- The Structure of Testing Group- .The Technical Training Program.

**UNIT V TEST AUTOMATION**

9

Software test automation – skills needed for automation – scope of automation – design and architecture for automation – requirements for a test tool – challenges in automation – Test metrics and measurements – project, progress and Productivity metrics.

TOTAL: 45 PERIODS

**OUTCOMES:**

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

- Design test cases suitable for a software development for different domains.
- Identify suitable tests to be carried out.
- Develop and validate a test plan.

**TEXT BOOKS:**

1. Srinivasan Desikan and Gopalaswamy Ramesh, —Software Testing – Principles and Practices, Pearson Education, 2006.
2. Ron Patton, —Software Testing, Second Edition, Sams Publishing, Pearson Education, 2007. AU Library.com

**REFERENCES:**

1. Ilene Burnstein, —Practical Software Testing, Springer International Edition, 2003.
2. Edward Kit, Software Testing in the Real World – Improving the Process, Pearson Education, 1995.
3. Boris Beizer, Software Testing Techniques – 2nd Edition, Van Nostrand Reinhold, New York, 1990.
4. Aditya P. Mathur, —Foundations of Software Testing \_ Fundamental Algorithms and Techniques, Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008.





**Advanced Skin Disease  
Diagnosis using CNN**



**A PROJECT REPORT**

*Submitted by*

**ANITHA.D**

**621117104004**

**MANIBHARATHI.D**

**621117104027**

**SARULATHA.K**

**621117104048**

**VASANTHAPRIYA.V**

**621117104058**

*in partial fulfillment for the award of the degree*

*of*

**BACHELOR OF ENGINEERING**

*in*


**COMPUTER SCIENCE AND ENGINEERING**

**IDHAYA ENGINEERING COLLEGE FOR WOMEN**

**CHINNASALEM**

**ANNA UNIVERSITY :: CHENNAI-600 025**


**APRIL 2021**

  
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**ANNA UNIVERSITY : CHENNAI-600 025**

**BONAFIDE CERTIFICATE**

Certified that this project report “ADVANCED SKIN DISEASE DIAGNOSIS USING CNN” is the bonafide work of “D. ANITHA, D. MANIBHARATHI, K. SARULATHA, V. VASANTHAPRIYA” who carried out the project work under my supervision.

  
**SIGNATURE**

Mr.S.JAYAPRAKASH.,M.E.,(Ph.D)

**HEAD OF THE DEPARTMENT**

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**SIGNATURE**


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**INTERNAL EXAMINER**

  
**EXTERNAL EXAMINER**

## ABSTRACT

Air pollution affects human skin in many ways. Skin diseases are common in densely populated regions. These diseases have a devastating impact on people's lives by creating a huge need for the disease diagnosis. In this project, a skin disease determination system used which aims for an accurate diagnosis leveraging image processing. The methodology outlined here aims to identify skin disease by scrutinizing the input image. The method involves filtering of the input provided to remove noise, conversion of image to a grayscale image, and image segmentation. Feature extraction is used to minimize the amount of data to be processed by the classifier. The SVM (Support Vector Machine) is then used in the image classification to identify the skin disease. Use of CNN technology has led to an efficient and accurate way of diagnosis that aids in curing the disease more expeditiously.



# BUG TRACKING SYSTEM



A MINI PROJECT REPORT

*Submitted by*

<b>AFREEN M</b>	621118205001
<b>FARSHA T</b>	621118205005
<b>MADHUMITHA V</b>	621118205010
<b>SWETHA M J</b>	621118205014

*in partial fulfillment for the award of the degree*

*of*

**BACHELOR OF TECHNOLOGY**

**IN**

**INFORMATION TECHNOLOGY**

**IDHAYA ENGINEERING COLLEGE FOR WOMEN**

**CHINNASALEM**

**ANNA UNIVERSITY:: CHENNAI-600 025**

**APRIL 2021**

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**ANNA UNIVERSITY: CHENNAI-600 025**

**BONAFIDE CERTIFICATE**

Certified that this project report “**BUG TRACKING SYSTEM**” is the bonafide work of “**AFREEN M, FARSHA T, MADHUMITHA V, SWETHA M J**” who carried out the project work under my supervision.

**SIGNATURE**

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**Submitted for the University Examination held on 30.07.2021**

**INTERNAL EXAMINER**



**EXTERNAL EXAMINER**

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CS8691

ARTIFICIAL INTELLIGENCE

L T P C  
3 0 0 3

OBJECTIVES:

- To understand the various characteristics of Intelligent agents
- To learn the different search strategies in AI
- To learn to represent knowledge in solving AI problems
- To understand the different ways of designing software agents
- To know about the various applications of AI.

UNIT I INTRODUCTION 9

Introduction–Definition - Future of Artificial Intelligence – Characteristics of Intelligent Agents–Typical Intelligent Agents– Problem Solving Approach to Typical AI problems.

UNIT II PROBLEM SOLVING METHODS 9

Problem solving Methods - Search Strategies- Uninformed - Informed - Heuristics - Local Search Algorithms and Optimization Problems - Searching with Partial Observations - Constraint Satisfaction Problems — Constraint Propagation - Backtracking Search - Game Playing – Optimal Decisions in Games – Alpha - Beta Pruning - Stochastic Games

UNIT III KNOWLEDGE REPRESENTATION 9

First Order Predicate Logic – Prolog Programming – Unification – Forward Chaining-Backward Chaining – Resolution – Knowledge Representation - Ontological Engineering–Categories and Objects – Events - Mental Events and Mental Objects - Reasoning Systems for Categories - Reasoning with Default Information.

UNIT IV SOFTWARE AGENTS 9

Architecture for Intelligent Agents – Agent communication – Negotiation and Bargaining –Argumentation among Agents –Trust and Reputation in Multi-agent systems.

UNIT V APPLICATIONS 9

AI applications – Language Models – Information Retrieval- Information Extraction – Natural Language Processing - Machine Translation – Speech Recognition – Robot – Hardware – Perception – Planning – Moving

TOTAL :45 PERIODS

OUTCOMES:

Upon completion of the course, the students will be able to:

- Use appropriate search algorithms for any AI problem
- Represent a problem using first order and predicate logic
- Provide the apt agent strategy to solve a given problem
- Design software agents to solve a problem
- Design applications for NLP that use Artificial Intelligence.

TEXT BOOKS:

- 1 S. Russell and P. Norvig, "Artificial Intelligence: A Modern Approach", Prentice Hall, Third Edition, 2009.
- 2 I. Bratko, —Prolog: Programming for Artificial Intelligence, Fourth edition, Addison-Wesley Educational Publishers Inc., 2011.

REFERENCES:

1. M. Tim Jones, —Artificial Intelligence: A Systems Approach(Computer Science), Jones and Bartlett Publishers, Inc.; First Edition, 2008
2. Nils J. Nilsson, —The Quest for Artificial Intelligence, Cambridge University Press, 2009.
3. William F. Clocksin and Christopher S. Mellish, Programming in Prolog: Using the ISO Standard, Fifth Edition, Springer, 2003.
4. Gerhard Weiss, —Multi Agent Systems, Second Edition, MIT Press, 2013.
5. David L. Poole and Alan K. Mackworth, —Artificial Intelligence: Foundations of Computational Agents, Cambridge University Press, 2010.

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**OBJECTIVES:**

- To develop C Programs using basic programming constructs
- To develop C programs using arrays and strings
- To develop applications in C using functions , pointers and structures
- To do input/output and file handling in C

**UNIT I BASICS OF C PROGRAMMING**

9

Introduction to programming paradigms - Structure of C program - C programming: Data Types – Storage classes - Constants – Enumeration Constants - Keywords – Operators: Precedence and Associativity - Expressions - Input/Output statements, Assignment statements – Decision making statements - Switch statement - Looping statements – Pre-processor directives - Compilation process

**UNIT II ARRAYS AND STRINGS**

9

Introduction to Arrays: Declaration, Initialization – One dimensional array – Example Program: Computing Mean, Median and Mode - Two dimensional arrays – Example Program: Matrix Operations (Addition, Scaling, Determinant and Transpose) - String operations: length, compare, concatenate, copy – Selection sort, linear and binary search

**UNIT III FUNCTIONS AND POINTERS**

9

Introduction to functions: Function prototype, function definition, function call, Built-in functions (string functions, math functions) – Recursion – Example Program: Computation of Sine series, Scientific calculator using built-in functions, Binary Search using recursive functions – Pointers – Pointer operators – Pointer arithmetic – Arrays and pointers – Array of pointers – Example Program: Sorting of names – Parameter passing: Pass by value, Pass by reference – Example Program: Swapping of two numbers and changing the value of a variable using pass by reference.

**UNIT IV STRUCTURES**

9

Structure - Nested structures – Pointer and Structures – Array of structures – Example Program using structures and pointers – Self referential structures – Dynamic memory allocation - Singlylinked list - typedef

**UNIT V FILE PROCESSING**

9

Files – Types of file processing: Sequential access, Random access – Sequential access file - Example Program: Finding average of numbers stored in sequential access file - Random access file - Example Program: Transaction processing using random access files – Command line arguments

**OUTCOMES:**

Upon completion of the course, the students will be able to

- Develop simple applications in C using basic constructs
- Design and implement applications using arrays and strings
- Develop and implement applications in C using functions and pointers.
- Develop applications in C using structures.
- Design applications using sequential and random access file processing.

**TEXT BOOKS:**

1. Reema Thareja, —Programming in C, Oxford University Press, Second Edition, 2016.
2. Kernighan, B.W and Ritchie,D.M, —The C Programming language, Second Edition,Pearson Education, 2006

**REFERENCES:**

1. Paul Deitel and Harvey Deitel, —C How to Program, Seventh edition, Pearson Publication
2. Juneja, B. L and Anita Seth, —Programming in C, CENGAGE Learning India Pvt. Ltd., 2011
3. Pradip Dey, Manas Ghosh, —Fundamentals of Computing and Programming in C, First Edition, Oxford University Press, 2009.
4. Anita Goel and Ajay Mittal, —Computer Fundamentals and Programming in C, DorlingKindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011.
5. Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C", McGraw-Hill Education, 1996.



**TWITTER BASED DISEASE IDEATION  
FOR SEASONAL PREDICTION  
USING DEEP LEARNING**



**A PROJECT REPORT**

*Submitted by*

**DAISY. C**

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**JENIFER. A**

**621117104020**

**JENIFER NAYAGI. S**

**621117104021**

*in partial fulfilment for the award of the degree*

*of*

**BACHELOR OF ENGINEERING**

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**COMPUTER SCIENCE AND ENGINEERING**

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**BONAFIDE CERTIFICATE**

Certified that this project report “TWITTER BASED DISEASE IDEATION FOR SEASONAL PREDICTION USING DEEP LEARNING” is the bonafide work of “DAISY.C (621117104010), JENIFER.A (621117104020), JENIFER NAYAGLS (621117104021)” who carried out the project work under my supervision.



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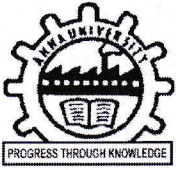


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## ABSTRACT

The strongest weapon to conquer the knowledge in today's world - "Internet", has unfortunately turned out to be one of our greatest obsessions in killing time and is affecting our daily activities and responsibilities with a massive desire to get rid of everything to be able to 'surfing internet apps and relax' all the time. Though the 'Internet Addiction' is gaining attention in the mental health field and had been recently added to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) as a disorder, it needs a lot of research and standardized diagnosis. Their detection at an early stage is extremely important because the clinical interventions only during the last stage will make things worse and critical. In this project, we use the Twitter API to argue that the potential SNMD users can be automatically identified and classified into various categories like Virtual Relationship Addiction and Information Glut using SNMD based tensor model, with the data sets collected from OSN (i.e) Twitter API. The proposed model stands out in the list as the users are not involved in revealing their habits to understand and diagnose the symptoms manually. We also exploit multi-source learning in SNMDI in which we can able to see the users who are depressed and who are addicted to the social networks and propose a new SNMD based Tensor Model (STM) to improve the accuracy. The results show that SNMDI is reliable for identifying online social network users with potential SNMDs and the comments which increase the stress and aggressive mentality of the users in the Twitter API.



# DETECTING IMPERSONATORS IN EXAMINATION

## CENTRES USING AI



A MINI PROJECT REPORT

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Certified that this project report “**DETECTING IMPERSONATORS IN EXAMINATION CENTRES USING AI**” is the bonafide work of “**BHARATHI M, KALAISELVI P, MADHUMITHA K, PAVITHRA M, PRIYA G**” who carried out the project work under my supervision.

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**OBJECTIVES:**

- To understand the foundations of distributed systems.
- To learn issues related to clock Synchronization and the need for global state in distributed systems.
- To learn distributed mutual exclusion and deadlock detection algorithms.
- To understand the significance of agreement, fault tolerance and recovery protocols in Distributed Systems.
- To learn the characteristics of peer-to-peer and distributed shared memory systems.

**UNIT I INTRODUCTION** 9

**Introduction:** Definition –Relation to computer system components –Motivation –Relation to parallel systems – Message-passing systems versus shared memory systems –Primitives for distributed communication –Synchronous versus asynchronous executions –Design issues and challenges. **A model of distributed computations:** A distributed program –A model of distributed executions –Models of communication networks –Global state – Cuts –Past and future cones of an event –Models of process communications. **Logical Time:** A framework for a system of logical clocks –Scalar time –Vector time – Physical clock synchronization: NTP.

**UNIT II MESSAGE ORDERING & SNAPSHOTS** 9

**Message ordering and group communication:** Message ordering paradigms –Asynchronous execution with synchronous communication –Synchronous program order on an asynchronous system –Group communication – Causal order (CO) - Total order. **Global state and snapshot recording algorithms:** Introduction –System model and definitions –Snapshot algorithms for FIFO channels

**UNIT III DISTRIBUTED MUTEX & DEADLOCK** 9

**Distributed mutual exclusion algorithms:** Introduction – Preliminaries – Lamport's algorithm – Ricart-Agrawala algorithm – Maekawa's algorithm – Suzuki-Kasami's broadcast algorithm. **Deadlock detection in distributed systems:** Introduction – System model – Preliminaries – Models of deadlocks – Knapp's classification – Algorithms for the single resource model, the AND model and the OR model.

**UNIT IV RECOVERY & CONSENSUS** 9

**Checkpointing and rollback recovery:** Introduction – Background and definitions – Issues in failure recovery – Checkpoint-based recovery – Log-based rollback recovery – Coordinated checkpointing algorithm – Algorithm for asynchronous checkpointing and recovery. **Consensus and agreement algorithms:** Problem definition – Overview of results – Agreement in a failure-free system – Agreement in synchronous systems with failures.

**UNIT V P2P & DISTRIBUTED SHARED MEMORY** 9

**Peer-to-peer computing and overlay graphs:** Introduction – Data indexing and overlays – Chord – Content addressable networks – Tapestry. **Distributed shared memory:** Abstraction and advantages – Memory consistency models –Shared memory Mutual Exclusion.

**TOTAL: 45 PERIODS****OUTCOMES:****At the end of this course, the students will be able to:**

- Elucidate the foundations and issues of distributed systems
- Understand the various synchronization issues and global state for distributed systems.
- Understand the Mutual Exclusion and Deadlock detection algorithms in distributed systems
- Describe the agreement protocols and fault tolerance mechanisms in distributed systems.
- Describe the features of peer-to-peer and distributed shared memory systems

**TEXT BOOKS:**

1. Kshemkalyani, Ajay D., and Mukesh Singhal. Distributed computing: principles, algorithms, and systems. Cambridge University Press, 2011.
2. George Coulouris, Jean Dollimore and Tim Kindberg, —Distributed Systems Concepts and Design, Fifth Edition, Pearson Education, 2012.

**REFERENCES:**

1. Pradeep K Sinha, "Distributed Operating Systems: Concepts and Design", Prentice Hall of India, 2007.
2. Mukesh Singhal and Niranjana G. Shivaratri. Advanced concepts in operating systems. McGraw-Hill, Inc., 1994.
3. Tanenbaum A.S., Van Steen M., —Distributed Systems: Principles and Paradigms, Pearson Education, 2007.
4. Liu M.L., —Distributed Computing, Principles and Applications, Pearson Education, 2004.
5. Nancy A Lynch, —Distributed Algorithms, Morgan Kaufman Publishers, USA, 2003.

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**OBJECTIVES:**

- To understand Object Oriented Programming concepts and basic characteristics of Java
- To know the principles of packages, inheritance and interfaces
- To define exceptions and use I/O streams
- To develop a java application with threads and generics classes
- To design and build simple Graphical User Interfaces

**UNIT I INTRODUCTION TO OOP AND JAVA FUNDAMENTALS**

10

Object Oriented Programming - Abstraction – objects and classes - Encapsulation- Inheritance -Polymorphism- OOP in Java – Characteristics of Java – The Java Environment - Java Source File -Structure – Compilation. Fundamental Programming Structures in Java – Defining classes in Java – constructors, methods -access specifiers - static members -Comments, Data Types, Variables, Operators, Control Flow, Arrays , Packages - JavaDoc comments.

**UNIT II INHERITANCE AND INTERFACES**

9

Inheritance – Super classes- sub classes –Protected members – constructors in sub classes- theObject class – abstract classes and methods- final methods and classes – Interfaces – defining an interface, implementing interface, differences between classes and interfaces and extending interfaces - Object cloning -inner classes, Array Lists - Strings

**UNIT III EXCEPTION HANDLING AND I/O**

9

Exceptions - exception hierarchy - throwing and catching exceptions – built-in exceptions, creating own exceptions, Stack Trace Elements. Input / Output Basics – Streams – Byte streams and Character streams – Reading and Writing Console – Reading and Writing Files

**UNIT IV MULTITHREADING AND GENERIC PROGRAMMING**

8

Differences between multi-threading and multitasking, thread life cycle, creating threads, synchronizing threads, Inter-thread communication, daemon threads, thread groups. Generic Programming – Generic classes – generic methods – Bounded Types – Restrictions and Limitations.

**UNIT V EVENT DRIVEN PROGRAMMING**

9

Graphics programming - Frame – Components - working with 2D shapes - Using color, fonts, and images - Basics of event handling - event handlers - adapter classes - actions - mouse events -AWT event hierarchy - Introduction to Swing – layout management - Swing Components – Text Fields , Text Areas – Buttons- Check Boxes – Radio Buttons – Lists- choices- Scrollbars – Windows –Menus – Dialog Boxes.

**TOTAL: 45 PERIODS****OUTCOMES:****Upon completion of the course, students will be able to:**

- Develop Java programs using OOP principles
- Develop Java programs with the concepts inheritance and interfaces
- Build Java applications using exceptions and I/O streams
- Develop Java applications with threads and generics classes
- Develop interactive Java programs using swings

**TEXT BOOKS:**

1. Herbert Schildt, —Java The complete reference!, 8<sup>th</sup> Edition, McGraw Hill Education, 2011.
2. Cay S. Horstmann, Gary cornell, —Core Java Volume –I Fundamentals!, 9<sup>th</sup> Edition,Prentice Hall, 2013.

**REFERENCES:**

1. Paul Deitel, Harvey Deitel, —Java SE 8 for programmers!, 3<sup>rd</sup> Edition, Pearson, 2015.
2. Steven Holzner, —Java 2 Black book!, Dreamtech press, 2011.
3. Timothy Budd, —Understanding Object-oriented programming with Javal, Updated Edition, Pearson Education, 2000.

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**ONLINE IDENTIFICATION AND DATA RECOVERY  
FOR PMU USING DATA MANIPULATION ATTACK**



**A PROJECT REPORT**

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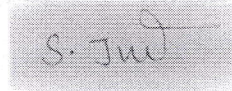
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## ABSTRACT

Some of the modern smart grid infrastructures, phasor measurement units (PMUs) for instance, are vulnerable to cyber attacks due to their ever-increasing dependence on information and communications technologies. In general, existing solutions to cyber attacks focus on creating redundancy and/or enhancing security levels of sensing and communication networks. These solutions require intensive offline efforts and therefore are economically expensive. Further, they are generally inefficient when dealing with dynamic attacks. This paper proposes a novel density-based spatial clustering approach for online detection, classification, and data recovery for data manipulation attacks to PMU measurements. The proposed method is purely data-driven and is applicable to simultaneous multi-measurement attacks without requiring additional hardware in the existing infrastructure. The proposed approach is also independent of the conventional state estimation (SE). Comprehensive case studies demonstrate the effectiveness of the proposed method.

  
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# Hybrid Event and Booking System



A PROJECT REPORT

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## ABSTRACT

Parking is costly and limited in almost every major city in the world. Innovative parking systems for meeting near-term parking demand are needed. This project proposes a novel, secure, and intelligent parking system (Smart Parking) based on imminent to best support the urban core. These persistent parking problems could be turned into new opportunities, brought by current trends in meeting the globally connected continuum. This project reveals a work-in-progress to capitalize on private land properties for parking, in order to relieve stress on public agencies, create new sources of revenue, and enlist new entities in the intermediary market. These intermediaries, labelled as Parking Service Providers (or PSPs) play a broker role through advertising parking lots on a shared cloud platform. To streamline these business collaborations and related processes, physical parking lots are augmented with Internet connectivity allowing cloud-provided applications to congregate these lots into a larger inventory.. From the point of users' view, Smart Parking is a secure and intelligent parking service. The parking reservation is safe and privacy preserved. The parking navigation is convenient and efficient. The whole parking process will be a non-stop service. From the point of management's view, Smart Parking is an intelligent parking system. Based on the prediction, new business promotion can be made, for example, on-sale prices and new parking fees. In Smart Parking, new promotions can be published through wireless network.

  
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CS8491

COMPUTER ARCHITECTURE

L T P C  
3 0 0 3

OBJECTIVES:

- To learn the basic structure and operations of a computer.
- To learn the arithmetic and logic unit and implementation of fixed-point and floating point arithmetic unit.
- To learn the basics of pipelined execution.
- To understand parallelism and multi-core processors.
- To understand the memory hierarchies, cache memories and virtual memories.
- To learn the different ways of communication with I/O devices.

UNIT I BASIC STRUCTURE OF A COMPUTER SYSTEM 9

Functional Units – Basic Operational Concepts – Performance – Instructions: Language of the Computer – Operations, Operands – Instruction representation – Logical operations – decision making – MIPS Addressing.

UNIT II ARITHMETIC FOR COMPUTERS 9

Addition and Subtraction – Multiplication – Division – Floating Point Representation – Floating Point Operations – Subword Parallelism

UNIT III PROCESSOR AND CONTROL UNIT 9

A Basic MIPS implementation – Building a Datapath – Control Implementation Scheme – Pipelining – Pipelined datapath and control – Handling Data Hazards & Control Hazards – Exceptions.

UNIT IV PARALLELISIM 9

Parallel processing challenges – Flynn's classification – SISD, MIMD, SIMD, SPMD, and Vector Architectures - Hardware multithreading – Multi-core processors and other Shared Memory Multiprocessors - Introduction to Graphics Processing Units, Clusters, Warehouse Scale Computers and other Message-Passing Multiprocessors.

UNIT V MEMORY & I/O SYSTEMS 9

Memory Hierarchy - memory technologies – cache memory – measuring and improving cache performance – virtual memory, TLB's – Accessing I/O Devices – Interrupts – Direct Memory Access – Bus structure – Bus operation – Arbitration – Interface circuits - USB.

TOTAL : 45 PERIODS

OUTCOMES:

On Completion of the course, the students should be able to:


- Understand the basics structure of computers, operations and instructions.
- Design arithmetic and logic unit.
- Understand pipelined execution and design control unit.
- Understand parallel processing architectures.
- Understand the various memory systems and I/O communication.

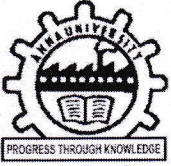
TEXT BOOKS:

1. David A. Patterson and John L. Hennessy, Computer Organization and Design: The Hardware/Software Interface, Fifth Edition, Morgan Kaufmann / Elsevier, 2014.
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky and Naraig Manjikian, Computer Organization and Embedded Systems, Sixth Edition, Tata McGraw Hill, 2012.

REFERENCES:

1. William Stallings, Computer Organization and Architecture – Designing for Performance, Eighth Edition, Pearson Education, 2010.
2. John P. Hayes, Computer Architecture and Organization, Third Edition, Tata McGraw Hill, 2012.
3. John L. Hennessey and David A. Patterson, Computer Architecture – A Quantitative Approach, Morgan Kaufmann / Elsevier Publishers, Fifth Edition, 2012.

  
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**UNDERSTANDING PICTURE PASSWORD**

**SELECTIONS BASED ON USER'S**

**SOCIOCULTURAL EXPERIENCES**

A PROJECT REPORT

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Certified that this project report "UNDERSTANDING PICTURE PASSWORD SELECTIONS BASED ON USER'S SOCIOCULTURAL EXPERIENCES" is the bonafide work of "VINTHIYA M, PRIYADHARSHINI A, DEEPIKA M" who carried out the project work under my supervision.

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## ABSTRACT

In three level graphical, text and color file security system the authentication is done by image representation password. Data sharing is an important functionality in cloud storage. In this article, we show how to securely, efficiently, and flexibly share data with others in cloud storage. We describe new public-key cryptosystems which produce constant-size cipher texts such that efficient delegation of decryption rights for any set of cipher texts are possible. The novelty is that one can aggregate any set of secret keys and make them as compact as a single key, but encompassing the power of all the keys being aggregated. In other words, the secret key holder can release a constant-size aggregate key for flexible choices of cipher text set in cloud storage, but the other encrypted files outside the set remain confidential.

  
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**OBJECTIVES**

- To learn the fundamentals of data models and to represent a database system using ER diagrams.
- To study SQL and relational database design.
- To understand the internal storage structures using different file and indexing techniques which will help in physical DB design.
- To understand the fundamental concepts of transaction processing- concurrency control techniques and recovery procedures.
- To have an introductory knowledge about the Storage and Query processing Techniques

**UNIT I RELATIONAL DATABASES**

10

Purpose of Database System – Views of data – Data Models – Database System Architecture – Introduction to relational databases – Relational Model – Keys – Relational Algebra – SQL fundamentals – Advanced SQL features – Embedded SQL – Dynamic SQL

**UNIT II DATABASE DESIGN**

8

Entity-Relationship model – E-R Diagrams – Enhanced-ER Model – ER-to-Relational Mapping – Functional Dependencies – Non-loss Decomposition – First, Second, Third Normal Forms, Dependency Preservation – Boyce/Codd Normal Form – Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form

**UNIT III TRANSACTIONS**

9

Transaction Concepts – ACID Properties – Schedules – Serializability – Concurrency Control – Need for Concurrency – Locking Protocols – Two Phase Locking – Deadlock – Transaction Recovery - Save Points – Isolation Levels – SQL Facilities for Concurrency and Recovery.

**UNIT IV IMPLEMENTATION TECHNIQUES**

9

RAID – File Organization – Organization of Records in Files – Indexing and Hashing – Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing – Query Processing Overview – Algorithms for SELECT and JOIN operations – Query optimization using Heuristics and Cost Estimation.

**UNIT V ADVANCED TOPICS**

9

Distributed Databases: Architecture, Data Storage, Transaction Processing – Object-based Databases: Object Database Concepts, Object-Relational features, ODMG Object Model, ODL, OQL - XML Databases: XML Hierarchical Model, DTD, XML Schema, XQuery – Information Retrieval: IR Concepts, Retrieval Models, Queries in IR systems.

**TOTAL: 45 PERIODS****OUTCOMES:****Upon completion of the course, the students will be able to:**

- Classify the modern and futuristic database applications based on size and complexity
- Map ER model to Relational model to perform database design effectively
- Write queries using normalization criteria and optimize queries
- Compare and contrast various indexing strategies in different database systems
- Appraise how advanced databases differ from traditional databases.

**TEXT BOOKS:**

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, —Database System Concepts, Sixth Edition, Tata McGraw Hill, 2011.
2. Ramez Elmasri, Shamkant B. Navathe, —Fundamentals of Database Systems, Sixth Edition, Pearson Education, 2011.

**REFERENCES:**

1. C.J.Date, A.Kannan, S.Swamynathan, —An Introduction to Database Systems, Eighth Edition, Pearson Education, 2006.
2. Raghu Ramakrishnan, —Database Management Systems, Fourth Edition, McGraw-Hill College Publications, 2015.
3. G.K.Gupta, "Database Management Systems, Tata McGraw Hill, 2011.

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**OBJECTIVES:**

- To understand the foundations of distributed systems.
- To learn issues related to clock Synchronization and the need for global state in distributed systems.
- To learn distributed mutual exclusion and deadlock detection algorithms.
- To understand the significance of agreement, fault tolerance and recovery protocols in Distributed Systems.
- To learn the characteristics of peer-to-peer and distributed shared memory systems.

**UNIT I INTRODUCTION** 9

**Introduction:** Definition –Relation to computer system components –Motivation –Relation to parallel systems – Message-passing systems versus shared memory systems –Primitives for distributed communication –Synchronous versus asynchronous executions –Design issues and challenges. **A model of distributed computations:** A distributed program –A model of distributed executions –Models of communication networks –Global state – Cuts –Past and future cones of an event –Models of process communications. **Logical Time:** A framework for a system of logical clocks –Scalar time –Vector time – Physical clock synchronization: NTP.

**UNIT II MESSAGE ORDERING & SNAPSHOTS** 9

**Message ordering and group communication:** Message ordering paradigms –Asynchronous execution with synchronous communication –Synchronous program order on an asynchronous system –Group communication – Causal order (CO) - Total order. **Global state and snapshot recording algorithms:** Introduction –System model and definitions –Snapshot algorithms for FIFO channels

**UNIT III DISTRIBUTED MUTEX & DEADLOCK** 9

**Distributed mutual exclusion algorithms:** Introduction – Preliminaries – Lamport's algorithm – Ricart-Agrawala algorithm – Maekawa's algorithm – Suzuki-Kasami's broadcast algorithm. **Deadlock detection in distributed systems:** Introduction – System model – Preliminaries – Models of deadlocks – Knapp's classification – Algorithms for the single resource model, the AND model and the OR model.

**UNIT IV RECOVERY & CONSENSUS** 9

**Checkpointing and rollback recovery:** Introduction – Background and definitions – Issues in failure recovery – Checkpoint-based recovery – Log-based rollback recovery – Coordinated checkpointing algorithm – Algorithm for asynchronous checkpointing and recovery. **Consensus and agreement algorithms:** Problem definition – Overview of results – Agreement in a failure-free system – Agreement in synchronous systems with failures.

**UNIT V P2P & DISTRIBUTED SHARED MEMORY** 9

**Peer-to-peer computing and overlay graphs:** Introduction – Data indexing and overlays – Chord – Content addressable networks – Tapestry. **Distributed shared memory:** Abstraction and advantages – Memory consistency models –Shared memory Mutual Exclusion.

**TOTAL: 45 PERIODS****OUTCOMES:****At the end of this course, the students will be able to:**

- Elucidate the foundations and issues of distributed systems
- Understand the various synchronization issues and global state for distributed systems.
- Understand the Mutual Exclusion and Deadlock detection algorithms in distributed systems
- Describe the agreement protocols and fault tolerance mechanisms in distributed systems.
- Describe the features of peer-to-peer and distributed shared memory systems

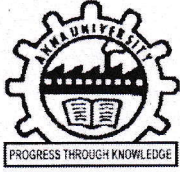
**TEXT BOOKS:**

1. Kshemkalyani, Ajay D., and Mukesh Singhal. Distributed computing: principles, algorithms, and systems. Cambridge University Press, 2011.
2. George Coulouris, Jean Dollimore and Tim Kindberg, —Distributed Systems Concepts and Design, Fifth Edition, Pearson Education, 2012.

**REFERENCES:**

1. Pradeep K Sinha, "Distributed Operating Systems: Concepts and Design", Prentice Hall of India, 2007.
2. Mukesh Singhal and Niranjana G. Shivaratri. Advanced concepts in operating systems. McGraw-Hill, Inc., 1994.
3. Tanenbaum A.S., Van Steen M., —Distributed Systems: Principles and Paradigms, Pearson Education, 2007.
4. Liu M.L., —Distributed Computing, Principles and Applications, Pearson Education, 2004.
5. Nancy A Lynch, —Distributed Algorithms, Morgan Kaufman Publishers, USA, 2003.

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# Multimodel Operation for Visually Impaired People Using Deep Learning



A PROJECT REPORT

*Submitted by*

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**APRIL 2021**

**ANNA UNIVERSITY: CHENNAI-600 025**

**BONAFIDE CERTIFICATE**

Certified that this project report “MULTIMODEL OPERATION FOR VISUALLY IMPAIRED PEOPLE USING DEEP LEARNING” is the bonafide work of “**SOWBARNIKA.A (621117104052), RISWANA.S (621117104042), ANUJAYA.K (621117104006)**” who carried out the project work under my supervision.



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## ABSTRACT

In this project, we recommended a technique called the **multi-view object racking (MVOT)** system to resolve the multiple cameras monitor an area from different angles. Videos recorded by the cameras contain complementary information and fusing the knowledge embedded in the videos facilitates the development of a robust and accurate system. The set ask of cameras that have different settings, we propose a correspondence Yolo V3 algorithm that maps each segmented group of objects in one view to the corresponding group in another view. We call these corresponding groups matched blob clusters, each of which enables knowledge to be shared between cameras. It follows that we present a two-pass regression framework for multi-view objects.

CS8602

COMPILER DESIGN

L T P C  
3 0 2 4

OBJECTIVES:

- To learn the various phases of compiler.
- To learn the various parsing techniques.
- To understand intermediate code generation and run-time environment.
- To learn to implement front-end of the compiler.
- To learn to implement code generator.

UNIT I INTRODUCTION TO COMPILERS 9

Structure of a compiler – Lexical Analysis – Role of Lexical Analyzer – Input Buffering – Specification of Tokens – Recognition of Tokens – Lex – Finite Automata – Regular Expressionsto Automata – Minimizing DFA.

UNIT II SYNTAX ANALYSIS 12

Role of Parser – Grammars – Error Handling – Context-free grammars – Writing a grammar –Top Down Parsing - General Strategies Recursive Descent Parser Predictive Parser-LL(1) Parser-Shift Reduce Parser-LR Parser-LR (0)Item Construction of SLR Parsing Table - Introduction to LALR Parser - Error Handling and Recovery in Syntax Analyzer-YACC.

UNIT III INTERMEDIATE CODE GENERATION 8

Syntax Directed Definitions, Evaluation Orders for Syntax Directed Definitions, Intermediate Languages: Syntax Tree, Three Address Code, Types and Declarations, Translation of Expressions, Type Checking.

UNIT IV RUN-TIME ENVIRONMENT AND CODE GENERATION 8

Storage Organization, Stack Allocation Space, Access to Non-local Data on the Stack, HeapManagement - Issues in Code Generation - Design of a simple Code Generator.

UNIT V CODE OPTIMIZATION 8

Principal Sources of Optimization – Peep-hole optimization - DAG- Optimization of Basic Blocks-Global Data Flow Analysis - Efficient Data Flow Algorithm.


Total: 45 Periods

TEXT BOOK:

1. Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, Compilers: Principles, Techniques and ToolsI, Second Edition, Pearson Education, 2009.

REFERENCES

1. Randy Allen, Ken Kennedy, Optimizing Compilers for Modern Architectures: A Dependence based Approach, Morgan Kaufmann Publishers, 2002.
2. Steven S. Muchnick, Advanced Compiler Design and ImplementationI, Morgan Kaufmann Publishers - Elsevier Science, India, Indian Reprint 2003.
3. Keith D Cooper and Linda Torczon, Engineering a CompilerI, Morgan Kaufmann Publishers Elsevier Science, 2004.
4. V. Raghavan, Principles of Compiler DesignI, Tata McGraw Hill Education Publishers, 2010.
5. Allen I. Holub, Compiler Design in C, Prentice-Hall Software Series, 1993.

  
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**OBJECTIVES:**

- To understand and apply the algorithm analysis techniques.
- To critically analyze the efficiency of alternative algorithmic solutions for the same problem
- To understand different algorithm design techniques.
- To understand the limitations of Algorithmic power.

**UNIT I INTRODUCTION**

9

Notion of an Algorithm – Fundamentals of Algorithmic Problem Solving – Important Problem Types  
 – Fundamentals of the Analysis of Algorithmic Efficiency – Asymptotic Notations and their properties. Analysis Framework – Empirical analysis - Mathematical analysis for Recursive and Non-recursive algorithms - Visualization

**UNIT II BRUTE FORCE AND DIVIDE-AND-CONQUER**

9

Brute Force – Computing  $a^n$  – String Matching - Closest-Pair and Convex-Hull Problems - Exhaustive Search - Travelling Salesman Problem - Knapsack Problem - Assignment problem.  
 Divide and Conquer Methodology – Binary Search – Merge sort – Quick sort – Heap Sort - Multiplication of Large Integers – Closest-Pair and Convex - Hull Problems.

**UNIT III DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE**

9

Dynamic programming – Principle of optimality - Coin changing problem, Computing a Binomial Coefficient – Floyd's algorithm – Multi stage graph - Optimal Binary Search Trees – Knapsack Problem and Memory functions. Greedy Technique – Container loading problem - Prim's algorithm and Kruskal's Algorithm – 0/1 Knapsack problem, Optimal Merge pattern - Huffman Trees.

**UNIT IV ITERATIVE IMPROVEMENT**

9

The Simplex Method - The Maximum-Flow Problem – Maximum Matching in Bipartite Graphs, Stable marriage Problem.

**UNIT V COPING WITH THE LIMITATIONS OF ALGORITHM POWER**

9

Lower - Bound Arguments - P, NP NP- Complete and NP Hard Problems. Backtracking – n-Queen problem - Hamiltonian Circuit Problem – Subset Sum Problem. Branch and Bound – LIFO Search and FIFO search - Assignment problem – Knapsack Problem – Travelling Salesman Problem - Approximation Algorithms for NP-Hard Problems – Travelling Salesman problem – Knapsack problem.

**TOTAL: 45 PERIODS****OUTCOMES:**

**At the end of the course, the students should be able to:**

- Design algorithms for various computing problems.
- Analyze the time and space complexity of algorithms.
- Critically analyze the different algorithm design techniques for a given problem.
- Modify existing algorithms to improve efficiency.

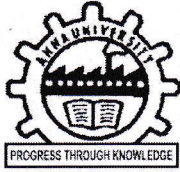
**TEXT BOOKS:**

1. Anany Levitin, —Introduction to the Design and Analysis of Algorithms, Third Edition, Pearson Education, 2012.
2. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Computer Algorithms/ C++, Second Edition, Universities Press, 2007.

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1. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, —Introduction to Algorithms, Third Edition, PHI Learning Private Limited, 2012.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, —Data Structures and Algorithms, Pearson Education, Reprint 2006.
3. Harsh Bhasin, —Algorithms Design and Analysis, Oxford university press, 2016.
4. S. Sridhar, —Design and Analysis of Algorithms, Oxford university press, 2014.
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# Child Rescue System Against Open Borewell



A PROJECT REPORT

*Submitted by*

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Certified that this project report “**Child Rescue System Against Open Borewell**” is the bonafide work of “**PRAVEENA P, PRIYA R, UDHAYANILA U**” who carried out the project work under my supervision.



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## ABSTRACT

In India we have N number of borewells which are left uncovered due to scarcity of water. Now the uncovered borewell turned as pitfalls for innocent life who playing near the borewell. As the diameter of the borewell is quite narrow (4.5-6inches) for adult and light goes dark inside it so rescue of the children from the borewell is a challenging task in those situations. In our project we install a sensor in the borewell which detect the falling of children and transmit the message to rescue team and nearby hospital which reduce the delaytime. And also, we proposed a robotic arm which lift the children safely. The arms are provided ultra-sonic camera which capture and record the status of the children and oxygen cylinder are also provided with it. The arm has human sensitivity and flexibility to lift the children. We use infrared rays to find posture of the children in the dark borewell. we proposed a robot which is used to secure the children during at the time of heavy rain. At the time of heavy rain, the robot covers the top of the borewell tightly which prevent the flow of water into it. This entire process is controlled by the pic microcontroller. This all the process is monitored at outside of the borewell by a technician.

  
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**OBJECTIVES:**

- To understand the language hierarchy
- To construct automata for any given pattern and find its equivalent regular expressions
- To design a context free grammar for any given language
- To understand Turing machines and their capability
- To understand undecidable problems and NP class problems

<b>UNIT I</b>	<b>AUTOMATA FUNDAMENTALS</b>	<b>9</b>
Introduction to formal proof – Additional forms of Proof – Inductive Proofs – Finite Automata – Deterministic Finite Automata – Non-deterministic Finite Automata – Finite Automata with Epsilon Transitions		
<b>UNIT II</b>	<b>REGULAR EXPRESSIONS AND LANGUAGES</b>	<b>9</b>
Regular Expressions – FA and Regular Expressions – Proving Languages not to be regular – Closure Properties of Regular Languages – Equivalence and Minimization of Automata.		
<b>UNIT III</b>	<b>CONTEXT FREE GRAMMAR AND LANGUAGES</b>	<b>9</b>
CFG – Parse Trees – Ambiguity in Grammars and Languages – Definition of the Pushdown Automata – Languages of a Pushdown Automata – Equivalence of Pushdown Automata and CFG, Deterministic Pushdown Automata.		
<b>UNIT IV</b>	<b>PROPERTIES OF CONTEXT FREE LANGUAGES</b>	<b>9</b>
Normal Forms for CFG – Pumping Lemma for CFL – Closure Properties of CFL – Turing Machines – Programming Techniques for TM.		
<b>UNIT V</b>	<b>UNDECIDABILITY</b>	<b>9</b>
Non Recursive Enumerable (RE) Language – Undecidable Problem with RE – Undecidable Problems about TM – Post's Correspondence Problem, The Class P and NP.		

**TOTAL :45PERIODS****OUTCOMES:****Upon completion of the course, the students will be able to:**

- Construct automata, regular expression for any pattern.
- Write Context free grammar for any construct.
- Design Turing machines for any language.
- Propose computation solutions using Turing machines.
- Derive whether a problem is decidable or not.

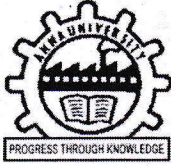
**TEXT BOOK:**

1. J.E.Hopcroft, R.Motwani and J.D Ullman, —Introduction to Automata Theory, Languages and Computations, Second Edition, Pearson Education, 2003.

**REFERENCES:**

1. H.R.Lewis and C.H.Papadimitriou, —Elements of the theory of Computation, Second Edition, PHI, 2003.
2. J.Martin, —Introduction to Languages and the Theory of Computation, Third Edition, TMH, 2003.
3. Micheal Sipser, —Introduction of the Theory and Computation, Thomson Brokecole, 1997.

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**ADAPTIVE RESOURCE  
ALLOCATION USING BROWNET**



A PROJECT REPORT

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## ABSTRACT

An infrastructure build in the cloud computing with enabling access of CloudSim environment which is reliable to strength of commercial and non-commercial IT development communities of robust reputation management mechanism in the federated cloud. This project is mainly focuses IAAS paradigm of cloud computing environment with computational datacenter for resources which is access in the Virtual Machine in the form of cloudlets This datacenter forms the resources with computational cost to the virtual network for low trust on the temporary resources with their computational resources protects the users to reduce the cost, computational resources are shared, i.e., there exists multi-tenancy. As the communication channels and other computational resources are shared, it creates security and privacy issues. A user may not identify a trustworthy cotenant as the users are anonymous. The user depends on the **Cloud Provider (CP)** to assign trustworthy co-ten hunting. But, it is in the CP's interest that it gets maximum utilization of its resources. Hence, it allows maximum co-tenancy irrespective of the behaviours of users. In this project, we propose a Brownout self-adaptive paradigm (SAP) users and assign resources in such a way that they do not share resources. We show the correctness and the efficiency of the proposed reputation management system using analytical and experimental analysis.

**OBJECTIVES:**

- To understand the fundamentals of object modeling
- To understand and differentiate Unified Process from other approaches.
- To design with static UML diagrams.
- To design with the UML dynamic and implementation diagrams.
- To improve the software design with design patterns.
- To test the software against its requirements specification

<b>UNIT I</b>	<b>UNIFIED PROCESS AND USE CASE DIAGRAMS</b>	<b>9</b>
	Introduction to OOAD with OO Basics - Unified Process – UML diagrams – Use Case – Case study – the Next Gen POS system, Inception - Use case Modelling – Relating Use cases – include, extend and generalization – When to use Use-cases	
<b>UNIT II</b>	<b>STATIC UML DIAGRAMS</b>	<b>9</b>
	Class Diagram— Elaboration – Domain Model – Finding conceptual classes and description classes – Associations – Attributes – Domain model refinement – Finding conceptual class Hierarchies – Aggregation and Composition – Relationship between sequence diagrams and use cases — When to use Class Diagrams	
<b>UNIT III</b>	<b>DYNAMIC AND IMPLEMENTATION UML DIAGRAMS</b>	<b>9</b>
	<b>Dynamic Diagrams</b> – UML interaction diagrams - System sequence diagram – Collaboration diagram – When to use Communication Diagrams - State machine diagram and Modelling –When to use State Diagrams - Activity diagram – When to use activity diagrams	
	<b>Implementation Diagrams</b> - UML package diagram - When to use package diagrams - Component and Deployment Diagrams – When to use Component and Deployment diagrams	
<b>UNIT IV</b>	<b>DESIGN PATTERNS</b>	<b>9</b>
	<b>GRASP:</b> Designing objects with responsibilities – Creator – Information expert – Low Coupling – High Cohesion – Controller	
	<b>Design Patterns</b> – <b>creational</b> – factory method – <b>structural</b> – Bridge – Adapter – <b>behavioural</b> – Strategy – observer – Applying GoF design patterns – Mapping design to code	
<b>UNIT V</b>	<b>TESTING</b>	<b>9</b>
	Object Oriented Methodologies – Software Quality Assurance – Impact of object orientation on Testing – Develop Test Cases and Test Plans	
<b>TOTAL: 45 PERIODS</b>		

**OUTCOMES:**

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

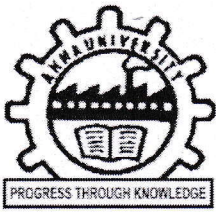
- Express software design with UML diagrams
- Design software applications using OO concepts.
- Identify various scenarios based on software requirements
- Transform UML based software design into pattern based design using design patterns
- Understand the various testing methodologies for OO software

**TEXT BOOKS:**

1. Craig Larman, —Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development, Third Edition, Pearson Education, 2005.
2. Ali Bahrami - Object Oriented Systems Development - McGraw Hill International Edition - 1999

**REFERENCES:**

1. Erich Gamma, and Richard Helm, Ralph Johnson, John Vlissides, —Design patterns: Elements of Reusable Object-Oriented Software, Addison-Wesley, 1995.
2. Martin Fowler, —UML Distilled: A Brief Guide to the Standard Object Modeling Language, Third edition, Addison Wesley, 2003



# **IOT Based Industrial pollution monitoring system**



A PROJECT REPORT

*Submitted by*

**INDHUJA.S**                              **621117104017**

**RAMYA.P**                                **621117104041**

**SARAL JAYARANI.A**      **621117104046**

*in partial fulfillment for the award of the degree*

*of*

**BACHELOR OF ENGINEERING**

*in*

**COMPUTER SCIENCE AND ENGINEERING**

**IDHAYA ENGINEERING COLLEGE FOR WOMEN**

**CHINNASALEM**

**ANNA UNIVERSITY :: CHENNAI-600 025**

**MARCH 2021**

*(Signature)*  
**Dr.R.GURUMANI,M.E.,Ph.D.,M.B.A.,M.ISTE.,F.IE.,**  
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# ANNA UNIVERSITY : CHENNAI-600 025

## BONAFIDE CERTIFICATE

Certified that this project report “MULTIMODEL OPERATION FOR VISUALLY IMPAIRED PEOPLE USING DEEP LEARNING” is the bonafide work of “INDHUJA.S,RAMYA.P, SARAL JAYARANI.A,” who carried out the project work under my supervision.



**SIGNATURE**

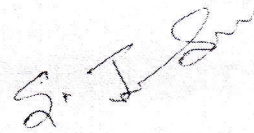
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**SIGNATURE**

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**INTERNAL EXAMINER**



**EXTERNAL EXAMINER**

## ABSTRACT

In this project, we recommended a technique called the multi-view object tracking (MVOT) system to resolve the multiple cameras monitor an area from different angles. Videos recorded by the cameras contain complementary information and fusing the knowledge embedded in the videos facilitates the development of a robust and accurate system. Those task of cameras that have different settings, we propose a correspondence Yolo V3 algorithm that maps each segmented group of objects in one view to the corresponding group in another view. We call these corresponding groups matched blob clusters, each of which enables knowledge to be shared between cameras. It follows that we present a two - pass regression framework for multi-view objects.

**OBJECTIVES:**

- To understand different Internet Technologies.
- To learn java-specific web services architecture

**UNIT I WEBSITE BASICS, HTML 5, CSS 3, WEB 2.0 9**

Web Essentials: Clients, Servers and Communication – The Internet – Basic Internet protocols – World wide web – HTTP Request Message – HTTP Response Message – WebClients – Web Servers – HTML5 – Tables – Lists – Image – HTML5 control elements – Semantic elements – Drag and Drop – Audio – Video controls - CSS3 – Inline, embedded and external style sheets – Rule cascading – Inheritance – Backgrounds – Border Images – Colors – Shadows – Text – Transformations – Transitions – Animations.

**UNIT II CLIENT SIDE PROGRAMMING 9**

Java Script: An introduction to JavaScript – JavaScript DOM Model-Date and Objects, - Regular Expressions- Exception Handling-Validation-Built-in objects-Event Handling- DHTML with JavaScript- JSON introduction – Syntax – Function Files – Http Request –SQL.

**UNIT III SERVER SIDE PROGRAMMING 9**

Servlets: Java Servlet Architecture- Servlet Life Cycle- Form GET and POST actions- Session Handling- Understanding Cookies- Installing and Configuring Apache Tomcat Web Server- DATABASE CONNECTIVITY: JDBC perspectives, JDBC program example - JSP: Understanding Java Server Pages-JSP Standard Tag Library (JSTL)-Creating HTML forms by embedding JSP code.

**UNIT IV PHP and XML 9**

An introduction to PHP: PHP- Using PHP- Variables- Program control- Built-in functions-Form Validation- Regular Expressions - File handling – Cookies - Connecting to Database.

XML: Basic XML- Document Type Definition- XML Schema DOM and Presenting XML, XMLParsers and Validation, XSL and XSLT Transformation, News Feed (RSS and ATOM).

**UNIT V INTRODUCTION TO AJAX and WEB SERVICES 9**

AJAX: Ajax Client Server Architecture-XML Http Request Object-Call Back Methods; Web Services: Introduction- Java web services Basics – Creating, Publishing, Testing and Describing a Web services (WSDL)-Consuming a web service, Database Driven web service from an application –SOAP.

**TOTAL 45 PERIODS****OUTCOMES:****At the end of the course, the students should be able to:**

- Construct a basic website using HTML and Cascading Style Sheets.
- Build dynamic web page with validation using Java Script objects and by applying different event handling mechanisms.
- Develop server side programs using Servlets and JSP.
- Construct simple web pages in PHP and to represent data in XML format.
- Use AJAX and web services to develop interactive web applications

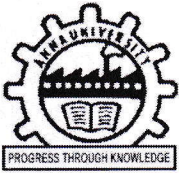
**TEXT BOOK:**

1. Deitel and Deitel and Nieto, —Internet and World Wide Web - How to Program, Prentice Hall, 5th Edition, 2011.

**REFERENCES:**

1. Stephen Wykoop and John Burke —Running a Perfect Website, QUE, 2nd Edition, 1999.
2. Chris Bates, Web Programming – Building Intranet Applications, 3rd Edition, Wiley Publications, 2009.
3. Jeffrey C and Jackson, —Web Technologies A Computer Science Perspective, Pearson Education, 2011.
4. Gopalan N.P. and Akilandeswari J., —Web Technology, Prentice Hall of India, 2011.
5. Uttam K. Roy, —Web Technologies, Oxford University Press, 2011.

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**WATER QUALITY MONITORING SYSTEM  
USING INTERNET OF THINGS**



**A PROJECT REPORT**

*Submitted by*

**AKSHAYA K**

**621117104002**

**BHUVANESHWARI K**

**621117104009**

**GOODLUCK V**

**621117104014**

*in partial fulfillment for the award of the degree*

*of*

**BACHELOR OF ENGINEERING**

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**COMPUTER SCIENCE AND ENGINEERING**

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**APRIL 2021**

  
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**BONAFIDE CERTIFICATE**

Certified that this project report “WATER QUALITY MONITORING SYSTEM USING INTERNET OF THINGS” is the bonafide work of “K.AKSHAYA, K.BHUVANESHWARI, V.GOODLUCK” who carried out the project work under my supervision.



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**INTERNAL EXAMINER**



**SIGNATURE**

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**EXTERNAL EXAMINER**



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## ABSTRACT

The contamination of water has become a common problem globally. The conventional method of monitoring involves manual collecting water sample from different locations and tested in the laboratory using the rigorous skills. Such approaches are time consuming and are no longer to be considered to be efficient. Moreover, the current methodologies include analyzing various kinds of physical and chemical parameters. The old method of quality detection and communication is time consuming, low precision and costly. Therefore, there is a need for continuous monitoring of water quality system in real time. By focusing on the above issues, low cost monitoring system to monitor water in real time using IoT is proposed. In this system quality parameters are measured using different sensors such as pH, turbidity, temperature and communicating data onto a platform of microcontroller system and GPRS are used. The current developments in the field of sensor networks are critical for environmental applications. Internet of Things allows connections among various device with the ability to exchange and gather data. IoT also extends its capability to environmental issues in addition to automation industry by using industry by 4.0. As water is one of the basic needs of human survival, it is required to incorporate some mechanism to monitor water quality time to time. Around 40% of death are caused due to contaminated water in the world. Hence, there is a necessity to ensure supply of purified drinking Water Quality Monitoring(WQM) is a cost-effective and efficient system designed to monitor drinking water quality which makes use of Internet of Things(IoT) technology. In this project, the proposed system consists of sensors to measure parameters such as pH value and contamination level by colour sensor. And also, the Microcontroller Unit(MCU) interfaced with these sensors and further processing is performed and send it to nodemcu. The obtained data is sent to the cloud by IoT based bylink application to monitor the quality of water.

  
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**OBJECTIVES:**

- To understand the basic concepts and functions of operating systems.
- To understand Processes and Threads
- To analyze Scheduling algorithms.
- To understand the concept of Deadlocks.
- To analyze various memory management schemes.
- To understand I/O management and File systems.
- To be familiar with the basics of Linux system and Mobile OS like iOS and Android.

**UNIT I OPERATING SYSTEM OVERVIEW** 7

Computer System Overview-Basic Elements, Instruction Execution, Interrupts, Memory Hierarchy, Cache Memory, Direct Memory Access, Multiprocessor and Multicore Organization. Operating system overview-objectives and functions, Evolution of Operating System.- Computer System Organization Operating System Structure and Operations- System Calls, System Programs, OS Generation and System Boot.

**UNIT II PROCESS MANAGEMENT** 11

Processes - Process Concept, Process Scheduling, Operations on Processes, Inter-process Communication; CPU Scheduling - Scheduling criteria, Scheduling algorithms, Multiple-processor scheduling, Real time scheduling; Threads- Overview, Multithreading models, Threading issues; Process Synchronization - The critical-section problem, Synchronization hardware, Mutex locks, Semaphores, Classic problems of synchronization, Critical regions, Monitors; Deadlock - System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock.

**UNIT III STORAGE MANAGEMENT** 9

Main Memory – Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation, Segmentation with paging, 32 and 64 bit architecture Examples; Virtual Memory – Background, Demand Paging, Page Replacement, Allocation, Thrashing; Allocating Kernel Memory, OS Examples.

**UNIT IV FILE SYSTEMS AND I/O SYSTEMS** 9

Mass Storage system – Overview of Mass Storage Structure, Disk Structure, Disk Scheduling and Management, swap space management; File-System Interface - File concept, Access methods, Directory Structure, Directory organization, File system mounting, File Sharing and Protection; File System Implementation- File System Structure, Directory implementation, Allocation Methods, Free Space Management, Efficiency and Performance, Recovery; I/O Systems – I/O Hardware, Application I/O interface, Kernel I/O subsystem, Streams, Performance.

**UNIT V CASE STUDY** 9

Linux System - Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, Input-Output Management, File System, Inter-process Communication; Mobile OS - iOS and Android - Architecture and SDK Framework, Media Layer, Services Layer, Core OS Layer, File System.

**TOTAL : 45 PERIODS****OUTCOMES:****At the end of the course, the students should be able to:**

- Analyze various scheduling algorithms.
- Understand deadlock, prevention and avoidance algorithms.
- Compare and contrast various memory management schemes.
- Understand the functionality of file systems.
- Perform administrative tasks on Linux Servers.
- Compare iOS and Android Operating Systems.

**TEXT BOOK :**

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne. —Operating System Concepts, 9<sup>th</sup> Edition, John Wiley and Sons Inc., 2012.

**REFERENCES :**

1. Ramaz Elmasri, A. Gil Carrick, David Levine, —Operating Systems – A Spiral Approach, Tata McGraw Hill Edition, 2010.
2. Achyut S. Godbole, Atul Kahate, —Operating Systems, McGraw Hill Education, 2016.
3. Andrew S. Tanenbaum, —Modern Operating Systems, Second Edition, Pearson Education, 2004.
4. Gary Nutt, —Operating Systems, Third Edition, Pearson Education, 2004.
5. Harvey M. Deitel, —Operating Systems, Third Edition, Pearson Education, 2004.
6. Daniel P Bovet and Marco Cesati, —Understanding the Linux kernel, 3rd edition, O'Reilly, 2005.
7. Neil Smyth, —iPhone iOS 4 Development Essentials – Xcode, Fourth Edition, Payload media, 2011.

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**OBJECTIVES:**

- To understand the basic concepts of mobile computing.
- To learn the basics of mobile telecommunication system .
- To be familiar with the network layer protocols and Ad-Hoc networks.
- To know the basis of transport and application layer protocols.
- To gain knowledge about different mobile platforms and application development.

<b>UNIT I</b>	<b>INTRODUCTION</b>	<b>9</b>
Introduction to Mobile Computing – Applications of Mobile Computing- Generations of Mobile Communication Technologies- Multiplexing – Spread spectrum -MAC Protocols – SDMA- TDMA- FDMA- CDMA		
<b>UNIT II</b>	<b>MOBILE TELECOMMUNICATION SYSTEM</b>	<b>9</b>
Introduction to Cellular Systems - GSM – Services & Architecture – Protocols – Connection Establishment – Frequency Allocation – Routing – Mobility Management – Security – GPRS-UMTS – Architecture – Handover - Security		
<b>UNIT III</b>	<b>MOBILE NETWORK LAYER</b>	<b>9</b>
Mobile IP – DHCP – AdHoc– Proactive protocol-DSDV, Reactive Routing Protocols – DSR, AODV , Hybrid routing – ZRP, Multicast Routing- ODMRP, Vehicular Ad Hoc networks( VANET) –MANET Vs VANET – Security.		
<b>UNIT IV</b>	<b>MOBILE TRANSPORT AND APPLICATION LAYER</b>	<b>9</b>
Mobile TCP– WAP – Architecture – WDP – WTLS – WTP –WSP – WAE – WTA Architecture– WML		
<b>UNIT V</b>	<b>MOBILE PLATFORMS AND APPLICATIONS</b>	<b>9</b>
Mobile Device Operating Systems – Special Constraints & Requirements – Commercial Mobile Operating Systems – Software Development Kit: iOS, Android, BlackBerry, Windows Phone – MCommerce – Structure – Pros & Cons – Mobile Payment System – Security Issues		

TOTAL 45 PERIODS

**OUTCOMES:****At the end of the course, the students should be able to:**

- Explain the basics of mobile telecommunication systems
- Illustrate the generations of telecommunication systems in wireless networks
- Determine the functionality of MAC, network layer and Identify a routing protocol for agiven Ad hoc network
- Explain the functionality of Transport and Application layers
- Develop a mobile application using android/blackberry/ios/Windows SDK

**TEXT BOOKS:**

1. Jochen Schiller, —Mobile CommunicationsI, PHI, Second Edition, 2003.
2. Prasant Kumar Pattnaik, Rajib Mall, —Fundamentals of Mobile ComputingI, PHILearning Pvt.Ltd, New Delhi – 2012

**REFERENCES**

1. Dharma Prakash Agarval, Qing and An Zeng, "Introduction to Wireless and Mobilesystems", Thomson Asia Pvt Ltd, 2005.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, —Principles of Mobile ComputingI, Springer, 2003.
3. William.C.Y.Lee,—Mobile Cellular Telecommunications-Analog and Digital SystemsI,Second Edition,TataMcGraw Hill Edition ,2006.
4. C.K.Toth, —AdHoc Mobile Wireless NetworksI, First Edition, Pearson Education, 2002.
5. Android Developers : <http://developer.android.com/index.html>
6. Apple Developer : <https://developer.apple.com/>
7. Windows Phone DevCenter : <http://developer.windowsphone.com>
8. BlackBerry Developer : <http://developer.blackberry.com>

*Ravi*  
**Dr. R. GURUMANI, M.E., Ph.D., M.B.A., M.ISTE., F.I.E.;**  
**PRINCIPAL**  
**IDHAYA ENGG. COLLEGE FOR WOMEN**  
**CHINNASALEM-606 201, KALLAKURICHI DT.**





# Certificate of Internship

This is presented to

**SNEHA S B**

II year CSE Student of Idhaya Engineering College for Women  
for completing the internship on **MOBILE OS AND  
APP DEVELOPMENT** from 03rd to 12th May of 2021.



**MANISH D**  
Team Leader



**Dr. R. GURUMANI**, M.E., Ph.D., M.B.A., M.I.S.T.E., F.I.I.  
PRINCIPAL



**VENKATESH N**  
Head Supervisor  
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# Certificate of Internship

This is presented to

**SNEKA I**

II year CSE Student of Idhaya Engineering College for Women  
for completing the internship on **MOBILE OS AND  
APP DEVELOPMENT** from 17th to 26th May of 2021.

  
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**MANISH D**  
Team Leader

  
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**VENKATESH N**  
Head Supervisor




# Certificate of Internship

This is presented to

**SOWMIYA A**

II year CSE Student of Idhaya Engineering College for Women  
for completing the internship on **MOBILE OS AND  
APP DEVELOPMENT** from 17th to 26th May of 2021.

  
\_\_\_\_\_  
**MANISH D**  
Team Leader

  
\_\_\_\_\_  
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# Certificate of Internship

This is presented to

**SUBA M**

II year CSE Student of Idhaya Engineering College for Women  
for completing the internship on **MOBILE OS AND  
APP DEVELOPMENT** from 03rd to 12th May of 2021.

  
\_\_\_\_\_  
**MANISH D**  
Team Leader

  
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**VENKATESH N**  
Head Supervisor



# Certificate of Internship

This is presented to

**INFANT ROSHINI G**

II year CSE Student of Idhaya Engineering College for Women  
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APP DEVELOPMENT** from 17th to 26th May of 2021.

**MANISH D**  
Team Leader

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**VENKATESH N**  
Head Supervisor




# Certificate of Internship

This is presented to

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II year CSE Student of Idhaya Engineering College for Women  
for completing the internship on **MOBILE OS AND  
APP DEVELOPMENT** from 03rd to 12th May of 2021.

  
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This is presented to

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II year CSE Student of Idhaya Engineering College for Women  
for completing the internship on **MOBILE OS AND  
APP DEVELOPMENT** from 03rd to 12th May of 2021.

---

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Head Supervisor



# Certificate of Internship

This is presented to

**BHUVANESHWARI M**

II year CSE Student of Idhaya Engineering College for Women  
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# Certificate of Internship

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APP DEVELOPMENT** from 03rd to 12th May of 2021.

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# Certificate of Internship

This is presented to

**SARANYA V**

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**MANISH D**  
Team Leader

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Head Supervisor



# Certificate of Internship

This is presented to

**VANISRI K**

II year IT Student of Idhaya Engineering College for Women  
for completing the internship on **WEB DEVELOPMENT**  
from 04th to 13th May of 2021.

**MANISH D**  
Team Leader

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# Certificate of Internship

This is presented to

**PRIYA JENCY S**

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APP DEVELOPMENT** from 03rd to 12th May of 2021.

**MANISH D**  
Team Leader

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# Certificate of Internship

This is presented to

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APP DEVELOPMENT** from 03rd to 12th May of 2021.

**MANISH D**  
Team Leader

**Dr. R. GURUMANI**, M.E., Ph.D., M.B.A., M.I.S.T.E.,  
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# Certificate of Internship

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for completing the internship on **MOBILE OS AND  
APP DEVELOPMENT** from 17th to 26th May of 2021.

**MANISH D**  
Team Leader

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PRINCIPAL  
IDHAYA ENGG. COLLEGE FOR WOMEN  
CHINNASALEM-606 201. KALLAKURICHI DT.

**VENKATESH N**  
Head Supervisor



# Certificate of Internship

This is presented to

**KRISHNAPRIYA S**

II year CSE Student of Idhaya Engineering College for Women  
for completing the internship on **MOBILE OS AND  
APP DEVELOPMENT** from 17th to 26th May of 2021.

---

**MANISH D**  
Team Leader

---

**Dr. R. GURUMANT, M.E., Ph.D., M.B.A., MISTE, IIT**  
PRINCIPAL  
IDHAYA ENGG. COLLEGE FOR WOMEN  
CHINNASALEM-606 201, KALLAKURICHI DT.

---

**VENKATESH N**  
Head Supervisor





# Certificate of Internship

This is presented to

**MEERA K**

II year CSE Student of Idhaya Engineering College for Women  
for completing the internship on **MOBILE OS AND  
APP DEVELOPMENT** from 03rd to 12th May of 2021.

---

**MANISH D**  
Team Leader

---

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---

**VENKATESH N**  
Head Supervisor



# Certificate of Internship

This is presented to

**NIRMALA P**

II year CSE Student of Idhaya Engineering College for Women  
for completing the internship on **MOBILE OS AND  
APP DEVELOPMENT** from 03rd to 12th May of 2021.

---

**MANISH D**  
Team Leader

---

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---

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Head Supervisor



# Certificate of Internship

This is presented to

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II year CSE Student of Idhaya Engineering College for Women  
for completing the internship on **MOBILE OS AND  
APP DEVELOPMENT** from 17th to 26th May of 2021.

  
\_\_\_\_\_  
**MANISH D**  
Team Leader

  
\_\_\_\_\_  
**Dr. R. GURUMANI**, M.E., Ph.D., M.B.A., M.ISTE., FIE  
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IDHAYA ENGG. COLLEGE FOR WOMEN  
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Head Supervisor



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II year CSE Student of Idhaya Engineering College for Women  
for completing the internship on **MOBILE OS AND  
APP DEVELOPMENT** from 03rd to 12th May of 2021.

**MANISH D**  
Team Leader

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# Certificate of Internship

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II year CSE Student of Idhaya Engineering College for Women  
for completing the internship on **MOBILE OS AND  
APP DEVELOPMENT** from 17th to 26th May of 2021.

**MANISH D**

Team Leader

**Dr. R. GURUMANI, M.E., Ph.D., M.B.A., M.ISTE., F.I.E.,**  
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**OBJECTIVES:**

- To understand the concept of cloud computing.
- To appreciate the evolution of cloud from the existing technologies.
- To have knowledge on the various issues in cloud computing.
- To be familiar with the lead players in cloud.
- To appreciate the emergence of cloud as the next generation computing paradigm.

**UNIT I INTRODUCTION 9**

Introduction to Cloud Computing — Definition of Cloud — Evolution of Cloud Computing — Underlying Principles of Parallel and Distributed Computing — Cloud Characteristics – Elasticity in Cloud — On-demand Provisioning.

**UNIT II CLOUD ENABLING TECHNOLOGIES 10**

Service Oriented Architecture – REST and Systems of Systems – Web Services – Publish-Subscribe Model – Basics of Virtualization – Types of Virtualization – Implementation Levels of Virtualization – Virtualization Structures – Tools and Mechanisms – Virtualization of CPU – Memory – I/O Devices – Virtualization Support and Disaster Recovery.

**UNIT III CLOUD ARCHITECTURE, SERVICES AND STORAGE 8**

Layered Cloud Architecture Design – NIST Cloud Computing Reference Architecture – Public, Private and Hybrid Clouds – IaaS – PaaS – SaaS – Architectural Design Challenges – Cloud Storage – Storage-as-a-Service – Advantages of Cloud Storage – Cloud Storage Providers – S3.

**UNIT IV RESOURCE MANAGEMENT AND SECURITY IN CLOUD 10**

Inter Cloud Resource Management – Resource Provisioning and Resource Provisioning Methods – Global Exchange of Cloud Resources – Security Overview – Cloud Security Challenges – Software-as-a-Service Security – Security Governance – Virtual Machine Security – IAM – Security Standards.

**UNIT V CLOUD TECHNOLOGIES AND ADVANCEMENTS 8**

Hadoop – MapReduce – Virtual Box -- Google App Engine – Programming Environment for Google App Engine — Open Stack – Federation in the Cloud – Four Levels of Federation – Federated Services and Applications – Future of Federation.

**TOTAL: 45 PERIODS**

**OUTCOMES:****On Completion of the course, the students should be able to:**

- Articulate the main concepts, key technologies, strengths and limitations of cloud computing.
- Learn the key and enabling technologies that help in the development of cloud.
- Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models.
- Explain the core issues of cloud computing such as resource management and security.
- Be able to install and use current cloud technologies.
- Evaluate and choose the appropriate technologies, algorithms and approaches for implementation and use of cloud.

**TEXT BOOKS:**

1. Kai Hwang, Geoffrey C. Fox, Jack G. Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.
2. Rittinghouse, John W., and James F. Ransome, — Cloud Computing: Implementation, Management and Security, CRC Press, 2017.

**REFERENCES:**

1. Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi, — Mastering Cloud Computing, Tata Mcgraw Hill, 2013.
2. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing - A Practical Approach", Tata Mcgraw Hill, 2009.
3. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud: Transactional Systems for EC2 and Beyond (Theory in Practice)", O'Reilly, 2009

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Kallakurichi Taluk, Villupuram District



**RESOURCE ALLOCATION OF CLOUD  
COMPUTING USING BROWNOUT  
AND THROTTLED LOAD BALANCING  
ALGORITHM**



**A PROJECT REPORT**

*Submitted by*

**AARTHI.V**

**621117104001**

**JANANI.N**

**621117104019**

**PAVITHRA.D**

**621117104033**

*in partial fulfillment for the award of the degree*

*of*

**BACHELOR OF ENGINEERING**

*in*

**COMPUTER SCIENCE AND ENGINEERING**

**IDHAYA ENGINEERING COLLEGE FOR WOMEN**

**CHINNASALEM**

**ANNA UNIVERSITY::CHENNAI-600 025**

**APRIL 2021**

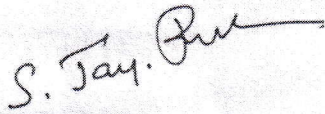
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**ANNA UNIVERSITY: CHENNAI-600 025**

**BONAFIDE CERTIFICATE**

Certified that this project report "**RESOURCE ALLOCATION OF CLOUD COMPUTING USING BROWNOUT AND THROTTLED LOAD BALANCING ALGORITHM**" is the work "**AARTHI.V, JANANI.N, PAVITHRA.D**" who carried out the project work under my supervision.



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**INTERNAL EXAMINER**

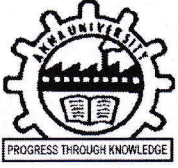


**EXTERNAL EXAMINER**



## ABSTRACT

An infrastructure build in the cloud computing with enabling access of CloudSim environment which is reliable to strength of commercial and non- commercial IT development communities of robust reputation management mechanism in the federated cloud. This project is mainly focuses IAAS paradigm of cloud computing environment with computational datacenter for resources which is access in the Virtual Machine in the form of cloudlets. This datacenter forms the resources with computational cost to the virtual network for low trust on the temporary resources with their computational resources protects the users to reduce the cost, computational resources are shared, i.e., there exists multi-tenancy. As the communication channels and other computational resources are shared, it creates security and privacy issues. A user may not identify a trustworthy cotenant as the users are anonymous. The user depends on the Cloud Provider (CP) to assign trustworthy co-ten hunting. But, it is in the CP's interest that it gets maximum utilization of its resources. Hence, it allows maximum co-tenancy irrespective of the behaviours of users. In this project, we propose a Brownoutself-adaptive paradigm (SAP) and Throttled Load Balancing Algorithm ie., hybrid Self-Adaptive Brownout (SAB) and Throttled Load Balancing (TLB) approach will be used to optimize resource allocation taking multiple parameters into consideration.



# SECURITY ISSUE OF CLOUD-BASED STORAGE



A MINI PROJECT REPORT

*Submitted by*

**DHULSIN A**

**621118205004**

**JESTIN JEEVA Y**

**621118205009**

**SNEHA V**

**621118205013**

**VAIJAYANTHI V**

**621118205015**

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*of*

**BACHELOR OF TECHNOLOGY**

**IN**


**INFORMATION TECHNOLOGY**

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**CHINNASALEM**

**ANNA UNIVERSITY:: CHENNAI-600 025**

**APRIL 2021**

  
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**CHINNASALEM-606 201, KALLAKURICHI DT.**

**ANNA UNIVERSITY: CHENNAI-600 025**

**BONAFIDE CERTIFICATE**

Certified that this project report "SECURITY ISSUE OF CLOUD-BASED STORAGE" is the bonafide work of "DHULSIN A, JESTIN JEEVA Y, SNEHA V, VAIJAYANTHI V" who carried out the project work under my supervision.

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**SUPERVISOR**

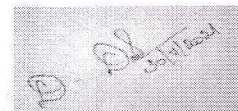
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**Submitted for the University Examination held on 30.07.2021**

**INTERNAL EXAMINER**



**EXTERNAL EXAMINER**

**Dr. R. GURUMANI, M.E., Ph.D., M.B.A., M.ISTE., F.IE.,**  
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**OBJECTIVES:**

- To learn the foundations of Human Computer Interaction.
- To become familiar with the design technologies for individuals and persons with disabilities.
- To be aware of mobile HCI.
- To learn the guidelines for user interface.

**UNIT I FOUNDATIONS OF HCI**

9

**The Human:** I/O channels – Memory – Reasoning and problem solving; **The Computer:** Devices – Memory – processing and networks; **Interaction:** Models – frameworks – Ergonomics – styles – elements – interactivity-Paradigms. - **Case Studies**

**UNIT II DESIGN & SOFTWARE PROCESS**

9

**Interactive Design:** Basics – process – scenarios – navigation – screen design – Iteration and prototyping. **HCI in software process:** Software life cycle – usability engineering – Prototyping in practice – design rationale. **Design rules:** principles, standards, guidelines, rules. **Evaluation Techniques – Universal Design**

**UNIT III MODELS AND THEORIES**

9

**HCI Models:** Cognitive models: Socio-Organizational issues and stakeholder requirements — Communication and collaboration models-**Hypertext, Multimedia and WWW.**

**UNIT IV MOBILE HCI**

9

**Mobile Ecosystem:** Platforms, Application frameworks- **Types of Mobile Applications:** Widgets, Applications, Games- Mobile Information Architecture, Mobile 2.0, **Mobile Design:** Elements of Mobile Design, Tools. - **Case Studies**

**UNIT V WEB INTERFACE DESIGN**

9

**Designing Web Interfaces –** Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow - **Case Studies**

**TOTAL :45 PERIODS****OUTCOMES:**

Upon completion of the course, the students should be able to:

- Design effective dialog for HCI
- Design effective HCI for individuals and persons with disabilities.
- Assess the importance of user feedback.
- Explain the HCI implications for designing multimedia/ ecommerce/ e-learning Web sites.
- Develop meaningful user interface.

**TEXT BOOKS:**

1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, —Human Computer Interaction I, 3rd Edition, Pearson Education, 2004 (UNIT I, II & III)
2. Brian Fling, —Mobile Design and Development I, First Edition, O'Reilly Media Inc., 2009 (UNIT –IV)
3. Bill Scott and Theresa Neil, —Designing Web Interfaces I, First Edition, O'Reilly, 2009. (UNIT-V)

**REFERENCES**

1. H.S. Kalsi, 'Electronic Instrumentation', McGraw Hill, III Edition 2010.
2. D.V.S. Murthy, 'Transducers and Instrumentation', Prentice Hall of India Pvt Ltd, 2015.
3. David Bell, ' Electronic Instrumentation & Measurements', Oxford University Press, 2013.
4. Martin Reissland, 'Electrical Measurements', New Age International (P) Ltd., Delhi, 2001.
5. Alan. S. Morris, Principles of Measurements and Instrumentation, 2nd Edition, Prentice Hall of India, 2003.

*Aravind*  
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Kallakurichi Taluk, Villupuram District



**Automatic Nursing and Remote  
Monitoring of health for old People**



**A PROJECT REPORT**

*Submitted by*

<b>GAYATHRI B</b>	<b>621117104013</b>
<b>NANDHINI E</b>	<b>621117104030</b>
<b>PRIYA C</b>	<b>621117104038</b>
<b>SOWNDHARYA V</b>	<b>621117104053</b>

*in partial fulfillment for the award of the degree*

*of*

**BACHELOR OF ENGINEERING**

**in**

**COMPUTER SCIENCE AND ENGINEERING**

**IDHAYA ENGINEERING COLLEGE FOR WOMEN**

**CHINNASALEM**

**ANNA UNIVERSITY :: CHENNAI-600 025**

**APRIL 2021**

**Dr.R.GURUMANI, M.E., Ph.D., M.B.A., M.ISTE., F.I.L.**  
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**CHINNASALEM-606 201. KALLAKURICHI DT.**

**ANNA UNIVERSITY : CHENNAI-600 025**

**BONAFIDE CERTIFICATE**

Certified that this project report “Automatic Nursing and Remote Monitoring of health for old People” is the bonafide work of “B. Gayathri, E. Nandhini, C. Priya, V. Sowndharya” who carried out the project work under my supervision.

  
**SIGNATURE**

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**SUPERVISOR**

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**INTERNAL EXAMINER**

  
**EXTERNAL EXAMINER**

## ABSTRACT

The acceleration of the population aging process is a serious social problem facing our country at present. As a special vulnerable group, the health of the elderly has received widespread social attention. Diabetes, high blood pressure, and other cardiovascular diseases are the biggest threat to the health of the elderly, to be monitored and cared. Many of the elder people are alone due to their son or daughter goes to office or went abroad. In this case Nurse to be appointed for elder persons to monitor their Physiological parameters and give medicines according to them. Due to invention of embedded system, sensor technology and IoT we can go for automatic caring system. In view of the current situation, that physiological parameter monitoring systems can only achieve local monitoring, and the multi-physiological parameter monitors are large, expensive, and disadvantageous to remote monitoring. Multiple physiological parameters such as heart rate, blood pressure, blood oxygen saturation, and body temperature in real time of the elder people are taken using sensors, based on that medicine will be automatically given to the people with the help of Automated Medicine Rack. Meanwhile the information also given to the family doctor and their son or daughter so that they can monitor remotely.

**DEPARTMENT OF ELECTRICAL AND  
ELECTRONICS ENGINEERING**



EE8351

DIGITAL LOGIC CIRCUITS

L	T	P	C
2	2	0	3

OBJECTIVES:

- To study various number systems and simplify the logical expressions using Boolean functions
- To study combinational circuits
- To design various synchronous and asynchronous circuits.
- To introduce asynchronous sequential circuits and PLDs
- To introduce digital simulation for development of application oriented logic circuits.

UNIT I NUMBER SYSTEMS AND DIGITAL LOGIC FAMILIES

6+6

Review of number systems, binary codes, error detection and correction codes (Parity and Hamming code) - Digital Logic Families - comparison of RTL, DTL, TTL, ECL and MOS families - operation, characteristics of digital logic family.

UNIT II COMBINATIONAL CIRCUITS

6+6

Combinational logic - representation of logic functions-SOP and POS forms, K-map representations - minimization using K maps - simplification and implementation of combinational logic — multiplexers and de multiplexers - code converters, adders, subtractors, Encoders and Decoders.

UNIT III SYNCHRONOUS SEQUENTIAL CIRCUITS

6+6

Sequential logic- SR, JK, D and T flip flops - level triggering and edge triggering - counters - asynchronous and synchronous type - Modulo counters - Shift registers - design of synchronous sequential circuits — Moore and Melay models- Counters, state diagram; state reduction; state assignment.

UNIT IV ASYNCHRONOUS SEQUENTIAL CIRCUITS AND PROGRAMMABILITY LOGIC DEVICES

6+6

Asynchronous sequential logic circuits-Transition stability, flow table-race conditions, hazards & errors in digital circuits; analysis of asynchronous sequential logic circuits- introduction to Programmability Logic Devices: PROM — PLA — PAL, CPLD-FPGA.

UNIT V VHDL

6+6

RTL Design — combinational logic — Sequential circuit — Operators — Introduction to Packages — Subprograms — Test bench. (Simulation / Tutorial Examples: adders, counters, flip flops, Multiplexers & De multiplexers).

TOTAL : 60 PERIODS

OUTCOMES:


- Ability to design combinational and sequential Circuits.
- Ability to simulate using software package.
- Ability to study various number systems and simplify the logical expressions using Boolean functions
- Ability to design various synchronous and asynchronous circuits.
- Ability to introduce asynchronous sequential circuits and PLDs
- Ability to introduce digital simulation for development of application oriented logic circuits.

TEXT BOOKS:

1. James W. Bignel, Digital Electronics, Cengage learning, 5th Edition, 2007.
2. M. Morris Mano, 'Digital Design with an introduction to the VHDL', Pearson Education, 2013.
3. Comer "Digital Logic & State Machine Design, Oxford, 2012.

REFERENCES

1. Mandal, "Digital Electronics Principles & Application, McGraw Hill Edu, 2013.
2. William Keitz, Digital Electronics-A Practical Approach with VHDL, Pearson, 2013.
3. Thomas L.Floyd, 'Digital Fundamentals', 11th edition, Pearson Education, 2015.
4. Charles H.Roth, Jr, Lizy Lizy Kurian John, 'Digital System Design using VHDL, Cengage, 2013.
5. D.P.Kothari, J.S.Dhillon, 'Digital circuits and Design', Pearson Education, 2016.

  
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**OBJECTIVES:**

- To study the structure of electric power system and to develop expressions for the computation of transmission line parameters.
- To obtain the equivalent circuits for the transmission lines based on distance and to determine voltage regulation and efficiency.
- To understand the mechanical design of transmission lines and to analyze the voltage distribution in insulator strings to improve the efficiency.
- To study the types, construction of cables and methods to improve the efficiency.
- To study about distribution systems, types of substations, methods of grounding, EHVAC, HVDC and FACTS.

<b>UNIT I</b>	<b>TRANSMISSION LINE PARAMETERS</b>	<b>9</b>
Structure of Power System - Parameters of single and three phase transmission lines with single and double circuits - Resistance, inductance and capacitance of solid, stranded and bundled conductors, Symmetrical and unsymmetrical spacing and transposition - application of self and mutual GMD; skin and proximity effects - Typical configurations, conductor types and electrical parameters of EHV lines.		
<b>UNIT II</b>	<b>MODELLING AND PERFORMANCE OF TRANSMISSION LINES</b>	<b>9</b>
Performance of Transmission lines - short line, medium line and long line - equivalent circuits, phasor diagram, attenuation constant, phase constant, surge impedance - transmission efficiency and voltage regulation, real and reactive power flow in lines - Power Circle diagrams - Formation of Corona - Critical Voltages - Effect on Line Performance.		
<b>UNIT III</b>	<b>MECHANICAL DESIGN OF LINES</b>	<b>9</b>
Mechanical design of OH lines - Line Supports - Types of towers - Stress and Sag Calculation - Effects of Wind and Ice loading. Insulators: Types, voltage distribution in insulator string, improvement of string efficiency, testing of insulators.		
<b>UNIT IV</b>	<b>UNDER GROUND CABLES</b>	<b>9</b>
Underground cables - Types of cables - Construction of single core and 3 core Cables - Insulation Resistance - Potential Gradient - Capacitance of Single-core and 3 core cables - Grading of cables - Power factor and heating of cables - DC cables.		
<b>UNIT V</b>	<b>DISTRIBUTION SYSTEMS</b>	<b>9</b>
Distribution Systems - General Aspects - Kelvin's Law - AC and DC distributions - Techniques of Voltage Control and Power factor improvement - Distribution Loss - Types of Substations - Methods of Grounding - Trends in Transmission and Distribution: EHVAC, HVDC and FACTS (Qualitative treatment only).		
<b>TOTAL :</b>		<b>45 PERIODS</b>

**OUTCOMES:**


- To understand the importance and the functioning of transmission line parameters.
- To understand the concepts of Lines and Insulators.
- To acquire knowledge on the performance of Transmission lines.
- To understand the importance of distribution of the electric power in power system.
- To acquire knowledge on Underground Cables
- To become familiar with the function of different components used in Transmission and Distribution levels of power system and modelling of these components.

**TEXT BOOKS:**

1. D.P.Kothari, I.J. Nagrath, 'Power System Engineering', Mc Graw-Hill Publishing Company limited, New Delhi, Second Edition, 2008.
2. C.L.Wadhwa, 'Electrical Power Systems', New Academic Science Ltd, 2009.
3. S.N. Singh, 'Electric Power Generation, Transmission and Distribution', Prentice Hall of India Pvt. Ltd, New Delhi, Second Edition, 2011.

**REFERENCES**

1. B.R.Gupta, 'Power System Analysis and Design' S. Chand, New Delhi, Fifth Edition, 2008.
2. Luces M.Fualken berry, Walter Coffer, 'Electrical Power Distribution and Transmission', Pearson Education, 2007.
3. Arun Ingole, "power transmission and distribution" Pearson Education, 2017
4. J.Brian, Hardy and Colin R.Bayliss 'Transmission and Distribution in Electrical Engineering', Newnes; Fourth Edition, 2012.
5. G.Ramamurthy, "Handbook of Electrical power Distribution," Universities Press, 2013.
6. V.K.Mehta, Rohit Mehta, 'Principles of power system', S. Chand & Company Ltd, New Delhi, 2013

  
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**ADVANCEMENT IN WIRELESS CHARGING  
OF ELECTRIC VEHICLE WITH  
IMPLEMENTATION OF SOLAR SYSTEM  
A PROJECT REPORT**



*Submitted by*

**V.GAYATHRI**

621117105004

**S.KOKILA**

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**L.PRIYADHARSHNI ALLWIN**

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*in partial fulfillment for the award of the degree Of*

**BACHELOR OF ENGINEERING**

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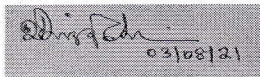
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**April 2021**

BONAFIDE CERTIFICATE

Certified that this project report "ADVANCEMENT IN WIRELESS CHARGING OF ELECTRIC VEHICLE WITH IMPLEMENTATION OF SOLAR SYSTEM" is the bonafide work of "V.GAYATHRI, S.KOKILA,L.PRIYADHARSHNI ALLWIN, A.SANTHINI" who carried out the project work under my supervision.



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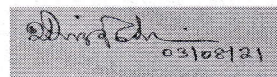
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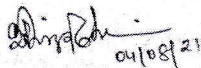
Department of EEE,

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Submitted for the university examination held on 04/08/2021



INTERNAL EXAMINER



EXTERNAL EXAMINER

## ABSTRACT

The wireless solution is increasingly spreading as method of battery charging for Electric Vehicles (EVs). The standard technology of wireless EV battery charging is based on the Inductive Power Transfer (IPT) between two coupled coils, one connected to the electrical grid and the other one connected to the rechargeable battery. The IPT provides benefits in terms of safety and comfort, due to the absence of a plug-in operation: through IPT, the electrocution risk typically arising from power cords is avoided and the battery charging operation can automatically start. The wireless power transfer obviously represents the only solution for the dynamic charging, since the wired connection would be impossible during the motion. In spite of the undeniable advantages brought by Inductive Power Transfer, the researchers have to deal with several issues in order to make this technology even more attractive for the EV market. Furthermore, some technical aspects need to be taken into account in the practical implementation of an IPT system: for example, in order to obtain the maximum coupling, the misalignment between the coils must be as small as possible. As far as safety is concerned, even if the IPT allows to reduce the electrocution risk, some care is required regarding the magnetic field.

**COURSE OBJECTIVES**

- To understand the use of transfer function models for analysis physical systems and introduce the control system components.
- To provide adequate knowledge in the time response of systems and steady state error analysis.
- To accord basic knowledge in obtaining the open loop and closed-loop frequency responses of systems.
- To introduce stability analysis and design of compensators
- To introduce state variable representation of physical systems

**UNIT I SYSTEMS AND REPRESENTATION**

9

**Basic elements in control systems:** – Open and closed loop systems – Electrical analogy of mechanical and thermal systems – Transfer function – AC and DC servomotors – Block diagram reduction techniques – Signal flow graphs.

**UNIT II TIME RESPONSE**

9

Time response: – Time domain specifications – Types of test input – I and II order system response – Error coefficients – Generalized error series – Steady state error – **Root locus construction- Effects of P, PI, PID modes of feedback control** – Time response analysis.

**UNIT III FREQUENCY RESPONSE**

9

Frequency response: – Bode plot – Polar plot – Determination of closed loop response from open loop response - Correlation between frequency domain and time domain specifications

**UNIT IV STABILITY AND COMPENSATOR DESIGN**

9

Characteristics equation – Routh Hurwitz criterion – Nyquist stability criterion- Performance criteria – Effect of Lag, lead and lag-lead compensation on frequency response-Design of Lag, lead and lag-lead compensator using bode plots.

**UNIT V STATE VARIABLE ANALYSIS**

9

Concept of state variables – State models for linear and time invariant Systems – Solution of state and output equation in controllable canonical form – Concepts of controllability and observability.

**TOTAL (L: 45+T:30): 75 PERIODS****COURSE OUTCOMES**

At the end of the course, the student should have the :

- Ability to develop various representations of system based on the knowledge of Mathematics, Science and Engineering fundamentals.
- Ability to do time domain and frequency domain analysis of various models of linear system.
- Ability to interpret characteristics of the system to develop mathematical model.
- Ability to design appropriate compensator for the given specifications.
- Ability to come out with solution for complex control problem.
- Ability to understand use of PID controller in closed loop system.

**TEXT BOOKS**

1. Nagarath, I.J. and Gopal, M., “Control Systems Engineering”, New Age International Publishers, 2017.
2. Benjamin C. Kuo, “Automatic Control Systems”, Wiley, 2014.

**REFERENCES**

1. Katsuhiko Ogata, “Modern Control Engineering”, Pearson, 2015.
2. Richard C. Dorf and Bishop, R.H., “Modern Control Systems”, Pearson Education, 2009.
3. John J.D., Azzo Constantine, H. and Houpis Stuart, N Sheldon, “Linear Control System Analysis and Design with MATLAB”, CRC Taylor & Francis Reprint 2009.
4. Ramesh C. Panda and T. Thyagarajan, “An Introduction to Process Modelling Identification and Control of Engineers”, Narosa Publishing House, 2017.
5. M. Gopal, “Control System: Principle and design”, McGraw Hill Education, 2012.
6. NPTEL Video Lecture Notes on “Control Engineering” by Prof. S. D. Agashe, IIT Bombay.

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**OBJECTIVES:**

- To introduce the basic mathematical concepts related to electromagnetic vector fields
- To impart knowledge on the concepts of
  - ✓ Electrostatic fields, electrical potential, energy density and their applications.
  - ✓ Magneto static fields, magnetic flux density, vector potential and its applications.
  - ✓ Different methods of emf generation and Maxwell's equations
  - ✓ Electromagnetic waves and characterizing parameters

**UNIT I ELECTROSTATICS – I**

6+6

Sources and effects of electromagnetic fields – Coordinate Systems – Vector fields – Gradient, Divergence, Curl – theorems and applications - Coulomb's Law – Electric field intensity – Field due to discrete and continuous charges – Gauss's law and applications.

**UNIT II ELECTROSTATICS – II**

6+6

Electric potential – Electric field and equipotential plots, Uniform and Non-Uniform field, Utilization factor – Electric field in free space, conductors, dielectrics - Dielectric polarization – Dielectric strength - Electric field in multiple dielectrics – Boundary conditions, Poisson's and Laplace's equations, Capacitance, Energy density, Applications.

**UNIT III MAGNETOSTATICS**

6+6

Lorentz force, magnetic field intensity (H) – Biot-Savart's Law - Ampere's Circuit Law – H due to straight conductors, circular loop, infinite sheet of current, Magnetic flux density (B) – B in free space, conductor, magnetic materials – Magnetization, Magnetic field in multiple media – Boundary conditions, scalar and vector potential, Poisson's Equation, Magnetic force, Torque, Inductance, Energy density, Applications.

**UNIT IV ELECTRODYNAMIC FIELDS**

6+6

Magnetic Circuits - Faraday's law – Transformer and motional EMF – Displacement current - Maxwell's equations (differential and integral form) – Relation between field theory and circuit theory – Applications.

**UNIT V ELECTROMAGNETIC WAVES**

6+6

Electromagnetic wave generation and equations – Wave parameters; velocity, intrinsic impedance, propagation constant – Waves in free space, lossy and lossless dielectrics, conductors- skin depth - Poynting vector – Plane wave reflection and refraction.

**TOTAL : 60 PERIODS****OUTCOMES:**

- Ability to understand the basic mathematical concepts related to electromagnetic vector fields.
- Ability to understand the basic concepts about electrostatic fields, electrical potential, energy density and their applications.
- Ability to acquire the knowledge in magneto static fields, magnetic flux density, vector potential and its applications.
- Ability to understand the different methods of emf generation and Maxwell's equations
- Ability to understand the basic concepts electromagnetic waves and characterizing parameters
- Ability to understand and compute Electromagnetic fields and apply them for design and analysis of electrical equipment and systems

**TEXT BOOKS:**

1. Mathew N. O. Sadiku, 'Principles of Electromagnetics', 6th Edition, Oxford University Press Inc. Asian edition, 2015.
2. William H. Hayt and John A. Buck, 'Engineering Electromagnetics', McGraw Hill Special Indian edition, 2014.
3. Kraus and Fleish, 'Electromagnetics with Applications', McGraw Hill International Editions, Fifth Edition, 2010.

**REFERENCES**

1. V.V.Sarwate, 'Electromagnetic fields and waves', First Edition, Newage Publishers, 1993.
2. J.P.Tewari, 'Engineering Electromagnetics - Theory, Problems and Applications', Second Edition, Khanna Publishers.
3. Joseph. A. Edminister, 'Schaum's Outline of Electromagnetics, Third Edition (Schaum's Outline Series), McGraw Hill, 2010.
4. S.P.Ghosh, Lipika Datta, 'Electromagnetic Field Theory', First Edition, McGraw Hill Education (India) Private Limited, 2012.

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EE8552

POWER ELECTRONICS

L T P C  
3 0 0 3

OBJECTIVES:

To impart knowledge on the following Topics

- Different types of power semiconductor devices and their switching
- Operation, characteristics and performance parameters of controlled rectifiers
- Operation, switching techniques and basics topologies of DC-DC switching regulators.
- Different modulation techniques of pulse width modulated inverters and to understand harmonic reduction methods.
- Operation of AC voltage controller and various configurations.

UNIT I POWER SEMI-CONDUCTOR DEVICES 9

Study of switching devices, SCR, TRIAC, GTO, BJT, MOSFET, IGBT and IGCT- Static characteristics: SCR, MOSFET and IGBT - Triggering and commutation circuit for SCR- Introduction to Driver and snubber circuits.

UNIT II PHASE-CONTROLLED CONVERTERS 9

pulse, 3-pulse and 6-pulse converters— performance parameters —Effect of source inductance— Firing Schemes for converter—Dual converters, Applications-light dimmer, Excitation system, Solar PV systems.

UNIT III DC TO DC CONVERTERS 9

Step-down and step-up chopper-control strategy— Introduction to types of choppers-A, B, C, D and E -Switched mode regulators- Buck, Boost, Buck- Boost regulator, Introduction to Resonant Converters, Applications-Battery operated vehicles.

UNIT IV INVERTERS 9

Single phase and three phase voltage source inverters (both  $120^\circ$  mode and  $180^\circ$  mode)—Voltage & harmonic control— PWM techniques: Multiple PWM, Sinusoidal PWM, modified sinusoidal PWM — Introduction to space vector modulation —Current source inverter, Applications-Induction heating, UPS.

UNIT V AC TO AC CONVERTERS 9

Single phase and Three phase AC voltage controllers—Control strategy- Power Factor Control— Multistage sequence control -single phase and three phase cyclo converters —Introduction to Matrix converters, Applications—welding

TOTAL : 45 PERIODS

OUTCOMES:

- Ability to analyse AC-AC and DC-DC and DC-AC converters.
- Ability to choose the converters for real time applications.

TEXT BOOKS:

1. M.H. Rashid, 'Power Electronics: Circuits, Devices and Applications', Pearson Education, Third Edition, New Delhi, 2004.
2. P.S. Bimbra "Power Electronics" Khanna Publishers, third Edition, 2003.
3. Ashfaq Ahmed 'Power Electronics for Technology', Pearson Education, Indian reprint, 2003.

REFERENCES

1. Joseph Vithayathil, 'Power Electronics, Principles and Applications', McGraw Hill Series, 6<sup>th</sup> Reprint, 2013.
2. Philip T. Krein, "Elements of Power Electronics" Oxford University Press, 2004 Edition.
3. L. Umanand, "Power Electronics Essentials and Applications", Wiley, 2010.
4. Ned Mohan, Tore M. Undel and, William P. Robbins, 'Power Electronics: Converters, Applications and Design', John Wiley and sons, third edition, 2003.
5. S.Rama Reddy, 'Fundamentals of Power Electronics', Narosa Publications, 2014.
6. M.D. Singh and K.B. Khanchandani, "Power Electronics," Mc Graw Hill India, 2013.
7. JP Agarwal, "Power Electronic Systems: Theory and Design" 1e, Pearson Education, 2002.

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**OBJECTIVES:** To impart knowledge about the following topics:

- Causes & Mitigation techniques of various PQ events.
- Various Active & Passive power filters.

#### UNIT I INTRODUCTION TO POWER QUALITY 9

Terms and definitions & Sources – Overloading, under voltage, over voltage - Concepts of transients - Short duration variations such as interruption - Long duration variation such as sustained interruption - Sags and swells - Voltage sag - Voltage swell - Voltage imbalance – Voltage fluctuations - Power frequency variations - International standards of power quality– Computer Business Equipment Manufacturers Associations (CBEMA) curve

#### UNIT II VOLTAGE SAG AND SWELL 9

Estimating voltage sag performance - Thevenin's equivalent source - Analysis and calculation of various faulted condition - Estimation of the sag severity - Mitigation of voltage sag, Static transfer switches and fast transfer switches. - Capacitor switching – Lightning - Ferro resonance - Mitigation of voltage swell.

#### UNIT III HARMONICS 9

Harmonic sources from commercial and industrial loads - Locating harmonic sources – Power system response characteristics - Harmonics Vs transients. Effect of harmonics – Harmonic distortion - Voltage and current distortions - Harmonic indices - Inter harmonics – Resonance Harmonic distortion evaluation, IEEE and IEC standards.

#### UNIT IV PASSIVE POWER COMPENSATORS 9

Principle of Operation of Passive Shunt and Series Compensators, Analysis and Design of Passive Shunt Compensators Simulation and Performance of Passive Power Filters- Limitations of Passive Filters Parallel Resonance of Passive Filters with the Supply System and Its Mitigation. Fundamentals of load compensation – voltage regulation & power factor correction.

#### UNIT V POWER QUALITY MONITORING & CUSTOM POWER DEVICES 9

Monitoring considerations - Monitoring and diagnostic techniques for various power quality problems - Quality measurement equipment - Harmonic / spectrum analyzer - Flicker meters Disturbance analyzer - Applications of expert systems for power quality monitoring. Principle & Working of DSTATCOM – DSTATCOM in Voltage control mode, current control mode, DVR Structure – Rectifier supported DVR – DC Capacitor supported DVR -Unified power quality conditioner.

**TOTAL : 45 PERIODS**

#### OUTCOMES:


- Ability to understand various sources, causes and effects of power quality issues, electrical systems and their measures and mitigation.
- Ability to analyze the causes & Mitigation techniques of various PQ events.
- Ability to study about the various Active & Passive power filters.
- Ability to understand the concepts about Voltage and current distortions, harmonics.
- Ability to analyze and design the passive filters.
- Ability to acquire knowledge on compensation techniques.
- Ability to acquire knowledge on DVR.

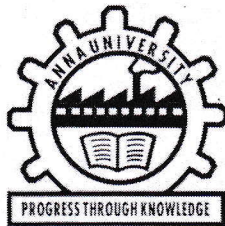
#### TEXT BOOKS:

1. Roger. C. Dugan, Mark. F. Mc Granaghan, Surya Santoso, H.Wayne Beaty, "Electrical Power Systems Quality", McGraw Hill, 2003
2. J. Arrillaga, N.R. Watson, S. Chen, "Power System Quality Assessment", (New York :Wiley), 2000.
3. Bhim Singh, Ambrish Chandra, Kamal Al-Haddad, "Power Quality Problems & Mitigation Techniques" Wiley, 2015.

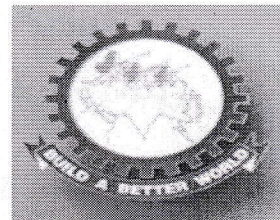
#### REFERENCES

1. G.T. Heydt, "Electric Power Quality", 2nd Edition. (West Lafayette, IN, Stars in a Circle Publications, 1994.
2. M.H.J Bollen, "Understanding Power Quality Problems: Voltage Sags and Interruptions", (New York: IEEE Press), 2000.

  
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**POWER QUALITY IMPROVEMENT  
USING FEEDBACK  
LINEARIZATION CONTROL IN DC  
MICRO GRID  
CONNECTED SYSTEM**



**A PROJECT REPORT**

*Submitted by*

**CELCIYA.L**

**621117105003**

**JEEVA.Y**

**621117105005**

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**SUVITHA.S**

**621117105015**

*In partial fulfillment for the award of the degree Of*  
**BACHELOR OF ENGINEERING IN  
ELECTRICAL AND ELECTRONICS ENGINEERING  
IDHAYA ENGINEERING COLLEGE FOR WOMEN  
CHINNASALEM-606 201  
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APRIL 2021

  
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**BONAFIDE CERTIFICATE**

Certified that this project report “**POWER QUALITY IMPROVEMENT USING FEEDBACK LINEARIZATION CONTROL IN DC MICRO GRID CONNECTED SYSTEM**” is the bonafide work of “**L.CELCIYA, Y.JEEVA, P.KALVI, S.SUVITHA**” who carried out the project work under my supervision.



**SIGNATURE**

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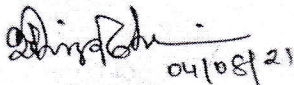


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**Submitted for the University Examination Held on-----04.08.2021-----**



**INTERNAL EXAMINER**



**EXTERNAL EXAMINER**

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X

### ABSTRACT

This method proposes the power quality of DC micro grid based on PV panel and using linearization feedback control through microcontroller. A PV panel is connected with DC-DC converter and linearization feedback control then it can be connected to the DC grid system. Here, a power quality control approach with inner loop as feedback linearization control is used to track the reference voltage across the DC micro grid. MPPT is used to Maximize power extraction of PV supply and it fetch into DC-DC converter. By converting the DC-DC for applying the DC micro grid system. The MPPT and the DC-DC converter injects desired amount of current to the DC grid to make the main grid supply. The performance of the proposed system is verified using MATLAB/SIMULINK.

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**OBJECTIVES**

To impart knowledge on the following Topics

- Magnetic-circuit analysis and introduce magnetic materials
- Constructional details, the principle of operation, prediction of performance, the methods of testing the transformers and three phase transformer connections.
- Working principles of electrical machines using the concepts of electromechanical energy conversion principles and derive expressions for generated voltage and torque developed in all Electrical Machines.
- Working principles of DC machines as Generator types, determination of their no- load/load characteristics, starting and methods of speed control of motors.
- Various losses taking place in D.C. Motor and to study the different testing methods to arrive at their performance.

**UNIT I MAGNETIC CIRCUITS AND MAGNETIC MATERIALS 6+6**

Magnetic circuits –Laws governing magnetic circuits - Flux linkage, Inductance and energy – Statically and Dynamically induced EMF - Torque – Properties of magnetic materials, Hysteresis and Eddy Current losses - AC excitation, introduction to permanent magnets- Transformer as a magnetically coupled circuit.

**UNIT II TRANSFORMERS 6+6**

Construction – principle of operation – equivalent circuit parameters – phasor diagrams, losses – testing – efficiency and voltage regulation-all day efficiency-Sumpner's test, per unit representation – inrush current - three phase transformers-connections – Scott Connection– Phasing of transformer– parallel operation of three phase transformers-auto transformer –tap changing transformers- tertiary winding.

**UNIT III ELECTROMECHANICAL ENERGY CONVERSION AND CONCEPTS IN ROTATING MACHINES 6+6**

Energy in magnetic system – Field energy and co energy-force and torque equations – singly and multiply excited magnetic field systems-mmf of distributed windings – Winding Inductances-, magnetic fields in rotating machines – rotating mmf waves – magnetic saturation and leakage fluxes.

**UNIT IV DC GENERATORS 6+6**

Construction and components of DC Machine – Principle of operation - Lap and wave windings-EMF equations– circuit model – armature reaction –methods of excitation- commutation - interpoles compensating winding – characteristics of DC generators.

**UNIT V DC MOTORS 6+6**

Principle and operations - types of DC Motors – Speed Torque Characteristics of DC Motors- starting and speed control of DC motors –Plugging, dynamic and regenerative braking- testing and efficiency – Retardation test- Swinburne's test and Hopkinson's test - Permanent Magnet DC (PMDC) motors-applications of DC Motor

**TOTAL : 60 PERIODS****OUTCOMES:**

- Ability to analyze the magnetic-circuits.
- Ability to acquire the knowledge in constructional details of transformers.
- Ability to acquire the knowledge in working principles of DC Generator.
- Ability to acquire the knowledge in working principles of DC Motor
- Ability to acquire the knowledge in various losses taking place in D.C. Machines

**TEXT BOOKS:**

1. Stephen J. Chapman, 'Electric Machinery Fundamentals' 4<sup>th</sup> edition, McGraw Hill Education Pvt. Ltd, 2010.
2. P.C. Sen 'Principles of Electric Machines and Power Electronics' John Wiley & Sons; 3<sup>rd</sup> Edition 2013.
3. Nagrath, I.J. and Kothari.D.P., 'Electric Machines', McGraw-Hill Education, 2004

**REFERENCES**

1. Theodore Wildi, "Electrical Machines, Drives, and Power Systems", Pearson Education., (5th Edition), 2002.
2. B.R. Gupta, 'Fundamental of Electric Machines' New age International Publishers, 3<sup>rd</sup> Edition, Reprint 2015.
3. S.K. Bhattacharya, 'Electrical Machines' McGraw - Hill Education, New Delhi, 3<sup>rd</sup> Edition, 2009.
4. Vincent Del Toro, 'Basic Electric Machines' Pearson India Education, 2016.
5. Surinder Pal Bali, 'Electrical Technology Machines & Measurements, Vol.II, Pearson, 2013.

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EE8403

MEASUREMENTS AND INSTRUMENTATION

L T P C  
3 0 0 3

**OBJECTIVES:**

To impart knowledge on the following Topics

- Basic functional elements of instrumentation
- Fundamentals of electrical and electronic instruments
- Comparison between various measurement techniques
- Various storage and display devices
- Various transducers and the data acquisition systems

**UNIT I INTRODUCTION**

9

Functional elements of an instrument – Static and dynamic characteristics – Errors in measurement – Statistical evaluation of measurement data – Standards and calibration- Principle and types of analog and digital voltmeters, ammeters.

**UNIT II ELECTRICAL AND ELECTRONIC INSTRUMENTS**

9

Principle and types of multi meters – Single and three phase watt meters and energy meters –Magnetic measurements – Determination of B-H curve and measurements of iron loss – Instrument transformers – Instruments for measurement of frequency and phase.

**UNIT III COMPARATIVE METHODS OF MEASUREMENTS**

9

D.C potentiometers, D.C (Wheat stone, Kelvin and Kelvin Double bridge) & A.C bridges (Maxwell, Anderson and Schering bridges), transformer ratio bridges, self-balancing bridges. Interference & screening – Multiple earth and earth loops - Electrostatic and electromagnetic Interference – Grounding techniques.

**UNIT IV STORAGE AND DISPLAY DEVICES**

9

Magnetic disk and tape – Recorders, digital plotters and printers, CRT display, digital CRO, LED, LCD & Dot matrix display – Data Loggers.

**UNIT V TRANSDUCERS AND DATA ACQUISITION SYSTEMS**

9

Classification of transducers – Selection of transducers – Resistive, capacitive & inductive Transducers – Piezoelectric, Hall effect, optical and digital transducers – Elements of data acquisition system – Smart sensors-Thermal Imagers.

**TOTAL : 45 PERIODS**

**OUTCOMES:**

- To acquire knowledge on Basic functional elements of instrumentation
- To understand the concepts of Fundamentals of electrical and electronic instruments
- Ability to compare between various measurement techniques
- To acquire knowledge on Various storage and display devices
- To understand the concepts Various transducers and the data acquisition systems
- Ability to model and analyze electrical and electronic Instruments and understand the operational features of display Devices and Data Acquisition System.

**TEXT BOOKS:**

1. A.K. Sawhney, 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, 2010.
2. J. B. Gupta, 'A Course in Electronic and Electrical Measurements', S. K. Kataria & Sons, Delhi, 2013.
3. Doebelin E.O. and Manik D.N., Measurement Systems – Applications and Design, Special Indian Edition, McGraw Hill Education Pvt. Ltd., 2007.

**REFERENCES**

1. H.S. Kalsi, 'Electronic Instrumentation', McGraw Hill, III Edition 2010.
2. D.V.S. Murthy, 'Transducers and Instrumentation', Prentice Hall of India Pvt Ltd, 2015.
3. David Bell, 'Electronic Instrumentation & Measurements', Oxford University Press, 2013.
4. Martin Reissland, 'Electrical Measurements', New Age International (P) Ltd., Delhi, 2001.
5. Alan. S. Morris, Principles of Measurements and Instrumentation, 2nd Edition, Prentice Hall of India, 2003.

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**OBJECTIVES:**

- To model the power system under steady state operating condition
- To understand and apply iterative techniques for power flow analysis
- To model and carry out short circuit studies on power system
- To model and analyze stability problems in power system

**UNIT I POWER SYSTEM**

9

Need for system planning and operational studies - Power scenario in India - Power system components — Representation - Single line diagram - per unit quantities - p.u. impedance diagram - p.u. reactance diagram - Network graph, Bus incidence matrix, Primitive parameters, Bus admittance matrix from primitive parameters - Representation of off-nominal transformer - Formation of bus admittance matrix of large power network.

**UNIT II POWER FLOW ANALYSIS**

9

Bus classification - Formulation of Power Flow problem in polar coordinates - Power flow solution using Gauss Seidel method - Handling of Voltage controlled buses - Power Flow Solution by Newton Raphson method.

**UNIT III SYMMETRICAL FAULT ANALYSIS**

9

Assumptions in short circuit analysis - Symmetrical short circuit analysis using Thevenin's theorem - Bus Impedance matrix building algorithm (without mutual coupling) - Symmetrical fault analysis through bus impedance matrix - Post fault bus voltages - Fault level - Current limiting reactors.

**UNIT IV UNSYMMETRICAL FAULT ANALYSIS**

9

Symmetrical components - Sequence impedances - Sequence networks - Analysis of unsymmetrical faults at generator terminals: LG, LL and LLG - unsymmetrical fault occurring at any point in a power system - computation of post fault currents in symmetrical component and phasor domains.

**UNIT V STABILITY ANALYSIS**

9

Classification of power system stability — Rotor angle stability - Swing equation - Swing curve - Power-Angle equation - Equal area criterion - Critical clearing angle and time - Classical step-by-step solution of the swing equation — modified Euler method.

**TOTAL : 45 PERIODS****OUTCOMES:**

- Ability to model the power system under steady state operating condition
- Ability to understand and apply iterative techniques for power flow analysis
- Ability to model and carry out short circuit studies on power system
- Ability to model and analyze stability problems in power system
- Ability to acquire knowledge on Fault analysis.
- Ability to model and understand various power system components and carry out power flow, short circuit and stability studies.

**TEXT BOOKS:**

1. John J. Grainger, William D. Stevenson, Jr, 'Power System Analysis', Mc Graw Hill Education (India) Private Limited, New Delhi, 2015.
2. Kothari D.P. and Nagrath I.J., 'Power System Engineering', Tata McGraw-Hill Education, Second Edition, 2008.
3. Hadi Saadat, 'Power System Analysis', Tata McGraw Hill Education Pvt. Ltd., New Delhi, 21st reprint, 2010.

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1. Pai M. A. 'Computer Techniques in Power System Analysis', Tata McGraw-Hill Publishing Company Ltd., New Delhi, Second Edition, 2007.
2. J. Duncan Glover, Mulukutla S. Sarma, Thomas J. Overbye, 'Power System Analysis & Design', Cengage Learning, Fifth Edition, 2012.
3. Gupta B.R., 'Power System - Analysis and Design', S. Chand Publishing, 2001.
4. Kundur P., 'Power System Stability and Control', Tata McGraw Hill Education Pvt. Ltd., New Delhi, 10th reprint, 2010.

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**PRINCIPAL**  
**IDHAYA ENGG. COLLEGE FOR WOMEN**  
**CHINNASALEM-606 201, KALLAKURICHI DT.**

**OBJECTIVES:**

To impart knowledge on the following topics

- Significance of power system operation and control.
- Real power-frequency interaction and design of power-frequency controller.
- Reactive power-voltage interaction and the control actions to be implemented for maintaining the voltage profile against varying system load.
- SCADA and its application for real time operation and control of power systems

**UNIT I PRELIMINARIES ON POWER SYSTEM OPERATION AND CONTROL 9**

Power scenario in Indian grid — National and Regional load dispatching centers — requirements of good power system - necessity of voltage and frequency regulation - real power vs frequency and reactive power vs voltage control loops - system load variation, load curves and basic concepts of load dispatching - load forecasting - Basics of speed governing mechanisms and modeling - speed load characteristics - regulation of two generators in parallel.

**UNIT II REAL POWER - FREQUENCY CONTROL 9**

Load Frequency Control (LFC) of single area system-static and dynamic analysis of uncontrolled and controlled cases - LFC of two area system - tie line modeling - block diagram representation of two area system - static and dynamic analysis - tie line with frequency bias control — state variability model - integration of economic dispatch control with LFC.

**UNIT III REACTIVE POWER – VOLTAGE CONTROL 9**

Generation and absorption of reactive power - basics of reactive power control – Automatic Voltage Regulator (AVR) – brushless AC excitation system – block diagram representation of AVR loop - static and dynamic analysis — stability compensation — voltage drop in transmission line - methods of reactive power injection - tap changing transformer, SVC (TCR + TSC) and STATCOM for voltage control.

**UNIT IV ECONOMIC OPERATION OF POWER SYSTEM 9**

Statement of economic dispatch problem - input and output characteristics of thermal plant - incremental cost curve - optimal operation of thermal units without and with transmission losses (no derivation of transmission loss coefficients) - base point and participation factors method - statement of unit commitment (UC) problem - constraints on UC problem - solution of UC problem using priority list — special aspects of short term and long term hydrothermal problems.

**UNIT V COMPUTER CONTROL OF POWER SYSTEMS 9**

Need of computer control of power systems-concept of energy control centers and functions- PMU - system monitoring, data acquisition and controls - System hardware configurations- SCADA and EMS functions - state estimation problem — measurements and errors -weighted least square estimation - various operating states - state transition diagram.

**TOTAL : 45 PERIODS**

**OUTCOMES:**

- Ability to understand the day-to-day operation of electric power system.
- Ability to analyze the control actions to be implemented on the system to meet the minute-to-minute variation of system demand.
- Ability to understand the significance of power system operation and control.
- Ability to acquire knowledge on real power-frequency interaction.
- Ability to understand the reactive power-voltage interaction.
- Ability to design SCADA and its application for real time operation.

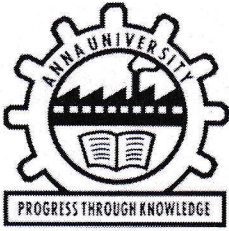
**TEXT BOOKS:**

1. Olle.I.Elgerd, 'Electric Energy Systems theory - An introduction', McGraw Hill Education Pvt. Ltd., New Delhi, 34th reprint, 2010.
2. Allen. J. Wood and Bruce F. Wollen berg, 'Power Generation, Operation and Control', John Wiley & Sons, Inc., 2016.
3. Abhijit Chakrabarti and Sunita Halder, 'Power System Analysis Operation and Control', PHI learning Pvt. Ltd., New Delhi, Third Edition, 2010.

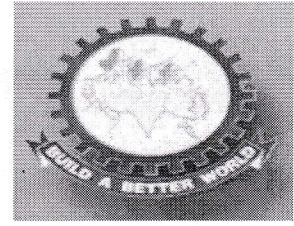
**REFERENCES**

1. Kothari D.P. and Nagrath I.J., 'Power System Engineering', Tata McGraw-Hill Education, Second Edition, 2008.
2. Hadi Saadat, 'Power System Analysis', McGraw Hill Education Pvt. Ltd., New Delhi, 21st reprint, 2010.





**SMART ENERGY METER  
MONITORING SYSTEM  
USING IOT**



**A PROJECT REPORT**

*Submitted by*

**R. RAJESHWARI**

**621117105011**

**N.SHAKILA ANANTHA BABY**

**621117105013**

**P.VEERAMMAL**

**621117105017**

*In partial fulfillment for the award of the degree*

*Of*

**BACHELOR OF ENGINEERING**

**IN**

**ELECTRICAL AND ELECTRONICS ENGINEERING**

**IDHAYA ENGINEERING COLLEGE FOR WOMEN**

**CHINNASALEM-606 201**

**ANNA UNIVERSITY: CHENNAI 600 025**

**April 2021**

  
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**BONAFIDE CERTIFICATE**

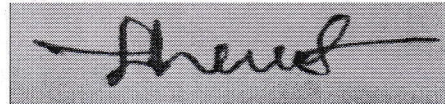
Certified that this project report “**SMART ENERGY METER MONITORING SYSTEM USING IOT**” is the bonafide work of “**R.RAJEAHWARI, N. SHAKILA ANANTHA BABY, P. VEERAMMAL**” who carried out the project work under my supervision.



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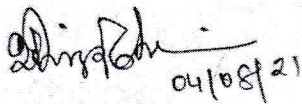


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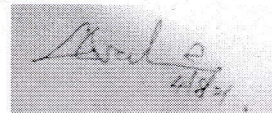
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**Submitted for the University Examination Held On---04.08.2021-----**




04/08/21

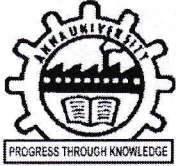
**INTERNAL EXAMINER**



**EXTERNAL EXAMINER**



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# GENERATION OF ELECTRICITY THROUGH SPEED BREAKER



A MINI PROJECT REPORT

*Submitted by*

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<b>CHANDHINI S</b>	<b>621118105003</b>
<b>PAVEENA P</b>	<b>621118105007</b>
<b>PAVENDHIRA M</b>	<b>621118105008</b>

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**IN**


**ELECTRICAL AND ELECTRONICS ENGINEERING**

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**BONAFIDE CERTIFICATE**

Certified that this project report “**GENERATION OF ELECTRICITY THROUGH SPEED BREAKER**” is the bonafide work of “**AGASTIYA K, CHANDHINI S, PAVEENA P, PAVENDHIRA M**” who carried out the project work under my supervision.



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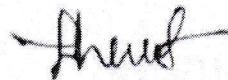
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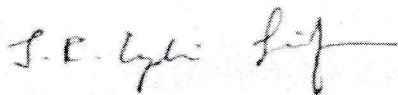
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**Submitted for the University Examination held on 04.08.2021**

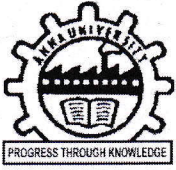


**INTERNAL EXAMINER**



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# **AUTOMATIC ROAD REFLECTOR LIGHT**



A MINI PROJECT REPORT

*Submitted by*

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621118105004

**KAVIYA S**

621118105005

**MADHUBALA S**

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**PRAVINA V**

621118105009

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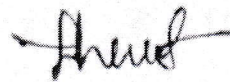
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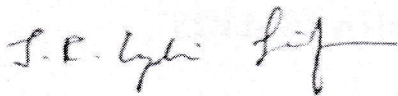
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**EXTERNAL EXAMINER**

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**COURSE OBJECTIVES**

- To understand the use of transfer function models for analysis physical systems and introduce the control system components.
- To provide adequate knowledge in the time response of systems and steady state error analysis.
- To accord basic knowledge in obtaining the open loop and closed-loop frequency responses of systems.
- To introduce stability analysis and design of compensators
- To introduce state variable representation of physical systems

**UNIT I SYSTEMS AND REPRESENTATION**

9

**Basic elements in control systems: – Open and closed loop systems** – Electrical analogy of mechanical and thermal systems – Transfer function – AC and DC servomotors – Block diagram reduction techniques – Signal flow graphs.

**UNIT II TIME RESPONSE**

9

**Time response: – Time domain specifications** – Types of test input – I and II order system response – Error coefficients – Generalized error series – Steady state error – Root locus construction- Effects of P, PI, PID modes of feedback control – **Time response analysis.**

**UNIT III FREQUENCY RESPONSE**

9

Frequency response: – Bode plot – Polar plot – Determination of closed loop response from open loop response - Correlation between frequency domain and time domain specifications

**UNIT IV STABILITY AND COMPENSATOR DESIGN**

9

Characteristics equation – Routh Hurwitz criterion – Nyquist stability criterion- Performance criteria – Effect of Lag, lead and lag-lead compensation on frequency response- **Design of Lag, lead and lag-lead compensator using bode plots.**

**UNIT V STATE VARIABLE ANALYSIS**

9

Concept of state variables – State models for linear and time invariant Systems – Solution of state and output equation in controllable canonical form – Concepts of controllability and observability.

**TOTAL (L: 45+T:30): 75 PERIODS****COURSE OUTCOMES**

At the end of the course, the student should have the :

- Ability to develop various representations of system based on the knowledge of Mathematics, Science and Engineering fundamentals.
- Ability to do time domain and frequency domain analysis of various models of linear system.
- Ability to interpret characteristics of the system to develop mathematical model.
- Ability to design appropriate compensator for the given specifications.
- Ability to come out with solution for complex control problem.
- Ability to understand use of PID controller in closed loop system.

**TEXT BOOKS**

1. Nagarath, I.J. and Gopal, M., “Control Systems Engineering”, New Age International Publishers, 2017.
2. Benjamin C. Kuo, “Automatic Control Systems”, Wiley, 2014.

**REFERENCES**

1. Katsuhiko Ogata, “Modern Control Engineering”, Pearson, 2015.
2. Richard C. Dorf and Bishop, R.H., “Modern Control Systems”, Pearson Education, 2009.
3. John J.D., Azzo Constantine, H. and Houpis Stuart, N Sheldon, “Linear Control System Analysis and Design with MATLAB”, CRC Taylor & Francis Reprint 2009.
4. Ramesh C. Panda and T. Thyagarajan, “An Introduction to Process Modelling Identification and Control of Engineers”, Narosa Publishing House, 2017.
5. M. Gopal, “Control System: Principle and design”, McGraw Hill Education, 2012.
6. NPTEL Video Lecture Notes on “Control Engineering” by Prof. S. D. Agashe, IIT Bombay.

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**SPECTRUM**

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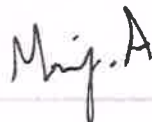
**SOLUTIONS**

# CERTIFICATE OF INTERNSHIP

This is proudly presented to

**JANANI V**

II Year EEE student of  
Idhaya Engineering College for Women  
for her completion of Internship on  
**BASICS OF MATLAB FOR CONTROL SYSTEMS**  
from 05th to 14th May 2021



**Manoj A**  
Supervisor



**Dr. R. GURUMANI, M.E., Ph.D., M.B.A., M.ISTE., F.I.E.,**

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**Naveen S**

Head of Department





# SPECTRUM SOLUTIONS

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II Year EEE student of  
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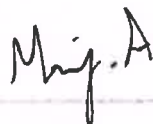
**SOLUTIONS**

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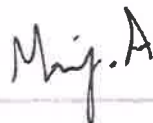
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from 05th to 14th May 2021



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# SPECTRUM SOLUTIONS

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from 05th to 14th May 2021

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Head of Department

**OBJECTIVES:**

To impart knowledge on the following Topics

- Construction and performance of salient and non – salient type synchronous generators.
- Principle of operation and performance of synchronous motor.
- Construction, principle of operation and performance of induction machines.
- Starting and speed control of three-phase induction motors.
- Construction, principle of operation and performance of single phase induction motors and special machines.

**UNIT I SYNCHRONOUS GENERATOR**

6+6

Constructional details – Types of rotors – winding factors- emf equation – Synchronous reactance – Armature reaction – Phasor diagrams of non salient pole synchronous generator connected to infinite bus – Synchronizing and parallel operation – Synchronizing torque -Change of excitation and mechanical input- Voltage regulation – EMF, MMF, ZPF and A.S.A methods – steady state power- angle characteristics – Two reaction theory – slip test -short circuit transients - Capability Curves

**UNIT II SYNCHRONOUS MOTOR**

6+6

Principle of operation – Torque equation – Operation on infinite bus bars - V and Inverted V curves – Power input and power developed equations – Starting methods – Current loci for constant power input, constant excitation and constant power developed – Hunting – natural frequency of oscillations – damper windings- synchronous condenser.

**UNIT III THREE PHASE INDUCTION MOTOR**

6+6

Constructional details – Types of rotors – Principle of operation – Slip – cogging and crawling- Equivalent circuit – Torque-Slip characteristics - Condition for maximum torque – Losses and efficiency – Load test - No load and blocked rotor tests - Circle diagram – Separation of losses – Double cage induction motors – Induction generators – Synchronous induction motor.

**UNIT IV STARTING AND SPEED CONTROL OF THREE PHASE INDUCTION MOTOR**

6+6

Need for starting – Types of starters – DOL, Rotor resistance, Autotransformer and Star- delta starters – Speed control – Voltage control, Frequency control and pole changing – Cascaded connection-V/f control – Slip power recovery scheme-Braking of three phase induction motor: Plugging, dynamic braking and regenerative braking.

**UNIT V SINGLE PHASE INDUCTION MOTORS AND SPECIAL MACHINES**

6+6

Constructional details of single phase induction motor – Double field revolving theory and operation – Equivalent circuit – No load and blocked rotor test – Performance analysis – Starting methods of single-phase induction motors – Capacitor-start capacitor run Induction motor- Shaded pole induction motor - Linear induction motor – Repulsion motor - Hysteresis motor - AC series motor- Servo motors- Stepper motors - introduction to magnetic levitation systems.

**TOTAL : 60 PERIODS****OUTCOMES:**

- Ability to understand the construction and working principle of Synchronous Generator
- Ability to acquire knowledge on Synchronous motor.
- Ability to understand the construction and working principle of Three phase Induction Motor
- Ability to understand the construction and working principle of Special Machines
- Ability to predetermine the performance characteristics of Synchronous Machines.

**TEXT BOOKS:**

1. A.E. Fitzgerald, Charles Kingsley, Stephen. D. Umans, 'Electric Machinery', Mc GrawHill publishing Company Ltd, 2003.
2. Vincent Del Toro, 'Basic Electric Machines' Pearson India Education, 2016.
3. Stephen J. Chapman, 'Electric Machinery Fundamentals' 4<sup>th</sup> edition, McGraw Hill Education Pvt. Ltd, 2010.

**REFERENCES**

1. D.P. Kothari and I.J. Nagrath, 'Electric Machines', McGraw Hill Publishing Company Ltd, 2002.
2. P.S. Bhimbhra, 'Electrical Machinery', Khanna Publishers, 2003.
3. M.N. Bandyopadhyay, 'Electrical Machines Theory and Practice', PHI Learning PVT LTD., New Delhi, 2009.
4. B.R. Gupta, 'Fundamental of Electric Machines' New age International Publishers, 3<sup>rd</sup> Edition, Reprint 2015.
5. Murugesh Kumar, 'Electric Machines', Vikas Publishing House Pvt. Ltd, 2002.
6. Alexander S. Langsdorf, 'Theory of Alternating-Current Machinery', McGraw Hill Publications, 2001.

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**OBJECTIVES:**

To impart knowledge on the following Topics

- Causes of abnormal operating conditions (faults, lightning and switching surges) of the apparatus and system.
- Characteristics and functions of relays and protection schemes.
- Apparatus protection, static and numerical relays
- Functioning of circuit breaker

**UNIT I PROTECTION SCHEMES**

9

Principles and need for protective schemes – nature and causes of faults – types of faults – Methods of Grounding - Zones of protection and essential qualities of protection – Protection scheme

**UNIT II ELECTROMAGNETIC RELAYS**

9

Operating principles of relays - the Universal relay – Torque equation – R-X diagram – Electromagnetic Relays – Over current, Directional, Distance, Differential, Negative sequence and Under frequency relays.

**UNIT III APPARATUS PROTECTION**

9

Current transformers and Potential transformers and their applications in protection schemes - Protection of transformer, generator, motor, bus bars and transmission line.

**UNIT IV STATIC RELAYS AND NUMERICAL PROTECTION**

9

Static relays – Phase, Amplitude Comparators – Synthesis of various relays using Static comparators – Block diagram of Numerical relays – Over current protection, transformer differential protection, distant protection of transmission lines.

**UNIT V CIRCUIT BREAKERS**

9

Physics of arcing phenomenon and arc interruption - DC and AC circuit breaking – re-striking voltage and recovery voltage - rate of rise of recovery voltage - resistance switching - current chopping - interruption of capacitive current - Types of circuit breakers – air blast, air break, oil, SF6, MCBs, MCCBs and vacuum circuit breakers – comparison of different circuit breakers – Rating and selection of Circuit breakers.

**TOTAL : 45 PERIODS****OUTCOMES:**

- Ability to understand and analyze Electromagnetic and Static Relays.
- Ability to suggest suitability circuit breaker.
- Ability to find the causes of abnormal operating conditions of the apparatus and system.
- Ability to analyze the characteristics and functions of relays and protection schemes.
- Ability to study about the apparatus protection, static and numerical relays.
- Ability to acquire knowledge on functioning of circuit breaker.

**TEXT BOOKS:**

1. Sunil S.Rao, 'Switchgear and Protection', Khanna Publishers, New Delhi, 2008.
2. B.Rabindranath and N.Chander, 'Power System Protection and Switchgear', New Age International (P) Ltd., First Edition 2011.
3. Arun Ingole, 'Switch Gear and Protection' Pearson Education, 2017.

**REFERENCES**

1. Badri Ram ,B.H. Vishwakarma, 'Power System Protection and Switchgear', New Age International Pvt Ltd Publishers, Second Edition 2011.
2. Y.G.Paithankar and S.R.Bhide, 'Fundamentals of power system protection', Second Edition, Prentice Hall of India Pvt. Ltd., New Delhi, 2010.
3. C.L.Wadhwa, 'Electrical Power Systems', 6th Edition, New Age International (P) Ltd., 2010
4. Ravindra P. Singh, 'Switchgear and Power System Protection', PHI Learning Private Ltd., New Delhi, 2009.
5. VK Metha, "Principles of Power Systems" S. Chand, 2005.
6. Bhavesh Bhalja, R.P. Maheshwari, Nilesh G. Chotani, 'Protection and Switchgear' Oxford University Press, 2011.

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**ADVANCEMENT IN WIRELESS CHARGING  
OF ELECTRIC VEHICLE WITH  
IMPLEMENTATION OF SOLAR SYSTEM**



A PROJECT REPORT

*Submitted by*

**V.GAYATHRI**

621117105004

**S.KOKILA**

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*in partial fulfillment for the award of the degree Of*

**BACHELOR OF ENGINEERING**

*in*

**ELECTRICAL AND ELECTRONICS ENGINEERING**

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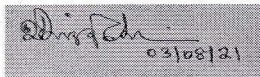
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**ANNA UNIVERSITY: CHENNAI 600 025**

**April 2021**

BONAFIDE CERTIFICATE

Certified that this project report "ADVANCEMENT IN WIRELESS CHARGING OF ELECTRIC VEHICLE WITH IMPLEMENTATION OF SOLAR SYSTEM" is the bonafide work of "V.GAYATHRI, S.KOKILA,L.PRIYADHARSHNI ALLWIN, A.SANTHINI" who carried out the project work under my supervision.



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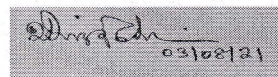
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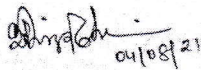
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Submitted for the university examination held on 04/08/2021



INTERNAL EXAMINER



EXTERNAL EXAMINER

## ABSTRACT

The wireless solution is increasingly spreading as method of battery charging for Electric Vehicles (EVs). The standard technology of wireless EV battery charging is based on the Inductive Power Transfer (IPT) between two coupled coils, one connected to the electrical grid and the other one connected to the rechargeable battery. The IPT provides benefits in terms of safety and comfort, due to the absence of a plug-in operation: through IPT, the electrocution risk typically arising from power cords is avoided and the battery charging operation can automatically start. The wireless power transfer obviously represents the only solution for the dynamic charging, since the wired connection would be impossible during the motion. In spite of the undeniable advantages brought by Inductive Power Transfer, the researchers have to deal with several issues in order to make this technology even more attractive for the EV market. Furthermore, some technical aspects need to be taken into account in the practical implementation of an IPT system: for example, in order to obtain the maximum coupling, the misalignment between the coils must be as small as possible. As far as safety is concerned, even if the IPT allows to reduce the electrocution risk, some care is required regarding the magnetic field.

**OBJECTIVES:**

To impart knowledge on the following Topics

- To study the generation, conservation of electrical power and energy efficient equipments.
- To understand the principle, design of illumination systems and energy efficiency lamps.
- To study the methods of industrial heating and welding.
- To understand the electric traction systems and their performance.

**UNIT I ILLUMINATION**

9

Importance of lighting – properties of good lighting scheme – laws of illumination – photometry - types of lamps – lighting calculations – basic design of illumination schemes for residential, commercial, street lighting, factory lighting and flood lighting – LED lighting and energy efficient lamps.

**UNIT II REFRIGERATION AND AIR CONDITIONING**

9

Refrigeration-Domestic refrigerator and water coolers - Air-Conditioning-Varioustypes of air-conditioning system and their applications, smart air conditioning units - Energy Efficient motors: Standard motor efficiency, need for efficient motors, Motor life cycle, Direct Savings and payback analysis, efficiency evaluation factor.

**UNIT III HEATING AND WELDING**

9

Role of electric heating for industrial applications – resistance heating – induction heating – dielectric heating - electric arc furnaces. Brief introduction to electric welding – welding generator, welding transformer and the characteristics.

**UNIT IV TRACTION**

9

Merits of electric traction – requirements of electric traction system – supply systems – mechanics of train movement – traction motors and control – braking – recent trends in electrictraction.

**UNIT V DOMESTIC UTILIZATION OF ELECTRICAL ENERGY**

9

Domestic utilization of electrical energy – House wiring. Induction based appliances, Online and OFF line UPS, Batteries - Power quality aspects – nonlinear and domestic loads – Earthing – Domestic, Industrial and Substation.

**TOTAL : 45 PERIODS****OUTCOMES:**

- To understand the main aspects of generation, utilization and conservation.
- To identify an appropriate method of heating for any particular industrial application.
- To evaluate domestic wiring connection and debug any faults occurred.
- To construct an electric connection for any domestic appliance like refrigerator as well as to design a battery charging circuit for a specific household application.
- To realize the appropriate type of electric supply system as well as to evaluate the performance of a traction unit.
- To understand the main aspects of Traction.

**TEXT BOOKS:**

1. Wadhwa, C.L. “Generation, Distribution and Utilization of Electrical Energy”, New Age International Pvt. Ltd, 2003.
2. Dr. Uppal S.L. and Prof. S. Rao, 'Electrical Power Systems', Khanna Publishers, New Delhi, 15th Edition, 2014.
3. Energy Efficiency in Electric Utilities, BEE Guide Book, 2010

**REFERENCES**

1. Partab.H, “Art and Science of Utilisation of Electrical Energy”, Dhanpat Rai and Co, New Delhi, 2004.
2. Openshaw Taylor.E, “Utilization of Electrical Energy in SI Units”, Orient Longman Pvt. Ltd, 2003.
3. Gupta.J.B, “Utilization of Electric Power and Electric Traction”, S.K.Kataria and Sons, 2002.
4. Cleaner Production – Energy Efficiency Manual for GERIAP, UNEP, Bangkok prepared by National Productivity Council.

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**OBJECTIVES:**

To impart knowledge on the following Topics

- Building Blocks of Embedded System
- Various Embedded Development Strategies
- Bus Communication in processors, Input/output interfacing.
- Various processor scheduling algorithms.
- Basics of Real time operating system and example tutorials to discuss on one real timeoperating system tool.

**UNIT I INTRODUCTION TO EMBEDDED SYSTEMS**

9

Introduction to Embedded Systems –Structural units in Embedded processor, selection of processor & memory devices- DMA – Memory management methods- Timer and Counting devices, Watchdog Timer, Real Time Clock, In circuit emulator, Target Hardware Debugging.

**UNIT II EMBEDDED NETWORKING**

9

Embedded Networking: Introduction, I/O Device Ports & Buses– Serial Bus communication protocols RS232 standard – RS422 – RS 485 - CAN Bus -Serial Peripheral Interface (SPI) – InterIntegrated Circuits (I<sup>2</sup>C) –need for device drivers.

**UNIT III EMBEDDED FIRMWARE DEVELOPMENT ENVIRONMENT**

9

Embedded Product Development Life Cycle- objectives, different phases of EDLC, Modelling of EDLC; issues in Hardware-software Co-design, Data Flow Graph, state machine model, Sequential Program Model, concurrent Model, object oriented Model.

**UNIT IV RTOS BASED EMBEDDED SYSTEM DESIGN**

9

Introduction to basic concepts of RTOS- Task, process & threads, interrupt routines in RTOS, Multiprocessing and Multitasking, Preemptive and non-preemptive scheduling, Task communication shared memory, message passing-, Inter process Communication – synchronization between processes-semaphores, Mailbox, pipes, priority inversion, priorityinheritance.

**UNIT V EMBEDDED SYSTEM APPLICATION AND DEVELOPMENT**

9

Case Study of Washing Machine- Automotive Application- Smart card System Application-ATM machine –Digital camera

**TOTAL : 45 PERIODS**

**OUTCOMES:**

- Ability to understand and analyze Embedded systems.
- Ability to suggest an embedded system for a given application.
- Ability to operate various Embedded Development Strategies
- Ability to study about the bus Communication in processors.
- Ability to acquire knowledge on various processor scheduling algorithms.
- Ability to understand basics of Real time operating system.

**TEXT BOOKS:**

1. Peckol, "Embedded system Design", John Wiley & Sons,2010
2. Lyla B Das," Embedded Systems-An Integrated Approach", Pearson, 2013
3. Shibu. K.V, "Introduction to Embedded Systems", 2e, Mc graw Hill, 2017.

**REFERENCES**

1. Raj Kamal, 'Embedded System-Architecture, Programming, Design', Mc Graw Hill, 2013.
2. C.R.Sarma, "Embedded Systems Engineering", University Press (India) Pvt. Ltd, 2013.
3. Tammy Noergaard, "Embedded Systems Architecture", Elsevier, 2006.
4. Han-Way Huang, "Embedded system Design Using C8051", Cengage Learning, 2009.
5. Rajib Mall "Real-Time systems Theory and Practice" Pearson Education, 2007.

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**OBJECTIVES:** To impart knowledge about the following topics:

- Planning of DC power transmission and comparison with AC power transmission.
- HVDC converters.
- HVDC system control.
- Harmonics and design of filters.
- Power flow in HVDC system under steady state.

#### UNIT I INTRODUCTION

9

DC Power transmission technology–Comparison of AC and DC transmission–Application of DC transmission–Description of DC transmission system–Planning for HVDC transmission–Modern trends in HVDC technology–DC breakers–Operating problems– HVDC transmission based on VSC–Types and applications of MTDC systems.

#### UNIT II ANALYSIS OF HVDC CONVERTERS

9

Line commutated converter -Analysis of Graetz circuit with and without overlap -Pulse number– Choice of converter configuration – Converter bridge characteristics– Analysis of a 12 pulse converters– Analysis of VSC topologies and firing schemes.

#### UNIT III CONVERTER AND HVDC SYSTEM CONTROL

9

Principles of DC link control–Converter control characteristics–System control hierarchy–Firing angle control– Current and extinction angle control–Starting and stopping of DC link

–Power control –Higher level controllers –Control of VSC based HVDC link.

#### UNIT IV REACTIVE POWER AND HARMONICS CONTROL

9

Reactive power requirements in steady state–Sources of reactive power–SVC and STATCOM– Generation of harmonics – Design of AC and DC filters– Active filters.

#### UNIT V POWER FLOW ANALYSIS IN AC/DC SYSTEMS

9

Per unit system for DC quantities–DC system model –Inclusion of constraints –Power flow analysis –case study

**TOTAL : 45 PERIODS**

#### OUTCOMES:

- Ability to understand the principles and types of HVDC system.
- Ability to analyze and understand the concepts of HVDC converters.
- Ability to acquire knowledge on DC link control.
- Ability to understand the concepts of reactive power management, harmonics and power flow analysis.
- Ability to get knowledge about Planning of DC power transmission and comparison with AC power transmission.
- Ability to understand the importance of power flow in HVDC system under steady state.

#### TEXT BOOKS:

1. Padiyar, K.R., "HVDC power transmission system", New Age International (P) Ltd. New Delhi, Second Edition, 2010.
2. Arrillaga, J., "High Voltage Direct Current Transmission", Peter Pregrinus, London, 1983.

#### REFERENCES

1. Kundur P., "Power System Stability and Control", McGraw-Hill, 1993.
2. Colin Adamson and Hingorani NG, "High Voltage Direct Current Power Transmission", Garraway Limited, London, 1960.
3. Edward Wilson Kimbark, "Direct Current Transmission", Vol. I, Wiley inter science, New York, London, Sydney, 1971.

  
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**OBJECTIVES:** To impart knowledge about the following topics:

- Generation of switching transients and their control using circuit – theoretical concept.
- Mechanism of lightning strokes and the production of lightning surges.
- Propagation, reflection and refraction of travelling waves.
- Voltage transients caused by faults, circuit breaker action, load rejection on integrated power system.

#### UNIT I INTRODUCTION AND SURVEY

9

Review and importance of the study of transients - causes for transients. RL circuit transient with sine wave excitation - double frequency transients - basic transforms of the RLC circuit transients. Different types of power system transients - effect of transients on power systems — role of the study of transients in system planning.

#### UNIT II SWITCHING TRANSIENTS

9

Over voltages due to switching transients - resistance switching and the equivalent circuit for interrupting the resistor current - load switching and equivalent circuit - waveforms for transient voltage across the load and the switch - normal and abnormal switching transients. Current suppression - current chopping - effective equivalent circuit. Capacitance switching - effect of source regulation - capacitance switching with a restrike, with multiple restrikes. Illustration for multiple restriking transients - ferro resonance.

#### UNIT III LIGHTNING TRANSIENTS

9

Review of the theories in the formation of clouds and charge formation - rate of charging of thunder clouds – mechanism of lightning discharges and characteristics of lightning strokes — model for lightning stroke - factors contributing to good line design - protection using ground wires - tower footing resistance - Interaction between lightning and power system.

#### UNIT IV TRAVELING WAVES ON TRANSMISSION LINE COMPUTATION OF TRANSIENTS

9

Computation of transients - transient response of systems with series and shunt lumped parameters and distributed lines. Traveling wave concept - step response - Bewely's lattice diagram - standing waves and natural frequencies - reflection and refraction of travelling waves.

#### UNIT V TRANSIENTS IN INTEGRATED POWER SYSTEM

9

The short line and kilometric fault - distribution of voltages in a power system - Line dropping and load rejection - voltage transients on closing and reclosing lines - over voltage induced by faults - switching surges on integrated system Qualitative application of EMTP for transient computation.

**TOTAL : 45 PERIODS**

#### OUTCOMES:

- Ability to understand and analyze switching and lightning transients.
- Ability to acquire knowledge on generation of switching transients and their control.
- Ability to analyze the mechanism of lightning strokes.
- Ability to understand the importance of propagation, reflection and refraction of travelling waves.
- Ability to find the voltage transients caused by faults.
- Ability to understand the concept of circuit breaker action, load rejection on integrated power system.

#### TEXT BOOKS:

1. Allan Greenwood, 'Electrical Transients in Power Systems', Wiley Inter Science, New York, 2<sup>nd</sup> Edition, 1991.
2. Pritindra Chowdhari, "Electromagnetic transients in Power System", John Wiley and Sons Inc., Second Edition, 2009.
3. C.S. Indulkar, D.P. Kothari, K. Ramalingam, 'Power System Transients – A statistical approach', PHI Learning Private Limited, Second Edition, 2010.

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1. M.S. Naidu and V. Kamaraju, 'High Voltage Engineering', McGraw Hill, Fifth Edition, 2013.
2. R.D. Begamudre, 'Extra High Voltage AC Transmission Engineering', Wiley Eastern Limited, 1986.
3. Y. Hase, Handbook of Power System Engineering, Wiley India, 2012.
4. J.L. Kirtley, "Electric Power Principles, Sources, Conversion, Distribution and use," Wiley, 2012.
5. Akihiro ametani, "Power System Transient theory and applications", CRC press, 2013.



**OBJECTIVES:**

To impart knowledge on the following Topics

- Awareness about renewable Energy Sources and technologies.
- Adequate inputs on a variety of issues in harnessing renewable Energy.
- Recognize current and possible future role of renewable energy sources.

**UNIT I RENEWABLE ENERGY (RE) SOURCES 9**

Environmental consequences of fossil fuel use, Importance of renewable sources of energy, Sustainable Design and development, Types of RE sources, Limitations of RE sources, Present Indian and international energy scenario of conventional and RE sources.

**UNIT II WIND ENERGY 9**

Power in the Wind – Types of Wind Power Plants(WPPs)–Components of WPPs-Working of WPPs- Siting of WPPs-Grid integration issues of WPPs.

**UNIT III SOLAR PV AND THERMAL SYSTEMS 9**

Solar Radiation, Radiation Measurement, Solar Thermal Power Plant, Central Receiver Power Plants, Solar Ponds.- Thermal Energy storage system with PCM- Solar Photovoltaic systems : Basic Principle of SPV conversion — Types of PV Systems- Types of Solar Cells, Photovoltaic cell concepts: Cell, module, array ,PV Module I-V Characteristics, Efficiency & Quality of the Cell, series and parallel connections, maximum power point tracking, Applications.

**UNIT IV BIOMASS ENERGY 9**

Introduction-Bio mass resources –Energy from Bio mass: conversion processes-Biomass Cogeneration-Environmental Benefits. Geothermal Energy: Basics, Direct Use, Geothermal Electricity. Mini/micro hydro power: Classification of hydropower schemes, Classification of water turbine, Turbine theory, Essential components of hydroelectric system.

**UNIT V OTHER ENERGY SOURCES 9**

Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems. Wave Energy: Energy from waves, wave power devices. Ocean Thermal Energy Conversion (OTEC)- Hydrogen Production and Storage- Fuel cell : Principle of working- various types - construction and applications. Energy Storage System- Hybrid Energy Systems.

**TOTAL : 45 PERIODS**

**OUTCOMES:**

- Ability to create awareness about renewable Energy Sources and technologies.
- Ability to get adequate inputs on a variety of issues in harnessing renewable Energy.
- Ability to recognize current and possible future role of renewable energy sources.
- Ability to explain the various renewable energy resources and technologies and their applications.
- Ability to understand basics about biomass energy.
- Ability to acquire knowledge about solar energy.

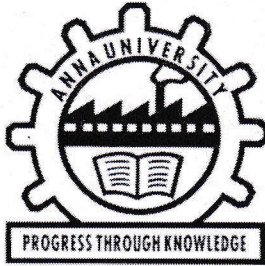
**TEXT BOOKS:**

1. Joshua Earnest, Tore Wizeliu, ‘Wind Power Plants and Project Development’, PHILearning Pvt.Ltd, New Delhi, 2011.
2. D.P.Kothari, K.C Singal, Rakesh Ranjan “Renewable Energy Sources and Emerging Technologies”, PHI Learning Pvt.Ltd, New Delhi, 2013.
3. Scott Grinnell, “Renewable Energy & Sustainable Design”, CENGAGE Learning,USA, 2016.

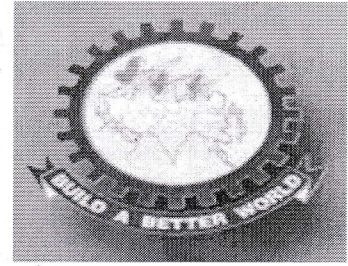
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1. A.K.Mukerjee and Nivedita Thakur, “ Photovoltaic Systems: Analysis and Design”, PHI Learning Private Limited, New Delhi, 2011
2. Richard A. Dunlap, “ Sustainable Energy” Cengage Learning India Private Limited, Delhi, 2015.
3. Chetan Singh Solanki, “ Solar Photovoltaics : Fundamentals, Technologies and Applications”, PHI Learning Private Limited, New Delhi, 2011
4. Bradley A. Striebig,Adebayo A.Ogundipe and Maria Papadakis, “ Engineering Applications in Sustainable Design and Development”, Cengage Learning India Private Limited, Delhi, 2016.
5. Godfrey Boyle, “Renewable energy”, Open University, Oxford University Press in association with the Open University, 2004.

Shobh Nath Singh, ‘Non-conventional Energy resources’ Pearson Education ,2015.



# SMART AGRICULTURE SYSTEM USING IOT



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**BONAFIDE CERTIFICATE**

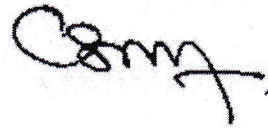
Certified that this project report "SMART INTEGRATION AGRICULTURE SYSTEM" is the bonafide work of "V.UDHAYANILA,-P.BHARANI,P-POONGUZHALI,-P.SUGANYA" who carried out the project work under my supervision.



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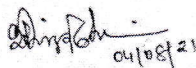


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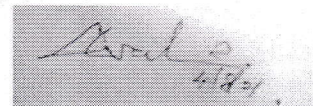
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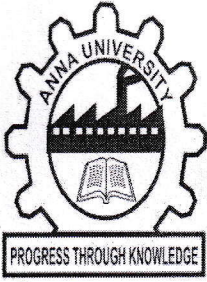


**INTERNAL EXAMINER**



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**ADVANCEMENT IN WIRELESS CHARGING  
OF ELECTRIC VEHICLE WITH  
IMPLEMENTATION OF SOLAR SYSTEM  
A PROJECT REPORT**



*Submitted by*

**V.GAYATHRI**

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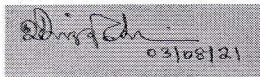
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**April 2021**

BONAFIDE CERTIFICATE

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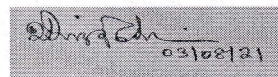
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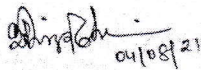
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Submitted for the university examination held on 04/08/2021



INTERNAL EXAMINER



EXTERNAL EXAMINER

## ABSTRACT

The wireless solution is increasingly spreading as method of battery charging for Electric Vehicles (EVs). The standard technology of wireless EV battery charging is based on the Inductive Power Transfer (IPT) between two coupled coils, one connected to the electrical grid and the other one connected to the rechargeable battery. The IPT provides benefits in terms of safety and comfort, due to the absence of a plug-in operation: through IPT, the electrocution risk typically arising from power cords is avoided and the battery charging operation can automatically start. The wireless power transfer obviously represents the only solution for the dynamic charging, since the wired connection would be impossible during the motion. In spite of the undeniable advantages brought by Inductive Power Transfer, the researchers have to deal with several issues in order to make this technology even more attractive for the EV market. Furthermore, some technical aspects need to be taken into account in the practical implementation of an IPT system: for example, in order to obtain the maximum coupling, the misalignment between the coils must be as small as possible. As far as safety is concerned, even if the IPT allows to reduce the electrocution risk, some care is required regarding the magnetic field.

**DEPARTMENT OF ELECTRONICS AND  
COMMUNICATION ENGINEERING**

EC8551

COMMUNICATION NETWORKS

L	T	P	C
3	0	0	3

**OBJECTIVES:**

**The student should be made to:**

- Understand the division of network functionalities into layers.
- Be familiar with the components required to build different types of networks
- Be exposed to the required functionality at each layer
- Learn the flow control and congestion control algorithms

**UNIT I FUNDAMENTALS & LINK LAYER**

9

Overview of Data Communications- Networks – Building Network and its types– Overview of Internet - Protocol Layering - OSI Mode – Physical Layer – Overview of Data and Signals -introduction to Data Link Layer - Link layer Addressing- Error Detection and Correction

**UNIT II MEDIA ACCESS & INTERNETWORKING**

9

Overview of Data link Control and Media access control - Ethernet (802.3) - Wireless LANs – Available Protocols – Bluetooth – Bluetooth Low Energy – WiFi – 6LowPAN–Zigbee - Network layer services – Packet Switching – IPV4 Address – Network layer protocols ( IP, ICMP, Mobile IP)

**UNIT III ROUTING**

9

Routing - Unicast Routing – Algorithms – Protocols – Multicast Routing and its basics – Overview of Intradomain and interdomain protocols – Overview of IPv6 Addressing – Transition from IPv4 to IPv6

**UNIT IV TRANSPORT LAYER**

9

Introduction to Transport layer –Protocols- User Datagram Protocols (UDP) and Transmission Control Protocols (TCP) – Services – Features – TCP Connection – State Transition Diagram – Flow, Error and Congestion Control - Congestion avoidance (DECbit, RED) – QoS – Application requirements

**UNIT V APPLICATION LAYER**

9

Application Layer Paradigms – Client Server Programming – World Wide Web and HTTP - DNS- -Electronic Mail (SMTP, POP3, IMAP, MIME) – Introduction to Peer to Peer Networks – Need for Cryptography and Network Security – Firewalls.

**TOTAL:45 PERIODS**

**OUTCOMES:**

**At the end of the course, the student should be able to:**

- Identify the components required to build different types of networks
- Choose the required functionality at each layer for given application
- Identify solution for each functionality at each layer
- Trace the flow of information from one node to another node in the network

**TEXT BOOK:**

1. Behrouz A. Forouzan, —Data communication and Networkingl, Fifth Edition, Tata McGraw –Hill, 2013 (UNIT I –V)

**REFERENCES**

1. James F. Kurose, Keith W. Ross, —Computer Networking - A Top-Down Approach Featuring the Internetl, Seventh Edition, Pearson Education, 2016.
2. Nader. F. Mir,— Computer and Communication NetworksI, Pearson Prentice HallPublishers, 2<sup>nd</sup> Edition, 2014.
3. Ying-Dar Lin, Ren-Hung Hwang, Fred Baker, —Computer Networks: An Open Source ApproachI, Mc Graw Hill Publisher, 2011.
4. Larry L. Peterson, Bruce S. Davie, —Computer Networks: A Systems ApproachI, Fifth Edition, Morgan Kaufmann Publishers, 2011.

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EC8501

DIGITAL COMMUNICATION

L	T	P	C
3	0	0	3

OBJECTIVES:

- To know the principles of sampling & quantization
- To study the various waveform coding schemes
- To learn the various baseband transmission schemes
- To understand the various band pass signaling schemes
- To know the fundamentals of channel coding

UNIT I INFORMATION THEORY 9

Discrete Memoryless source, Information, Entropy, Mutual Information - Discrete Memoryless channels – Binary Symmetric Channel, Channel Capacity - Hartley - Shannon law - Source coding theorem - Shannon - Fano & Huffman codes.

UNIT II WAVEFORM CODING & REPRESENTATION 9

Prediction filtering and DPCM - Delta Modulation - ADPCM & ADM principles-Linear Predictive Coding- Properties of Line codes- Power Spectral Density of Unipolar / Polar RZ & NRZ — Bipolar NRZ - Manchester

UNIT III BASEBAND TRANSMISSION & RECEPTION 9

ISI – Nyquist criterion for distortion less transmission – Pulse shaping – Correlative coding - Eyepattern – Receiving Filters- Matched Filter, Correlation receiver, Adaptive Equalization

UNIT IV DIGITAL MODULATION SCHEME 9

Geometric Representation of signals - Generation, detection, PSD & BER of Coherent BPSK, BFSK & QPSK - QAM - Carrier Synchronization - Structure of Non-coherent Receivers - Principle of DPSK.

UNIT V ERROR CONTROL CODING 9

Channel coding theorem - Linear Block codes - Hamming codes - Cyclic codes - Convolutional codes - Viterbi Decoder.

TOTAL:45 PERIODS

OUTCOMES:

Upon completion of the course, the student should be able to

- Design PCM systems
- Design and implement base band transmission schemes
- Design and implement band pass signaling schemes
- Analyze the spectral characteristics of band pass signaling schemes and their noise performance
- Design error control coding schemes

TEXT BOOK:

1. S. Haykin, —Digital Communications I, John Wiley, 2005 (Unit I –V)

REFERENCES

1. B. Sklar, —Digital Communication Fundamentals and Applications I, 2nd Edition, Pearson Education, 2009
2. B.P.Lathi, —Modern Digital and Analog Communication Systems I 3rd Edition, Oxford University Press 2007.
3. H P Hsu, Schaum Outline Series - —Analog and Digital Communications I, TMH 2006

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**OBJECTIVES:**

- To acquaint the students with the construction, theory and operation of the basic electronic devices such as PN junction diode, Bipolar and Field effect Transistors, Power control devices, LED, LCD and other Opto-electronic devices

<b>UNIT I</b>	<b>SEMICONDUCTOR DIODE</b>	<b>9</b>
	PN junction diode, Current equations, Energy Band diagram, Diffusion and drift current densities, forward and reverse bias characteristics, Transition and Diffusion Capacitances, Switching Characteristics, Breakdown in PN Junction Diodes.	
<b>UNIT II</b>	<b>BIPOLAR JUNCTION TRANSISTORS</b>	<b>9</b>
	NPN -PNP -Operations-Early effect-Current equations – Input and Output characteristics of CE,CB, CC - Hybrid - $\pi$ model - h-parameter model, Ebers Moll Model- Gummel Poon-model, MultiEmitter Transistor.	
<b>UNIT III</b>	<b>FIELD EFFECT TRANSISTORS</b>	<b>9</b>
	JFETs – Drain and Transfer characteristics,-Current equations-Pinch off voltage and its significance- MOSFET- Characteristics- Threshold voltage -Channel length modulation, D- MOSFET, E-MOSFET- Characteristics – Comparison of MOSFET with JFET.	
<b>UNIT IV</b>	<b>SPECIAL SEMICONDUCTOR DEVICES</b>	<b>9</b>
	Metal-Semiconductor Junction- MESFET, FINFET, PINFET, CNTFET, DUAL GATE MOSFET, Schottky barrier diode-Zener diode-Varactor diode –Tunnel diode- Gallium Arsenide device, LASER diode, LDR.	
<b>UNIT V</b>	<b>POWER DEVICES AND DISPLAY DEVICES</b>	<b>9</b>
	UJT, SCR, Diac, Triac, Power BJT- Power MOSFET- DMOS-VMOS. LED, LCD, Photo transistor, Opto Coupler, Solar cell, CCD.	
<b>TOTAL : 45 PERIODS</b>		

**OUTCOMES:****At the end of the course the students will be able to:**

- Explain the V-I characteristic of diode, UJT and SCR
- Describe the equivalence circuits of transistors
- Operate the basic electronic devices such as PN junction diode, Bipolar and Field effect Transistors, Power control devices, LED, LCD and other Opto-electronic devices

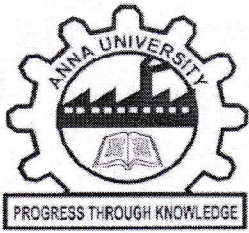
**TEXT BOOKS:**

- Donald A Neaman, —Semiconductor Physics and DevicesI, Fourth Edition, Tata Mc GrawHillInc. 2012.
- Salivahanan. S, Suresh Kumar. N, Vallavaraj.A, —Electronic Devices and circuitsI, Third Edition,Tata McGraw- Hill, 2008.

**REFERENCES:**

- Robert Boylestad and Louis Nashelsky, —Electron Devices and Circuit TheoryI PearsonPrentice Hall, 10th edition, July 2008.
- R.S.Sedha, — A Text Book of Applied ElectronicsI S.Chand Publications, 2006.
- Yang, —Fundamentals of Semiconductor devicesI, McGraw Hill International Edition, 1978.

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**ENHANCED SYSTEM FOR  
RAILWAY TRACK FAULT  
DETECTION USING AI BASED  
SOLAR POWER**



**A PROJECT REPORT**

*Submitted by*

**SRIMATHI M**

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**SUBASHINI S**

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*in partial fulfillment for the award of the degree*

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**BACHELOR OF ENGINEERING**

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**APRIL 2021**

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**BONAFIDE CERTIFICATE**

Certified that this project report “**ENHANCED SYSTEM FOR RAILWAY TRACK FAULT DETECTION USING AI BASED SOLAR POWER**” is the bonafide work of “**SRIMATHI M, SUBASHINI S, ANJUGAM S**” who carried out the project work under my supervision.



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**INTERNAL EXAMINER**

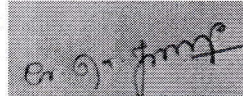


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**EXTERNAL EXAMINER**



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## ABSTRACT

India is one of the fastest developing countries with significant advancement in the field of the railway network. Railways has one of the largest railway networks to reliability and passenger safety Among other factors, cracks developed on the rails due to absence of timely detection and the associated maintenance pose serious questions on the security of operation of rail transport. Manual detection of tracks is cumbersome and not fully effective owing to much time consumption and requirement of skilled technicians.

This work is aimed towards addressing the issue by developing an automatic railway track crack detection system. This work introduces a project that aims in designing robust railway crack detection scheme (RRCDS) using TSOP IR Receiver Sensor assembly system which avoids the train accidents by detecting the cracks on railway tracks. The capable of alerting the authorities in the form of SMS messages along with location by using **GPS and GSM modules**. The system also includes distance measuring sensor which displays the track deviation distance between the railway tracks.

**OBJECTIVES:**

- To understand the methods of biasing transistors
- To design and analyze single stage and multistage amplifier circuits
- To analyze the frequency response of small signal amplifiers
- To design and analyze the regulated DC power supplies.
- To troubleshoot and fault analysis of power supplies.

**UNIT I BIASING OF DISCRETE BJT, JFET AND MOSFET** 9

BJT- Need for biasing - DC Load Line and Bias Point – DC analysis of Transistor circuits - Various biasing methods of BJT – Bias Circuit Design - Thermal stability - Stability factors - Bias compensation techniques using Diode, thermistor and sensistor – Biasing BJT Switching Circuits- JFET - DC Load Line and Bias Point - Various biasing methods of JFET - JFET Bias Circuit Design - MOSFET Biasing - Biasing FET Switching Circuits.

**UNIT II BJT AMPLIFIERS** 9

Small Signal Hybrid  $\pi$  equivalent circuit of BJT – Early effect - Analysis of CE, CC and CB amplifiers using Hybrid  $\pi$  equivalent circuits - AC Load Line Analysis- Darlington Amplifier - Bootstrap technique - Cascade, Cascode configurations - Differential amplifier, Basic BJT differential pair – Small signal analysis and CMRR.

**UNIT III SINGLE STAGE FET, MOSFET AMPLIFIERS**

Small Signal Hybrid  $\pi$  equivalent circuit of FET and MOSFET - Analysis of CS, CD and CG amplifiers using Hybrid  $\pi$  equivalent circuits - Basic FET differential pair- BiCMOS circuits.

**UNIT IV FREQUENCY RESPONSE OF AMPLIFIERS** 9

Amplifier frequency response – Frequency response of transistor amplifiers with circuit capacitors  
– BJT frequency response – short circuit current gain - cut off frequency –  $f_{\alpha}$ ,  $f_{\beta}$  and unity gain bandwidth – Miller effect - frequency response of FET - High frequency analysis of CE and MOSFET CS amplifier - Transistor Switching Times.

**UNIT V POWER SUPPLIES AND ELECTRONIC DEVICE TESTING** 9

Linear mode power supply - Rectifiers - Filters - Half-Wave Rectifier Power Supply - Full-Wave Rectifier Power Supply - Voltage regulators: Voltage regulation - Linear series, shunt and switching Voltage Regulators - Over voltage protection - BJT and MOSFET – Switched mode power supply (SMPS) - Power Supply Performance and Testing - Troubleshooting and Fault Analysis, Design of Regulated DC Power Supply.

**TOTAL: 45 PERIODS****OUTCOMES:****After studying this course, the student should be able to:**

- Acquire knowledge of
  - Working principles, characteristics and applications of BJT and FET
  - Frequency response characteristics of BJT and FET amplifiers
- Analyze the performance of small signal BJT and FET amplifiers - single stage and multistage amplifiers
- Apply the knowledge gained in the design of Electronic circuits

**TEXT BOOKS:**

1. Donald. A. Neamen, Electronic Circuits Analysis and Design, 3<sup>rd</sup> Edition, Mc Graw Hill Education (India) Private Ltd., 2010. (Unit I-IV)
2. Robert L. Boylestad and Louis Nasheresky, —Electronic Devices and Circuit Theory, 11<sup>th</sup> Edition, Pearson Education, 2013. (Unit V)

**REFERENCES**

1. Millman J, Halkias.C.and Sathyabrada Jit, Electronic Devices and Circuits, 4<sup>th</sup> Edition, Mc Graw Hill Education (India) Private Ltd., 2015.
2. Salivahanan and N. Suresh Kumar, Electronic Devices and Circuits, 4<sup>th</sup> Edition, Mc Graw Hill Education (India) Private Ltd., 2017.
3. Floyd, Electronic Devices, Ninth Edition, Pearson Education, 2012.
4. David A. Bell, Electronic Devices & Circuits, 5<sup>th</sup> Edition, Oxford University Press, 2008.
5. Anwar A. Khan and Kanchan K. Dey, A First Course on Electronics, PHL 2006.

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**EC8451****ELECTROMAGNETIC FIELDS**

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**OBJECTIVES:**

- To gain conceptual and basic mathematical understanding of electric and magnetic fields in free space and in materials
- To understand the coupling between electric and magnetic fields through Faraday's law, displacement current and Maxwell's equations
- To understand wave propagation in lossless and in lossy media
- To be able to solve problems based on the above concepts

**UNIT I INTRODUCTION** 12

Electromagnetic model, Units and constants, Review of vector algebra, Rectangular, cylindrical and spherical coordinate systems, Line, surface and volume integrals, Gradient of a scalar field, Divergence of a vector field, Divergence theorem, Curl of a vector field, Stoke's theorem, Null identities, Helmholtz's theorem

**UNIT II ELECTROSTATICS** 12

Electric field, Coulomb's law, Gauss's law and applications, Electric potential, Conductors in static electric field, Dielectrics in static electric field, Electric flux density and dielectric constant, Boundary conditions, Capacitance, Parallel, cylindrical and spherical capacitors, Electrostatic energy, Poisson's and Laplace's equations, Uniqueness of electrostatic solutions, Current density and Ohm's law, Electromotive force and Kirchhoff's voltage law, Equation of continuity and Kirchhoff's current law

**UNIT III MAGNETOSTATICS** 12

Lorentz force equation, Law of no magnetic monopoles, Ampere's law, Vector magnetic potential, Biot-Savart law and applications, Magnetic field intensity and idea of relative permeability, Magnetic circuits, Behaviour of magnetic materials, Boundary conditions, Inductance and inductors, Magnetic energy, Magnetic forces and torques

**UNIT IV TIME-VARYING FIELDS AND MAXWELL'S EQUATIONS** 12

Faraday's law, Displacement current and Maxwell-Ampere law, Maxwell's equations, Potential functions, Electromagnetic boundary conditions, Wave equations and solutions, Time-harmonic fields

**UNIT V PLANE ELECTROMAGNETIC WAVES** 12

Plane waves in lossless media, Plane waves in lossy media (low-loss dielectrics and good conductors), Group velocity, Electromagnetic power flow and Poynting vector, Normal incidence at a plane conducting boundary, Normal incidence at a plane dielectric boundary

**TOTAL:60 PERIODS****OUTCOMES:**

By the end of this course, the student should be able to:

- Display an understanding of fundamental electromagnetic laws and concepts
- Write Maxwell's equations in integral, differential and phasor forms and explain their physical meaning
- Explain electromagnetic wave propagation in lossy and in lossless media
- Solve simple problems requiring estimation of electric and magnetic field quantities based on these concepts and laws

**TEXT BOOKS:**

1. D.K. Cheng, Field and wave electromagnetics, 2nd ed., Pearson (India), 1989 (UNIT I, II, III, IV, V)
2. W.H. Hayt and J.A. Buck, Engineering electromagnetics, 7th ed., McGraw-Hill (India), 2006 (UNIT I-V)

**REFERENCES**

1. D.J. Griffiths, Introduction to electrodynamics, 4th ed., Pearson (India), 2013
2. B.M. Notaros, Electromagnetics, Pearson: New Jersey, 2011
3. M.N.O. Sadiku and S.V. Kulkarni, Principles of electromagnetics, 6th ed., Oxford (Asian Edition), 2015

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## OPTICAL COMMUNICATION

L T P C  
3 0 0 3

EC8751

### OBJECTIVES:

- To study about the various optical fiber modes, configuration and transmission characteristics of optical fibers
- To learn about the various optical sources, detectors and transmission techniques
- To explore various idea about optical fiber measurements and various coupling techniques
- To enrich the knowledge about optical communication systems and networks

### UNIT I INTRODUCTION TO OPTICAL FIBERS 9

Introduction-general optical fiber communication system- basic optical laws and definitions- optical modes and configurations -mode analysis for optical propagation through fibers- modes in planar wave guide-modes in cylindrical optical fiber-transverse electric and transverse magnetic modes- fiber materials-fiber fabrication techniques-fiber optic cables- classification of optical fiber-single mode fiber-graded index fiber.

### UNIT II TRANSMISSION CHARACTERISTIC OF OPTICAL FIBER 9

Attenuation-absorption --scattering losses-bending losses-core and cladding losses-signal dispersion --inter symbol interference and bandwidth-intra modal dispersion-material dispersion- waveguide dispersion-polarization mode dispersion-intermodal dispersion-dispersion optimization of single mode fiber-characteristics of single mode fiber-R-I Profile- cutoff wave length-dispersion calculation-mode field diameter.

### UNIT III OPTICAL SOURCES AND DETECTORS 9

**Sources:** Intrinsic and extrinsic material-direct and indirect band gaps-LED-LED structures- surface emitting LED-Edge emitting LED-quantum efficiency and LED power-light source materials-modulation of LED-LASER diodes-modes and threshold conditions-Rate equations-external quantum efficiency-resonant frequencies-structures and radiation patterns-single mode laser-external modulation-temperature effort.

**Detectors:** PIN photo detector-Avalanche photo diodes-Photo detector noise-noise sources-SNR-detector response time-Avalanche multiplication noise-temperature effects- comparisons of photo detectors.

### UNIT IV OPTICAL RECEIVER, MEASUREMENTS AND COUPLING 9

Fundamental receiver operation-preamplifiers-digital signal transmission-error sources-Frontend amplifiers-digital receiver performance-probability of error-receiver sensitivity-quantum limit. Optical power measurement-attenuation measurement-dispersion measurement- Fiber Numerical Aperture Measurements- Fiber cut- off Wave length Measurements- Fiber diameter measurements-Source to Fiber Power Launching-Lensing Schemes for Coupling Management-Fiber to Fiber Joints-LED Coupling to Single Mode Fibers-Fiber Splicing- Optical Fiber connectors.

### UNIT V OPTICAL COMMUNICATION SYSTEMS AND NETWORKS 9

System design consideration Point — to —Point link design —Link power budget —rise time budget, WDM —Passive DWDM Components-Elements of optical networks-SONET/SDH- Optical Interfaces-SONET/SDH Rings and Networks-High speed light wave Links-OADM configuration-Optical ETHERNET-Soliton.

TOTAL:45 PERIODS

### OUTCOMES:

At the end of the course, the student should be able to:

- Realize basic elements in optical fibers, different modes and configurations.
- Analyze the transmission characteristics associated with dispersion and polarization techniques.
- Design optical sources and detectors with their use in optical communication system.
- Construct fiber optic receiver systems, measurements and coupling techniques.
- Design optical communication systems and its networks.

### TEXT BOOKS:

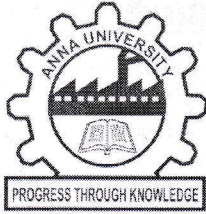
1. P Chakrabarti, "Optical Fiber Communication", McGraw Hill Education Private Limited, 2016 (UNIT I, II, III)
2. Gred Keiser, "Optical Fiber Communication", McGraw Hill Education (India) Private Limited. Fifth Edition, Reprint 2013. (UNIT I, IV, V)

### REFERENCES:

1. John M.Senior, —Optical fiber communication, Pearson Education, second edition.2007.
2. Rajiv Ramaswami, —Optical Networks — , Second Edition, Elsevier , 2004.
3. J.Gower, —Optical Communication System, Prentice Hall of India, 2001.

  
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**SARS – CoV – 2  
DETECTION FROM  
MEDICAL IMAGES USING  
VGG 16 ALGORITHM**



**A PROJECT REPORT**

*Submitted by*

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**MADHURASREE G**

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**APRIL 2021**

  
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**BONAFIDE CERTIFICATE**

Certified that this project report “SARS – CoV – 2 DETECTION FROM MEDICAL IMAGES USING VGG – 16 ALGORITHM” is the bonafide work of “ALAMELU A, MADHURASREE G, SUBASRI S” who carried out the project work under my supervision.



**SIGNATURE**

**SIGNATURE**

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**HEAD OF THE DEPARTMENT**

**SUPERVISOR**

Associate Professor

Professor

Department of Electronics and

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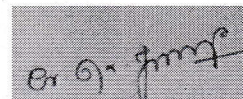
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**INTERNAL EXAMINER**

**EXTERNAL EXAMINER**

  
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## ABSTRACT

The SARS-CoV-2 pandemic has affected millions of people worldwide. To date, several million people have gone to the valley of death and many more are getting affected by it on daily bases. Hundreds of subjects don't get diagnosed with COVID-19 at their early stage due to the shortage of testing equipment. The current approach to test COVID19 is by using reverse transcription-polymerase chain reaction (RT-PCR). This process is time consuming and due to its huge demand, there is a shortage of these kits. Round the globe, researchers are trying to find alternative techniques to diagnose coronavirus in affected people. Radiological equipment such as X-ray and CT-scan came up as potential alternatives for COVID-19 diagnosis. As per the idea, deep learning technology is used to diagnose COVID-19 in subjects through chest CT-scan. VGG16 algorithm is used for more accurate detection of coronavirus. Instead of performing horizontally and vertically flipped image conversion, it will perform blocking operation. Our proposed model achieved better result In terms of Accuracy, precision, Recall, F-score, respectively. The results are compared with both the traditional machine learning methods and those using Convolutional Neural Networks (CNNs). The results

**OBJECTIVES:**

- To understand the basic properties of signal & systems
- To know the methods of characterization of LTI systems in time domain
- To analyze continuous time signals and system in the Fourier and Laplace domain
- To analyze discrete time signals and system in the Fourier and Z transform domain

**UNIT I CLASSIFICATION OF SIGNALS AND SYSTEMS 12**

Standard signals- Step, Ramp, Pulse, Impulse, Real and complex exponentials, and Sinusoids. Classification of signals — Continuous time (CT) and Discrete Time (DT) signals, Periodic & Aperiodic signals, Deterministic & Random signals, Energy & Power signals - Classification of systems- CT systems and DT systems- — Linear & Nonlinear, Time-variant & Time-invariant, Causal & Non-causal, Stable & Unstable.

**UNIT II ANALYSIS OF CONTINUOUS TIME SIGNALS 12**

Fourier series for periodic signals - Fourier Transform — properties- Laplace Transforms and properties

**UNIT III LINEAR TIME INVARIANT CONTINUOUS TIME SYSTEMS 12**

Impulse response - convolution integrals- Differential Equation- Fourier and Laplace transforms in Analysis of CT systems - Systems connected in series / parallel.

**UNIT IV ANALYSIS OF DISCRETE TIME SIGNALS 12**

Baseband signal Sampling – Fourier Transform of discrete time signals (DTFT) – Properties of DTFT - Z Transform & Properties

**UNIT V LINEAR TIME INVARIANT-DISCRETE TIME SYSTEMS 12**

Impulse response — Difference equations-Convolution sum- Discrete Fourier Transform and Z Transform Analysis of Recursive & Non-Recursive systems-DT systems connected in series and parallel.

**TOTAL: 60 PERIODS****OUTCOMES:**

**At the end of the course, the student should be able to:**

- To be able to determine if a given system is linear/causal/stable
- Capable of determining the frequency components present in a deterministic signal
- Capable of characterizing LTI systems in the time domain and frequency domain
- To be able to compute the output of an LTI system in the time and frequency domains

**TEXT BOOK:**

1. Allan V. Oppenheim, S. Wilsky and S.H. Nawab, —Signals and Systems, Pearson, 2015. (Unit 1-V)

**REFERENCES**

1. B. P. Lathi, —Principles of Linear Systems and Signals, Second Edition, Oxford, 2009.
2. R.E. Zeimer, W.H. Tranter and R.D. Fannin, —Signals & Systems - Continuous and Discrete, Pearson, 2007.
3. John Alan Stuller, —An Introduction to Signals and Systems, Thomson, 2007.

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EC8652

WIRELESS COMMUNICATION

L T P C  
3 0 0 3

OBJECTIVES:

- To study the characteristic of wireless channel
- To understand the design of a cellular system
- To study the various digital signaling techniques and multipath mitigation techniques
- To understand the concepts of multiple antenna techniques

UNIT I WIRELESS CHANNELS 9

Large scale path loss – Path loss models: Free Space and Two-Ray models -Link Budget design – Small scale fading- Parameters of mobile multipath channels – Time dispersion parameters-Coherence bandwidth – Doppler spread & Coherence time, fading due to Multipath time delay spread – flat fading – frequency selective fading – Fading due to Doppler spread – fast fading – slow fading.

UNIT II CELLULAR ARCHITECTURE 9

Multiple Access techniques - FDMA, TDMA, CDMA – Capacity calculations–Cellular concept- Frequency reuse - channel assignment- hand off- interference & system capacity- trunking & grade of service – Coverage and capacity improvement.

UNIT III DIGITAL SIGNALING FOR FADING CHANNELS 9

Structure of a wireless communication link, Principles of Offset-QPSK, p/4-DQPSK, Minimum Shift Keying, Gaussian Minimum Shift Keying, Error performance in fading channels, OFDM principle – Cyclic prefix, Windowing, PAPR.

UNIT IV MULTIPATH MITIGATION TECHNIQUES 9

Equalisation – Adaptive equalization, Linear and Non-Linear equalization, Zero forcing and LMS Algorithms, Diversity – Micro and Macro diversity, Diversity combining techniques, Error probability in fading channels with diversity reception, Rake receiver.

UNIT V MULTIPLE ANTENNA TECHNIQUES 9

MIMO systems – spatial multiplexing -System model -Pre-coding - Beam forming -transmitter diversity, receiver diversity- Channel state information-capacity in fading and non-fading channels.

TOTAL: 45 PERIODS

OUTCOMES:

The student should be able to:

- Characterize a wireless channel and evolve the system design specifications
- Design a cellular system based on resource availability and traffic demands
- Identify suitable signaling and multipath mitigation techniques for the wireless channel and system under consideration.

TEXT BOOKS:

1. Rappaport, T.S., —Wireless communicationsI, Pearson Education, Second Edition, 2010. (UNIT I, II, IV)
2. Andreas.F. Molisch, —Wireless CommunicationsI, John Wiley – India, 2006. (UNIT III, V)

REFERENCES:

1. Wireless Communication –Andrea Goldsmith, Cambridge University Press, 2011
2. Van Nee, R. and Ramji Prasad, —OFDM for wireless multimedia communications, Artech House, 2000
3. David Tse and Pramod Viswanath, —Fundamentals of Wireless Communication, Cambridge University Press, 2005.
4. Upena Dalal, —Wireless CommunicationI, Oxford University Press, 2009.

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**OBJECTIVES:**

- To enable the student to understand the basic principles in antenna and microwave system design
- To enhance the student knowledge in the area of various antenna designs.
- To enhance the student knowledge in the area of microwave components and antenna for practical applications.

**UNIT I INTRODUCTION TO MICROWAVE SYSTEMS AND ANTENNAS 9**

Microwave frequency bands, Physical concept of radiation, Near- and far-field regions, Fields and Power Radiated by an Antenna, Antenna Pattern Characteristics, Antenna Gain and Efficiency, Aperture Efficiency and Effective Area, Antenna Noise Temperature and G/T, Impedance matching, Friis transmission equation, Link budget and link margin, Noise Characterization of a microwave receiver.

**UNIT II RADIATION MECHANISMS AND DESIGN ASPECTS 9**

Radiation Mechanisms of Linear Wire and Loop antennas, Aperture antennas, Reflector antennas, Microstrip antennas and Frequency independent antennas, Design considerations and applications.

**UNIT III ANTENNA ARRAYS AND APPLICATIONS 9**

Two-element array, Array factor, Pattern multiplication, Uniformly spaced arrays with uniform and non-uniform excitation amplitudes, Smart antennas.

**UNIT IV PASSIVE AND ACTIVE MICROWAVE DEVICES 9**

Microwave Passive components: Directional Coupler, Power Divider, Magic Tee, attenuator, resonator, Principles of Microwave Semiconductor Devices: Gunn Diodes, IMPATT diodes, Schottky Barrier diodes, PIN diodes, Microwave tubes: Klystron, TWT, Magnetron.

**UNIT V MICROWAVE DESIGN PRINCIPLES 9**

Impedance transformation, Impedance Matching, Microwave Filter Design, RF and Microwave Amplifier Design, Microwave Power amplifier Design, Low Noise Amplifier Design, Microwave Mixer Design, Microwave Oscillator Design

**TOTAL: 45 PERIODS****OUTCOMES:****The student should be able to:**

- Apply the basic principles and evaluate antenna parameters and link power budgets
- Design and assess the performance of various antennas
- Design a microwave system given the application specifications

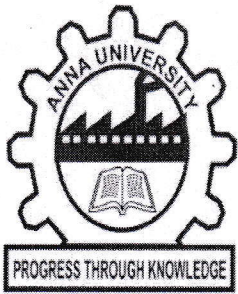
**TEXTBOOKS:**

1. John D Krauss, Ronald J Marhefka and Ahmad S. Khan, "Antennas and Wave Propagation: Fourth Edition, Tata McGraw-Hill, 2006. (UNIT I, II, III)
2. David M. Pozar, "Microwave Engineering", Fourth Edition, Wiley India, 2012. (UNIT I, IV, V)

**REFERENCES:**

1. Constantine A. Balanis, —Antenna Theory Analysis and Design, Third edition, John Wiley India Pvt Ltd., 2005.
2. R.E. Collin, "Foundations for Microwave Engineering", Second edition, IEEE Press, 2001

*Principals*  
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**A RADIATION PATTERN  
RECONFIGURABLE FABRY-PEROT  
ANTENNA USING LIQUID METAL**



A PROJECT REPORT

Submitted by

ANITHA.P	621117106004
KOWSALYA.K.	621116106017
SNEKA.A.	621116106027

In partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

in


ELECTRONICS AND COMMUNICATION ENGINEERING

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APRIL 2021

  
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**ANNA UNIVERSITY: CHENNAI 600 025**

**BONAFIDE CERTIFICATE**

Certified that this project report "A RADIATION PATTERN RECONFIGURABLE FABRY-PEROT ANTENNA" is the bonafide work of "ANITHA P, KOWSALYA A, SNEKA A," who carried out the project work under my supervision.

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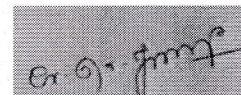
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Submitted for the Project work viva voce held on 04.08.2021



**INTERNAL EXAMINER.**



**EXTERNAL EXAMINER**



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## DIGITAL ELECTRONICS

EC8392

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### OBJECTIVES:

- To present the Digital fundamentals, Boolean algebra and its applications in digital systems
- To familiarize with the design of various combinational digital circuits using logic gates
- To introduce the analysis and design procedures for synchronous and asynchronous sequential circuits
- To explain the various semiconductor memories and related technology
- To introduce the electronic circuits involved in the making of logic gates

### UNIT I DIGITAL FUNDAMENTALS

9

Number Systems – Decimal, Binary, Octal, Hexadecimal, 1's and 2's complements, Codes – Binary, BCD, Excess 3, Gray, Alphanumeric codes, Boolean theorems, Logic gates, Universal gates, Sum of products and product of sums, Minterms and Maxterms, Karnaugh map Minimization and Quine-McCluskey method of minimization.

### UNIT II COMBINATIONAL CIRCUIT DESIGN

9

Design of Half and Full Adders, Half and Full Subtractors, Binary Parallel Adder – Carry lookahead Adder, BCD Adder, Multiplexer, Demultiplexer, Magnitude Comparator, Decoder, Encoder, Priority Encoder.

### UNIT III SYNCHRONOUS SEQUENTIAL CIRCUITS

9

Flip flops – SR, JK, T, D, Master/Slave FF – operation and excitation tables, Triggering of FF, Analysis and design of clocked sequential circuits – Design - Moore/Mealy models, state minimization, state assignment, circuit implementation – Design of Counters- Ripple Counters, Ring Counters, Shift registers, Universal Shift Register.

### UNIT IV ASYNCHRONOUS SEQUENTIAL CIRCUITS

9

Stable and Unstable states, output specifications, cycles and races, state reduction, race free assignments, Hazards, Essential Hazards, Pulse mode sequential circuits, Design of Hazard free circuits.

### UNIT V MEMORY DEVICES AND DIGITAL INTEGRATED CIRCUITS

9

Basic memory structure – ROM -PROM – EPROM – EEPROM –EAPROM, RAM – Static and dynamic RAM - Programmable Logic Devices – Programmable Logic Array (PLA) - Programmable Array Logic (PAL) – Field Programmable Gate Arrays (FPGA) - Implementation of combinational logic circuits using PLA, PAL.

Digital integrated circuits: Logic levels, propagation delay, power dissipation, fan-out and fan-in, noise margin, logic families and their characteristics-RTL, TTL, ECL, CMOS

**TOTAL: 45 PERIODS**

### OUTCOMES:

#### At the end of the course:

- Use digital electronics in the present contemporary world
- Design various combinational digital circuits using logic gates
- Do the analysis and design procedures for synchronous and asynchronous sequential circuits
- Use the semiconductor memories and related technology
- Use electronic circuits involved in the design of logic gates

### TEXT BOOK:

1. M. Morris Mano and Michael D. Ciletti, —Digital DesignI, 5th Edition, Pearson, 2014.

### REFERENCES:

1. Charles H.Roth. —Fundamentals of Logic DesignI, 6th Edition, Thomson Learning, 2013.
2. Thomas L. Floyd, —Digital FundamentalsI, 10th Edition, Pearson Education Inc, 2011
3. S.Salivahanan and S.Arivazhagan—Digital ElectronicsI, 1st Edition, Vikas PublishingHouse pvt Ltd, 2012.
4. Anil K.Maini —Digital ElectronicsI, Wiley, 2014.
5. A.Anand Kumar —Fundamentals of Digital CircuitsI, 4th Edition, PHI Learning Private Limited, 2016.
6. Soumitra Kumar Mandal — Digital ElectronicsI, McGraw Hill Education Private Limited, 2016.

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EC8553

DISCRETE-TIME SIGNAL PROCESSING

L T P C  
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OBJECTIVES:

- To learn discrete fourier transform, properties of DFT and its application to linear filtering
- To understand the characteristics of digital filters, design digital IIR and FIR filters and apply these filters to filter undesirable signals in various frequency bands
- To understand the effects of finite precision representation on digital filters
- To understand the fundamental concepts of multi rate signal processing and its applications
- To introduce the concepts of adaptive filters and its application to communication engineering

UNIT I DISCRETE FOURIER TRANSFORM 12

Review of signals and systems, concept of frequency in discrete-time signals, summary of analysis & synthesis equations for FT & DTFT, frequency domain sampling, Discrete Fourier transform (DFT) - deriving DFT from DTFT, properties of DFT - periodicity, symmetry, circular convolution. Linear filtering using DFT. Filtering long data sequences - overlap save and overlap add method. Fast computation of DFT - Radix-2 Decimation-in-time (DIT) Fast Fourier transform (FFT), Decimation-in-frequency (DIF) Fast Fourier transform (FFT). Linear filtering using FFT.

UNIT II INFINITE IMPULSE RESPONSE FILTERS 12

Characteristics of practical frequency selective filters. characteristics of commonly used analog filters - Butterworth filters, Chebyshev filters. Design of IIR filters from analog filters (LPF, HPF, BPF, BRF) - Approximation of derivatives, Impulse invariance method, Bilinear transformation. Frequency transformation in the analog domain. Structure of IIR filter - direct form I, direct form II, Cascade, parallel realizations.

UNIT III FINITE IMPULSE RESPONSE FILTERS 12

Design of FIR filters - symmetric and Anti-symmetric FIR filters - design of linear phase FIR filters using Fourier series method - FIR filter design using windows (Rectangular, Hamming and Hanning window), Frequency sampling method. FIR filter structures - linear phase structure, direct form realizations

UNIT IV FINITE WORD LENGTH EFFECTS 12

Fixed point and floating point number representation - ADC - quantization - truncation and rounding - quantization noise - input / output quantization - coefficient quantization error - product quantization error - overflow error - limit cycle oscillations due to product quantization and summation - scaling to prevent overflow.

UNIT V INTRODUCTION TO DIGITAL SIGNAL PROCESSORS 12

DSP functionalities - circular buffering - DSP architecture - Fixed and Floating point architecture principles - Programming - Application examples.

TOTAL:60 PERIODS

OUTCOMES:

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

- Apply DFT for the analysis of digital signals and systems
- Design IIR and FIR filters
- Characterize the effects of finite precision representation on digital filters
- Apply adaptive filters appropriately in communication systems

TEXT BOOK:

1. John G. Proakis & Dimitris G. Manolakis, —Digital Signal Processing — Principles, Algorithms & Applications, Fourth Edition, Pearson Education / Prentice Hall, 2007. (UNIT I — V)

REFERENCES:

1. Emmanuel C. Ifeakor & Barrie. W. Jervis, —Digital Signal Processing, Second Edition, Pearson Education / Prentice Hall, 2002.
2. A. V. Oppenheim, R.W. Schafer and J.R. Buck, —Discrete-Time Signal Processing, 8th Indian Reprint, Pearson, 2004.
3. Sanjit K. Mitra, —Digital Signal Processing – A Computer Based Approach, Tata Mc GrawHill, 2007.

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**OBJECTIVES:**

- To expose the students to the importance of improving capacity of wireless channel using MIMO
- To enable understanding of channel impairment mitigation using space-time block and Trellis codes
- To teach advanced MIMO system like layered space time codes, MU-MIMO System and MIMO-OFDM systems

**UNIT I CAPACITY OF WIRELESS CHANNELS**

9

The crowded spectrum, need for high data rate, MIMO systems – Array Gain, Diversity Gain, Data Pipes, Spatial MUX, MIMO System Model. MIMO System Capacity – channel known at the TX, Channel unknown to the TX – capacity of deterministic channels, Random channels and frequency selective channels.

**UNIT II RADIO WAVE PROPAGATION**

Radio wave propagation – Macroscopic fading- free space and out door, small scale fading Fading measurements – Direct pulse measurements, spread spectrum correlation channel sounding frequency domain channel sounding, Antenna Diversity – Diversity combining methods.

**UNIT III SPACE TIME BLOCK CODES**

Delay Diversity scheme, Alamoti space time code – Maximum likelihood decoding maximum ratio combining. Transmit diversity space time block codes for real signal constellation and complex signal constellation - decoding of STBC.

**UNIT IV SPACE TIME TRELLIS CODES**

Space time coded systems, space time code word design criteria, design of space time T Con slow fading channels, design of STTC on Fast Fading channels, performance analysis in slow and fast fading channels, effect of imperfect channel estimation and Antenna correlation on performance, comparison of STBC & STTC.

**UNIT V LAYERED SPACE TIME CODES**

LST transmitter – Horizontal and Vertical LST receiver – ML Rx, Zero forcing Rx; MMSE Rx, SIC Rx, ZF V-blast Rx- MMSE V-blast Rx, Iterative Rx - capacity of MIMO – OFDM systems – capacity of MIMO multi user systems.

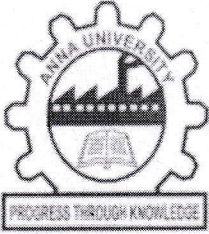
**TOTAL : 45 PERIODS****OUTCOMES:****The student should be able to:**

- Comprehend and appreciate the significance and role of this course in the present contemporary world
- Apply the knowledge about the importance of MIMO in today's communication
- Appreciate the various methods for improving the data rate of wireless communication system

**REFERENCES:**

1. Mohinder Jankiraman, Space-time codes and MIMO systems, Artech House, Boston, London . www.artech house.com, ISBN 1-58053-865-7-2004
2. Paulraj Rohit Nabar, Dhananjay Gore, Introduction of space time wireless communication systems, Cambridge University Press, 2003.
3. David Tse and Pramod Viswanath, —Fundamentals of Wireless Communication, Cambridge University Press, 2005.
4. Sergio Verdu — Multi User Detection, Cambridge University Press, 1998.

  
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**COVID-19 DETECTION BY PI  
CAMERA AND TEMPERATURE  
MEASUREMENT USING  
RASPBERRY PI CONTROLLER**



A PROJECT REPORT

*Submitted by*

**BHARATHI.T**

**621117106009**

**AMALA.S**

**621117106003**

**NANTHINI.A**

**621117106020**

**SUGANTHI.C**

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*In partial fulfillment for the award of the degree*

*of*

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**IN**

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**APRIL 2021**

  
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**BONAFIDE CERTIFICATE**

Certified that this project report "COVID-19 DETECTION BY PI CAMERA AND TEMPERATURE MEASUREMENT USING RASPBERRY PI CONTROLLER" is the bonafide work of "BHARATHI T, AMALA S, NANTHINI A, SUGANTHI C" who carried out the project work under my supervision.

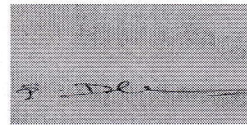
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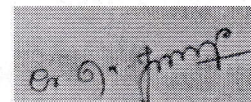
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**INTERNAL EXAMINER**



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**EXTERNAL EXAMINER**

## ABSTRACT

Man-made diseases are the outcome of lack of awareness, lack of sensitivity towards the safety measures to be taken to prevent COVID-19. Thermal Cameras can assist with Corona virus fever screening by detecting elevated body temperatures in moving crowds such as passengers, commuters and visitors, with accuracy up to  $\pm 0.3^{\circ}\text{C}$ . The cameras provide color images and temperature scales, and sound alarms that can be set to go off when a certain temperature threshold is exceeded. These functions make it easy for an operator to instantly decide whether the subject needs to be referred for medical examination. In this method, we propose prototype for counting the people as a part of developing better crowd monitoring system. The system counts people and displays the result in a user friendly interface. In this time when COVID-19 is spreading rapidly, it is essential to maintain social distance and avoid large public gatherings at one place to break the chain of corona infection. But maintaining this is not easy. Many people, knowingly or unknowingly, gather and roam on the streets. Keeping an eye on all these activities is not an easy job. The authorities need reliable technology that can survey such places to prevent any unnecessary movement. Some law enforcement departments have been using drones and other surveillance cameras to detect mass gatherings of people, and taking regulatory actions to disperse. Such manual intervention in these

EC8391

CONTROL SYSTEMS ENGINEERING

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OBJECTIVES:

- To introduce the components and their representation of control systems
- To learn various methods for analyzing the time response, frequency response and stability of the systems.
- To learn the various approach for the state variable analysis.

UNIT I SYSTEMS COMPONENTS AND THEIR REPRESENTATION 9

Control System: Terminology and Basic Structure-Feed forward and Feedback control theory- Electrical and Mechanical Transfer Function Models-Block diagram Models-Signal flow graphs models-DC and AC servo Systems-Synchronous -Multivariable control system

UNIT II TIME RESPONSE ANALYSIS 9

Transient response-steady state response-Measures of performance of the standard first order and second order system-effect on an additional zero and an additional pole-steady error constant and system- type number-PID control-Analytical design for PD, PI, PID control systems

UNIT III FREQUENCY RESPONSE AND SYSTEM ANALYSIS 9

Closed loop frequency response-Performance specification in frequency domain-Frequency response of standard second order system- Bode Plot - Polar Plot- Nyquist plots-Design of compensators using Bode plots-Cascade lead compensation-Cascade lag compensation-Cascade lag-lead compensation

UNIT IV CONCEPTS OF STABILITY ANALYSIS 9

Concept of stability-Bounded - Input Bounded - Output stability-Routh stability criterion-Relative stability-Root locus concept-Guidelines for sketching root locus-Nyquist stability criterion.

UNIT V CONTROL SYSTEM ANALYSIS USING STATE VARIABLE METHODS 9

State variable representation-Conversion of state variable models to transfer functions-Conversion of transfer functions to state variable models-Solution of state equations-Concepts of Controllability and Observability-Stability of linear systems-Equivalence between transfer function and state variable representations-State variable analysis of digital control system-Digital control design using state feedback.

TOTAL:45 PERIODS

OUTCOMES:

Upon completion of the course, the student should be able to:

- Identify the various control system components and their representations.
- Analyze the various time domain parameters.
- Analysis the various frequency response plots and its system.
- Apply the concepts of various system stability criterions.
- Design various transfer functions of digital control system using state variable models.

TEXT BOOK:

1. M.Gopal, —Control System – Principles and Design, Tata McGraw Hill, 4th Edition, 2012.

REFERENCES:

1. J.Nagrath and M.Gopal, —Control System Engineering, New Age International Publishers, 5<sup>th</sup> Edition, 2007.
2. K. Ogata, 'Modern Control Engineering', 5th edition, PHI, 2012.
3. S.K.Bhattacharya, Control System Engineering, 3rd Edition, Pearson, 2013.
4. Benjamin.C.Kuo, —Automatic control systems, Prentice Hall of India, 7th Edition, 1995.

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**OBJECTIVES:****The student should be made:**

- To understand the concept about Wireless networks, protocol stack and standards
- To understand and analyse the network layer solutions for Wireless networks
- To study about fundamentals of 3G Services, its protocols and applications
- To have in depth knowledge on internetworking of WLAN and WWAN
- To learn about evolution of 4G Networks, its architecture and applications

**UNIT I WIRELESS LAN 9**

Introduction-WLAN technologies: - IEEE802.11: System architecture, protocol architecture, 802.11b, 802.11a – Hiper LAN: WATM, BRAN, HiperLAN2 – Bluetooth: Architecture, WPAN –IEEE 802.15.4, Wireless USB, Zigbee, 6LoWPAN, WirelessHART

**UNIT II MOBILE NETWORK LAYER 9**

Introduction - Mobile IP: IP packet delivery, Agent discovery, tunneling and encapsulation, IPV6-Network layer in the internet-Mobile IP session initiation protocol - mobile ad-hoc network: Routing: Destination Sequence distance vector, IoT: CoAP

**UNIT III 3G OVERVIEW 9**

Overview of UTMS Terrestrial Radio access network-UMTS Core network Architecture: 3GPP Architecture, User equipment, CDMA2000 overview- Radio and Network components, Network structure, Radio Network, TD-CDMA, TD – SCDMA.

**UNIT IV INTERNETWORKING BETWEEN WLANS AND WWANS 9**

Internetworking objectives and requirements, Schemes to connect WLANS and 3G Networks, Session Mobility, Internetworking Architecture for WLAN and GPRS, System Description, Local Multipoint Distribution Service, Multichannel Multipoint Distribution System.

**UNIT V 4G & Beyond 9**

Introduction – 4G vision – 4G features and challenges - Applications of 4G – 4G Technologies: Multicarrier Modulation, Smart antenna techniques, IMS Architecture, LTE, Advanced Broadband Wireless Access and Services, MVNO.

**TOTAL:45 PERIODS****OUTCOMES:****Upon completion of the course, the student would be able to:**

- Conversant with the latest 3G/4G networks and its architecture
- Design and implement wireless network environment for any application using latest wireless protocols and standards
- Ability to select the suitable network depending on the availability and requirement
- Implement different type of applications for smart phones and mobile devices with latest network strategies

**TEXT BOOKS:**

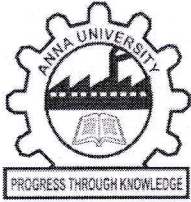
1. Jochen Schiller, IMobile CommunicationsI, Second Edition, Pearson Education 2012.(Unit I,II,III)
2. Vijay Garg, —Wireless Communications and networkingI, First Edition, Elsevier 2007.(UnitIV,V)

**REFERENCES:**

1. Erik Dahlman, Stefan Parkvall, Johan Skold and Per Beming, "3G Evolution HSPA and LTE for Mobile BroadbandI, Second Edition, Academic Press, 2008.
2. Anurag Kumar, D.Manjunath, Joy kuri, —Wireless NetworkingI, First Edition, Elsevier 2011\
3. Simon Haykin , Michael Moher, David Koilpillai, —Modern Wireless CommunicationsI, First Edition, Pearson Education 2013

  
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**CHINNASALEM-606 201. KALLAKURICHI DT.**





**UTILIZATION OF ENERGY EFFICIENCY  
IN WIRELESS NETWORK CONTROL  
SYSTEMS USING RANDOM ACCESS  
CONTROL AWARE SCHEDULING  
ALGORITHM**



**A PROJECT REPORT**

*Submitted by*

**R.HARANISHWARI**

**621117106014**

**R.RANJITHA**

**621117106023**

**D.PUNITHA**

**621117106022**

*In partial fulfillment for the award of the degree*

*of*

**BACHELOR OF ENGINEERING**


*in*

**ELECTRONICS AND COMMUNICATION ENGINEERING**

**IDHAYA ENGINEERING COLLEGE FOR WOMEN**

**ANNA UNIVERSITY: CHENNAI 600 025**

**APRIL 2021**

  
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**BONAFIDE CERTIFICATE**

Certified that this project report “**UTILIZATION OF ENERGY EFFICIENCY IN WIRELESS NETWORK CONTROL SYSTEMS USING RANDOM ACCESS CONTROL AWARE SCHEDULING**” is the bonafide work of “**R.HARANISHWARI, R.RANJITHA, D.PUNITHA**” who carried out the project work under my supervision.



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Mrs.V.Dhivyapriya,M.TECH

**SUPERVISOR**

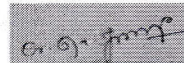
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**EXTERNAL EXAMINER**

**OBJECTIVES:**

- To give a comprehensive exposure to all types of amplifiers and oscillators constructed with discrete components. This helps to develop a strong basis for building linear and digital integrated circuits
- To study about feedback amplifiers and oscillators principles
- To design oscillators.
- To study about turned amplifier.
- To understand the analysis and design of LC and RC oscillators, amplifiers, multivibrators, power amplifiers and DC convertors.

**UNIT I FEEDBACK AMPLIFIERS AND STABILITY 9**

Feedback Concepts – gain with feedback – effect of feedback on gain stability, distortion, bandwidth, input and output impedances; topologies of feedback amplifiers – analysis of series-series, shunt-shunt and shunt-series feedback amplifiers-stability problem-Gain and Phase-margins-Frequency compensation.

**UNIT II OSCILLATORS 9**

Barkhausen criterion for oscillation – phase shift, Wien bridge - Hartley & Colpitt's oscillators – Clapp oscillator-Ring oscillators and crystal oscillators – oscillator amplitude stabilization.

**UNIT III TUNED AMPLIFIERS 9**

Coil losses, unloaded and loaded Q of tank circuits, small signal tuned amplifiers – Analysis of capacitor coupled single tuned amplifier – double tuned amplifier - effect of cascading single tuned and double tuned amplifiers on bandwidth – Stagger tuned amplifiers - Stability of tuned amplifiers – Neutralization - Hazeltine neutralization method.

**UNIT IV WAVE SHAPING AND MULTIVIBRATOR CIRCUITS 9**

Pulse circuits – attenuators – RC integrator and differentiator circuits – diode clampers and clippers – Multivibrators - Schmitt Trigger- UJT Oscillator.

**UNIT V POWER AMPLIFIERS AND DC CONVERTERS 9**

Power amplifiers- class A-Class B-Class AB-Class C-Power MOSFET-Temperature Effect- Class AB Power amplifier using MOSFET –DC/DC convertors – Buck, Boost, Buck-Boost analysis and design

**TOTAL: 45 PERIODS**

**OUTCOMES:**

**Upon completion of the course, the student should be able to:**

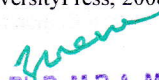
- Analyze different types of amplifier, oscillator and multivibrator circuits
- Design BJT amplifier and oscillator circuits
- Analyze transistorized amplifier and oscillator circuits
- Design and analyze feedback amplifiers
- Design LC and RC oscillators, tuned amplifiers, wave shaping circuits, multivibrators, power amplifier and DC convertors.

**TEXT BOOKS:**

1. Sedra and Smith, —Micro Electronic Circuits; Sixth Edition, Oxford University Press, 2011. (UNIT I, III, IV, V)
2. Jacob Millman, 'Microelectronics', McGraw Hill, 2nd Edition, Reprinted, 2009. (UNIT I, II, IV, V)

**REFERENCES:**

1. Robert L. Boylestad and Louis Nasheresky, —Electronic Devices and Circuit Theory, 10th Edition, Pearson Education / PHI, 2008
2. David A. Bell, —Electronic Devices and Circuits, Fifth Edition, Oxford University Press, 2008.
3. Millman J. and Taub H., —Pulse Digital and Switching Waveforms, TMH, 2000.
4. Millman and Halkias, C., Integrated Electronics, TMH, 2007.

  
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**OBJECTIVES:**

- To make students understand the basic structure and operation of digital computer
- To familiarize with implementation of fixed point and floating-point arithmetic operations
- To study the design of data path unit and control unit for processor
- To understand the concept of various memories and interfacing
- To introduce the parallel processing technique

**UNIT I COMPUTER ORGANIZATION & INSTRUCTIONS 9**

Basics of a computer system: Evolution, Ideas, Technology, Performance, Power wall, Uniprocessors to Multiprocessors. Addressing and addressing modes. Instructions: Operations and Operands, Representing instructions, Logical operations, control operations.

**UNIT II ARITHMETIC 9**

Fixed point Addition, Subtraction, Multiplication and Division. Floating Point arithmetic, Highperformance arithmetic, Subword parallelism

**UNIT III THE PROCESSOR 9**

Introduction, Logic Design Conventions, Building a Datapath - A Simple Implementation scheme - An Overview of Pipelining - Pipelined Datapath and Control. Data Hazards: Forwarding versus Stalling, Control Hazards, Exceptions, Parallelism via Instructions.

**UNIT IV MEMORY AND I/O ORGANIZATION 9**

Memory hierarchy, Memory Chip Organization, Cache memory, Virtual memory. Parallel Bus Architectures, Internal Communication Methodologies, Serial Bus Architectures, Massstorage, Input and Output Devices.

**UNIT V ADVANCED COMPUTER ARCHITECTURE 9**

Parallel processing architectures and challenges, Hardware multithreading, Multicore and sharedmemory multiprocessors, Introduction to Graphics Processing Units, Clusters and Warehouse scale computers - Introduction to Multiprocessor network topologies.

**TOTAL:45 PERIODS****OUTCOMES:**

**At the end of the course, the student should be able to**

- Describe data representation, instruction formats and the operation of a digital computer
- Illustrate the fixed point and floating-point arithmetic for ALU operation
- Discuss about implementation schemes of control unit and pipeline performance
- Explain the concept of various memories, interfacing and organization of multiple processors
- Discuss parallel processing technique and unconventional architectures

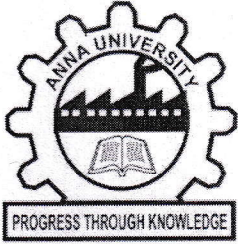
**TEXT BOOKS:**

1. David A. Patterson and John L. Hennessey, —Computer Organization and DesignI, Fifthedition, Morgan Kauffman / Elsevier, 2014. (UNIT I-V)
2. Miles J. Murdocca and Vincent P. Heuring, —Computer Architecture and Organization: AnIntegrated approachI, Second edition, Wiley India Pvt Ltd, 2015 (UNIT IV,V)

**REFERENCES**

1. V. Carl Hamacher, Zvonko G. Varanescic and Safat G. Zaky, —Computer Organization—,Fifthedition, Mc Graw-Hill Education India Pvt Ltd, 2014.
2. William Stallings —Computer Organization and ArchitectureI, Seventh Edition, PearsonEducation, 2006.
3. Govindarajalu, —Computer Architecture and Organization, Design Principles and Applications", Second edition, McGraw-Hill Education India Pvt Ltd, 2014.

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**PERFORMANCE ANALYSIS OF BRAIN  
TUMOR IMAGE CLASSIFICATION  
USING CNN AND SVM**



**A PROJECT REPORT**

*Submitted by*

**SELVA BHARTHI.T**

**621117106025**

**RASIYA.P**

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**BONAFIDE CERTIFICATE**

Certified that this project report “**PERFORMANCE ANALYSIS OF BRAIN TUMOR IMAGE CLASSIFICATION USING CNN AND SVM**”, is the bonafide work of “**RASIYA.P, SELVA BHARATHI.T, SUMITHRA.M**” who carried out the project work under my supervision.



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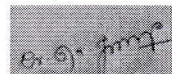


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**EXTERNAL EXAMINER**

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## ABSTRACT

Brain tumor is an unprecedented growth of cells in the brain region. Its detection at early stages ensures the survival of the patient and hence contributes significantly to Healthcare sector. In India, There is a scarcity of quality medical practitioners, due to hectic and challenging schedule of medical practitioners, especially in rural areas. In order to speed up the diagnosis and to serve as second decision for neurologists, this method is proposed. The classification process undergoes following steps- pre-processing which includes downsizing of MR image and adding salt noise to image, also, geometric augmentation is done to increase the dataset size. Then, the images from each type of tumor are shuffled and divided into training (60%) and validation (20%) and testing (20%) of the dataset. Since bio-medical images are difficult to analyze therefore CNN and SVM are chosen due to their classification based on depth of feature extraction. CNN does the extraction using convolution layers and as the depth increases level of feature goes higher. Whereas in SVM, features are extracted depends on type of texture or pattern in the image and classes which have similar features, can be classified easily. So, CNN and SVM based architectures are selected to train using the training set and then this trained model is tested using validation and testing dataset. Finally, the accuracy of the classifier models is calculated and conclusion is drawn.

**OBJECTIVES:**

- To introduce the concepts of various analog modulations and their spectral characteristics
- To understand the properties of random process
- To know the effect of noise on communication systems
- To study the limits set by Information Theory

**UNIT I AMPLITUDE MODULATION** 9

Amplitude Modulation- DSBSC, DSBFC, SSB, VSB - Modulation index, Spectra, Power relations and Bandwidth — AM Generation — Square law and Switching modulator, DSBSC Generation — Balanced and Ring Modulator, SSB Generation — Filter, Phase Shift and Third Methods, VSB Generation — Filter Method, Hilbert Transform, Pre-envelope & complex envelope — comparison of different AM techniques, Superheterodyne Receiver

**UNIT II ANGLE MODULATION** 9

Phase and frequency modulation, Narrow Band and Wide band FM — Modulation index, Spectra, Power relations and Transmission Bandwidth - FM modulation — Direct and Indirect methods, FM Demodulation — FM to AM conversion, FM Discriminator - PLL as FM Demodulator.

**UNIT III RANDOM PROCESS** 9

Random variables, Random Process, Stationary Processes, Mean, Correlation & Covariance functions, Power Spectral Density, Ergodic Processes, Gaussian Process, Transmission of a Random Process Through a LTI filter.

**UNIT IV NOISE CHARACTERIZATION** 9

Noise sources — Noise figure, noise temperature and noise bandwidth — Noise in cascaded systems. Representation of Narrow band noise — In-phase and quadrature, Envelope and Phase — Noise performance analysis in AM & FM systems — Threshold effect, Pre-emphasis and de-emphasis for FM.

**UNIT V SAMPLING & QUANTIZATION** 9

Low pass sampling — Aliasing- Signal Reconstruction-Quantization - Uniform & non-uniform quantization - quantization noise - Logarithmic Companding — PAM, PPM, PWM, PCM — TDM, FDM.

**TOTAL: 45 PERIODS**

**OUTCOMES:**

At the end of the course, the student should be able to:

- Design AM communication systems
- Design Angle modulated communication systems
- Apply the concepts of Random Process to the design of Communication systems
- Analyze the noise performance of AM and FM systems
- Gain knowledge in sampling and quantization

**TEXT BOOKS:**

1. J.G.Proakis, M.Salehi, —Fundamentals of Communication Systems, Pearson Education 2014. (UNIT I-IV)
2. Simon Haykin, —Communication Systems, 4th Edition, Wiley, 2014.(UNIT I-V)

**REFERENCES:**

1. B.P.Lathi, —Modern Digital and Analog Communication Systems, 3rd Edition, Oxford University Press, 2007.
2. D.Roody, J.Coolen, —Electronic Communications, 4th edition PHI 2006
3. A.Papoulis, —Probability, Random variables and Stochastic Processes, McGraw Hill, 3<sup>rd</sup> edition, 1991.
4. B.Sklar, —Digital Communications Fundamentals and Applications, 2nd Edition Pearson Education 2007
5. H P Hsu, Schaum Outline Series - —Analog and Digital Communications TMH 2006
6. Couch.L., "Modern Communication Systems", Pearson, 2001.

*Wane*  
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EC8095

VLSI DESIGN

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**OBJECTIVES:**

- Study the fundamentals of CMOS circuits and its characteristics.
- Learn the design and realization of combinational & sequential digital circuits.
- Architectural choices and performance tradeoffs involved in designing and realizing the circuits in CMOS technology are discussed
- Learn the different FPGA architectures and testability of VLSI circuits.

**UNIT I INTRODUCTION TO MOS TRANSISTOR 9**

**MOS Transistor, CMOS logic, Inverter, Pass Transistor, Transmission gate, Layout Design Rules, Gate Layouts, Stick Diagrams, Long-Channel I-V Characteristics, C-V Characteristics, Non ideal I-V Effects, DC Transfer characteristics, RC Delay Model, Elmore Delay, Linear Delay Model, Logical effort, Parasitic Delay, Delay in Logic Gate, Scaling.**

**UNIT II COMBINATIONAL MOS LOGIC CIRCUITS 9**

**Circuit Families:** Static CMOS, Ratioed Circuits, Cascode Voltage Switch Logic, Dynamic Circuits, Pass Transistor Logic, Transmission Gates, Domino, Dual Rail Domino, CPL, DCVSPG, DPL, Circuit Pitfalls. **Power:** Dynamic Power, Static Power, Low Power Architecture.

**UNIT III SEQUENTIAL CIRCUIT DESIGN 9**

Static latches and Registers, Dynamic latches and Registers, Pulse Registers, Sense Amplifier Based Register, Pipelining, Schmitt Trigger, Monostable Sequential Circuits, Astable Sequential Circuits. **Timing Issues :** Timing Classification Of Digital System, Synchronous Design

**UNIT IV DESIGN OF ARITHMETIC BUILDING BLOCKS AND SUBSYSTEM 9**

**Arithmetic Building Blocks:** Data Paths, Adders, Multipliers, Shifters, ALUs, power and speed tradeoffs, Case Study: Design as a tradeoff. **Designing Memory and Array structures:** Memory Architectures and Building Blocks, Memory Core, Memory Peripheral Circuitry.

**UNIT V IMPLEMENTATION STRATEGIES AND TESTING 9**

FPGA Building Block Architectures, FPGA Interconnect Routing Procedures. Design for Testability: *Ad Hoc* Testing, Scan Design, BIST, IDDQ Testing, Design for Manufacturability, Boundary Scan.

**TOTAL : 45 PERIODS**

**OUTCOMES:**

**UPON COMPLETION OF THE COURSE, STUDENTS SHOULD BE ABLE TO**

- Realize the concepts of digital building blocks using MOS transistor.
- Design combinational MOS circuits and power strategies.
- Design and construct Sequential Circuits and Timing systems.
- Design arithmetic building blocks and memory subsystems.
- Apply and implement FPGA design flow and testing.

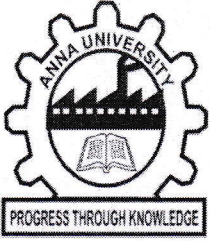
**TEXT BOOKS:**

1. Neil H.E. Weste, David Money Harris —CMOS VLSI Design: A Circuits and Systems Perspective, 4<sup>th</sup> Edition, Pearson , 2017 (UNIT I,II,V)
2. John M. Rabaey ,Anantha Chandrakasan, Borivoje. Nikolic, Digital Integrated Circuits: A Design perspective, Second Edition , Pearson , 2016.(UNIT III,IV)

**REFERENCES**

1. M.J. Smith, —Application Specific Integrated Circuits, Addison Wesley, 1997
2. Sung-Mo kang, Yusuf Leblebici, Chulwoo Kim —CMOS Digital Integrated Circuits: Analysis & Design, 4<sup>th</sup> edition McGraw Hill Education, 2013
3. Wayne Wolf, —Modern VLSI Design: System On Chip, Pearson Education, 2007

  
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**VLSI BASED LOW COMPLEXITY  
INTERVAL PASSING ALGORITHM  
FOR BINARY COMPRESSED SENSING**



**A PROJECT REPORT**

*Submitted by*

**GOMATHI.P**

**621117106013**

**KAVIYA.V**

**621117106016**

**SINDHUBALA.B**

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ANNA UNIVERSITY:CHENNAI 600 025

**BONAFIDE CERTIFICATE**

Certified that this project titled “**VLSI BASED LOW COMPLEXITY INTERVAL PASSING ALGORITHM FOR BINARY COMPRESSED SENSING**” is the bonafide work of “**P.GOMATHI, V.KAVIYA, B.SINDHUBALA**” who carried out the project under my supervision.

*PP*

*J. SJP*

**SIGNATURE**

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Submitted for the Project work viva voce held on 04.08.2021

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**EXTERNAL EXAMINER**

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**CHINNASALEM-606 201. KALLAKURICHI DT.**

## ABSTRACT

Binary compressed sensing (BCS), in which signals of interest have binary values, finds applications in areas including fault detection and wireless sensor networks. In this method, a low-complexity VLSI architecture for BCS based on interval passing algorithm is proposed. BCS codes have been adopted in latest wireless standards such as electronic devices communications since they possess superior error-detecting and correcting capabilities. As technology scales, memory devices become larger and more powerful and low power consumption based error correction codes are needed.

Moreover, the algorithm is modified in order to reduce its complexity without significant loss in performance, and its corresponding VLSI architecture is proposed. Binary compressed sensing (BCS) matrices based on finite geometry have been used as measurement matrices. The proposed VLSI architectures have been synthesized in both ASIC and field-programmable gate array (FPGA) platforms. As technology scales, memory devices become larger and more powerful and low power consumption based error correction codes are needed. Moreover, the proposed architectures offer high frequency of operation and low reconstruction time when compared to the state-of-the-art designs.

**OBJECTIVES:**

The student should be made to:

- Understand the concepts of embedded system design and analysis
- Learn the architecture and programming of ARM processor
- Be exposed to the basic concepts of embedded programming
- Learn the real time operating systems

**UNIT I INTRODUCTION TO EMBEDDED SYSTEM DESIGN 9**

Complex systems and micro processors– Embedded system design process –Design example: Model train controller- Design methodologies- Design flows - Requirement Analysis – Specifications-System analysis and architecture design – Quality Assurance techniques - Designing with computing platforms – consumer electronics architecture –platform-level performance analysis.

**UNIT II ARM PROCESSOR AND PERIPHERALS 9**

ARM Architecture Versions — ARM Architecture — Instruction Set — Stacks and Subroutines – Features of the LPC 214X Family – Peripherals – The Timer Unit – Pulse Width Modulation Unit – UART – Block Diagram of ARM9 and ARM Cortex M3 MCU.

**UNIT III EMBEDDED PROGRAMMING 9**

Components for embedded programs- Models of programs- Assembly, linking and loading- compilation techniques- Program level performance analysis – Software performance optimization – Program level energy and power analysis and optimization – Analysis and optimization of program size- Program validation and testing.

**UNIT IV REAL TIME SYSTEMS 9**

Structure of a Real Time System — Estimating program run times – Task Assignment and Scheduling – Fault Tolerance Techniques – Reliability, Evaluation – Clock Synchronisation.

**UNIT V PROCESSES AND OPERATING SYSTEMS 9**

Introduction – Multiple tasks and multiple processes – Multirate systems- Preemptive real-time operating systems- Priority based scheduling- Interprocess communication mechanisms Evaluating operating system performance- power optimization strategies for processes – Example Real time operating systems-POSIX-Windows CE. - Distributed embedded systems - MPSoCs and shared memory multiprocessors. – Design Example - Audio player, Engine control unit — Video accelerator.

**TOTAL: 45 PERIODS**

**OUTCOMES:**

At the end of the course, the student should be able to:

- Describe the architecture and programming of ARM processor
- Outline the concepts of embedded systems
- Explain the basic concepts of real time operating system design
- Model real-time applications using embedded-system concepts

**TEXT BOOKS:**

1. Marilyn Wolf, —Computers as Components - Principles of Embedded Computing System Design, Third Edition —Morgan Kaufmann Publisher (An imprint from Elsevier), 2012. (UNIT I, II, III, V)
2. Jane W.S.Liu, | Real Time Systems|, Pearson Education, Third Indian Reprint, 2003.(UNIT IV)

**REFERENCES:**

1. Lyla B.Das, —Embedded Systems : An Integrated Approach| Pearson Education, 2013.
2. Jonathan W.Valvano, —Embedded Microcomputer Systems Real Time Interfacing|, Third Edition Cengage Learning, 2012.
3. David. E. Simon, —An Embedded Software Primer|, 1st Edition, Fifth Impression, Addison-Wesley Professional, 2007.
4. Raymond J.A. Buhr, Donald L.Bailey, —An Introduction to Real-Time Systems- From Design to Networking with C/C++|, Prentice Hall, 1999.
5. C.M. Krishna, Kang G. Shin, —Real-Time Systems|, International Editions, Mc Graw Hill 1997



## **CERTIFICATE OF INTERNSHIP**

This is proudly given to

# **ABARNA A**

II Year ECE student of Idhaya Engineering College for Women  
for her successful completion of

**EMBEDDED SYSTEM DESIGN**

Internship program from 03rd to 12th May 2021

**Ramesh K**

Internship Manager

**Aravind R**

Company Director

**Dr. R. GURUMANI, M.E., Ph.D., M.B.A., M.ISTE, F.I.E.**  
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Internship Manager

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**EMBEDDED SYSTEM DESIGN**

Internship program from 03rd to 12th May 2021

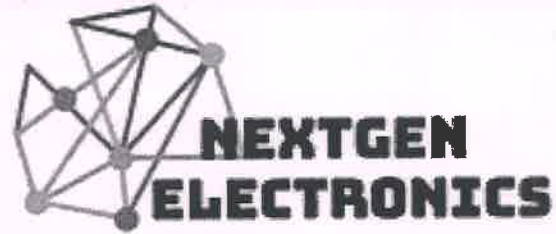
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**Ramesh K**  
Internship Manager

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**Aravind R**  
Company Director

**Dr. R. GURUMANI, M.E., Ph.D., M.B.A., M.ISTE., F.I.E.**  
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## **CERTIFICATE OF INTERNSHIP**

This is proudly given to

# **ISHWARIYA P**

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**EMBEDDED SYSTEM DESIGN**

Internship program from 17th to 26th May 2021

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Internship Manager

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**Aravind R**  
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**EMBEDDED SYSTEM DESIGN**

Internship program from 03rd to 12th May 2021

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**Ramesh K**  
Internship Manager

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**Aravind R**  
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Internship program from 17th to 26th May 2021



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Internship Manager



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**Ramesh K**  
Internship Manager



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**Aravind R**  
Company Director

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Internship Manager



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**Aravind R**  
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EC8651

**TRANSMISSION LINES AND RF SYSTEMS**

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**OBJECTIVES:**

- To introduce the various types of transmission lines and its characteristics
- To give thorough understanding about high frequency line, power and impedance measurements
- To impart technical knowledge in impedance matching using smith chart
- To introduce passive filters and basic knowledge of active RF components
- To get acquaintance with RF system transceiver design

**UNIT I TRANSMISSION LINE THEORY 9**

General theory of Transmission lines - the transmission line - general solution - The infinite line - Wavelength, velocity of propagation - Waveform distortion - the distortion-less line - Loading and different methods of loading - Line not terminated in  $Z_0$  - Reflection coefficient - calculation of current, voltage, power delivered and efficiency of transmission - Input and transfer impedance - Open and short circuited lines - reflection factor and reflection loss.

**UNIT II HIGH FREQUENCY TRANSMISSION LINES 9**

Transmission line equations at radio frequencies - Line of Zero dissipation - Voltage and current on the dissipation-less line, Standing Waves, Nodes, Standing Wave Ratio - Input impedance of the dissipation-less line - Open and short circuited lines - Power and impedance measurement on lines - Reflection losses - Measurement of VSWR and wavelength.

**UNIT III IMPEDANCE MATCHING IN HIGH FREQUENCY LINES 9**

Impedance matching: Quarter wave transformer - Impedance matching by stubs - Single stub and double stub matching - Smith chart - Solutions of problems using Smith chart - Single and double stub matching using Smith chart.

**UNIT IV WAVEGUIDES 9**

General Wave behavior along uniform guiding structures – Transverse Electromagnetic Waves, Transverse Magnetic Waves, Transverse Electric Waves – TM and TE Waves between parallel plates. Field Equations in rectangular waveguides, TM and TE waves in rectangular waveguides, Bessel Functions, TM and TE waves in Circular waveguides.

**UNIT V RF SYSTEM DESIGN CONCEPTS 9**

Active RF components: Semiconductor basics in RF, bipolar junction transistors, RF field effect transistors, High electron mobility transistors Basic concepts of RF design, Mixers, Low noise amplifiers, voltage control oscillators, Power amplifiers, transducer power gain and stability considerations.

**TOTAL:45 PERIODS**

**OUTCOMES:**

**Upon completion of the course, the student should be able to:**

- Explain the characteristics of transmission lines and its losses
- Write about the standing wave ratio and input impedance in high frequency transmission lines
- Analyze impedance matching by stubs using smith charts
- Analyze the characteristics of TE and TM waves
- Design a RF transceiver system for wireless communication

**TEXT BOOKS:**

1. John D Ryder, —Networks, lines and fields, 2nd Edition, Prentice Hall India, 2015. (UNIT I-IV)
2. Mathew M. Radmanesh, —Radio Frequency & Microwave Electronics, Pearson Education Asia, Second Edition, 2002. (UNIT V)

**REFERENCES:**

1. Reinhold Ludwig and Powel Bretchko, RF Circuit Design — Theory and Applications, Pearson Education Asia, First Edition, 2001.
2. D. K. Misra, Radio Frequency and Microwave Communication Circuits- Analysis and Design, John Wiley & Sons, 2004.
3. E.C. Jordan and K.G. Balmain, —Electromagnetic Waves and Radiating Systems Prentice Hall of India, 2006.
4. G.S.N Raju, "Electromagnetic Field Theory and Transmission Lines Pearson Education, First edition 2005.

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**CHINNASALEM-606 201, KALLAKURICHI DT.**

**OBJECTIVES:**

The student should be made to:

- Learn Ad hoc network and Sensor Network fundamentals
- Understand the different routing protocols
- Have an in-depth knowledge on sensor network architecture and design issues
- Understand the transport layer and security issues possible in Ad hoc and Sensor networks
- Have an exposure to mote programming platforms and tools

**UNIT I AD HOC NETWORKS – INTRODUCTION AND ROUTING PROTOCOLS 9**

Elements of Ad hoc Wireless Networks, Issues in Ad hoc wireless networks, Example commercial applications of Ad hoc networking, Ad hoc wireless Internet, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classifications of Routing Protocols, Table Driven Routing Protocols - Destination Sequenced Distance Vector (DSDV), On-Demand Routing protocols – Ad hoc On-Demand Distance Vector Routing (AODV).

**UNIT II SENSOR NETWORKS – INTRODUCTION & ARCHITECTURES 9**

Challenges for Wireless Sensor Networks, Enabling Technologies for Wireless Sensor Networks, WSN application examples, Single-Node Architecture - Hardware Components, Energy Consumption of Sensor Nodes, Network Architecture - Sensor Network Scenarios, Transceiver Design Considerations, Optimization Goals and Figures of Merit.

**UNIT III WSN NETWORKING CONCEPTS AND PROTOCOLS 9**

MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts - S-MAC, The Mediation Device Protocol, Contention based protocols - PAMAS, Schedule based protocols — LEACH, IEEE 802.15.4 MAC protocol, Routing Protocols- Energy Efficient Routing, Challenges and Issues in Transport layer protocol.

**UNIT IV SENSOR NETWORK SECURITY 9**

Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Layer wise attacks in wireless sensor networks, possible solutions for jamming, tampering, black hole attack, flooding attack. Key Distribution and Management, Secure Routing — SPINS, reliability requirements in sensor networks.

**UNIT V SENSOR NETWORK PLATFORMS AND TOOLS 9**

Sensor Node Hardware – Berkeley Motes, Programming Challenges, Node-level software platforms – TinyOS, nesC, CONTIKIOS, Node-level Simulators – NS2 and its extension to sensor networks, COOJA, TOSSIM, Programming beyond individual nodes – State centric programming.

**TOTAL:45 PERIODS****OUTCOMES:**

At the end of the course, the student would be able to:

- Know the basics of Ad hoc networks and Wireless Sensor Networks
- Apply this knowledge to identify the suitable routing algorithm based on the network and user requirement
- Apply the knowledge to identify appropriate physical and MAC layer protocols
- Understand the transport layer and security issues possible in Ad hoc and sensor networks.
- Be familiar with the OS used in Wireless Sensor Networks and build basic modules

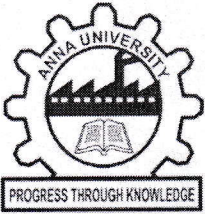
**TEXT BOOKS:**

1. C. Siva Ram Murthy and B. S. Manoj, —Ad Hoc Wireless Networks Architectures and Protocols, Prentice Hall, PTR, 2004. (UNIT I)
2. Holger Karl, Andreas Willig, —Protocol and Architecture for Wireless Sensor Networks, John Wiley publication, Jan 2006. (UNIT II-V)

**REFERENCES:**

1. Feng Zhao, Leonidas Guibas, —Wireless Sensor Networks: an information processing approach, Elsevier publication, 2004.
2. Charles E. Perkins, —Ad Hoc Networking, Addison Wesley, 2000.
3. I.F. Akyildiz, W. Su, Sankarasubramanian, E. Cayirci, —Wireless sensor networks: a survey, computer networks, Elsevier, 2002, 394 - 422.

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**ADVANCED MOBILE AD-HOC NETWORK BASED ON  
SECURE PACKET TRANSMISSION ROUTING PROTOCOL**



**A PROJECT REPORT**

*Submitted by*

**BHARATHI MEENA K**

**621117106008**

**MEENA K**

**621117106019**

**DEVIPRIYA G**

**621117106010**

*In partial fulfillment for the award of the degree*

*of*

**BACHELOR OF ENGINEERING**


*in*

**ELECTRONICS AND COMMUNICATION ENGINEERING**

**IDHAYA ENGINEERING COLLEGE FOR WOMEN**

**ANNA UNIVERSITY : CHENNAI 600 025**

**APRIL 2021**

  
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## BONAFIDE CERTIFICATE

Certified that this project report “ADVANCED MOBILE AD-HOC NETWORK BASED ON SECURE PACKET TRANSMISSION ROUTING PROTOCOL” is the bonafide work of “**BHARATHI MEENA K,MEENA K,DEVIPRIYA G**” who carried out the project work under my supervision.



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### HEAD OF THE DEPARTMENT

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### SIGNATURE

Mrs.K.Solaiyammal,AP/ECE

### SUPERVISOR

Assistant Professor

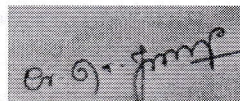
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Submitted for the Project work viva voce held on 04.08.2021



### INTERNAL EXAMINER



### EXTERNAL EXAMINER



**Dr.R.GURUMANI,M.E.,Ph.D.,M.B.A.,M.ISTE.,F.IE.,**  
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## ABSTRACT

New technology for the advanced Mobile Ad-hoc Network (MANETs) is based on the wireless multi-hop architecture without prior setting of fixed infrastructure and the network node. Mobile Ad-hoc Network (MANETs) autonomous operation can be mobile, multi-hop, it is the infrastructure-less wireless network. Security is one of the biggest challenges in advanced Mobile Ad hoc Network (MANETs). Thus, the MANETs and security needs, there are two considerations must be, so that the second routing protocol in order to protect the secure data transmission. In the routing and security that is an important aspect for in a MANETs, existing method routing protocol, however, is not enough to less security, low efficient requirements. The proposed method Secure Packet Transmission Routing Protocol (SPTRP) algorithm used designed to maximize the data security, routing path change, minimizing the impact of detection of Man-in-the-middle (MitM) attack activity over the spectrum, and select the best path. The general terms advanced MANETs routing protocol, the security, and routing protocol. The proposed SPTRP algorithm improves the energy efficiency of the network and reduces the Data loss rate of the node. The proposed method shows high performance than other existing evaluations of the most advanced state security and routing delay end-to-end Data transfer rate, Data loss.

**DEPARTMENT OF INFORMATION  
TECHNOLOGY**



**OBJECTIVES:**

- To provide a strong foundation on fundamental concepts in Computational Intelligence.
- To enable Problem-solving through various searching techniques.
- To apply these techniques in applications which involve perception, reasoning and learning.
- To apply Computational Intelligence techniques for information retrieval
- To apply Computational Intelligence techniques primarily for machine learning.

**UNIT I INTRODUCTION**

9

Introduction to Artificial Intelligence-Search-Heuristic Search-A\* algorithm-Game Playing- Alpha-Beta Pruning-Expert systems- Inference-Rules-Forward Chaining and Backward Chaining- Genetic Algorithms.

**UNIT II KNOWLEDGE REPRESENTATION AND REASONING**

9

Proposition Logic - First Order Predicate Logic – Unification – Forward Chaining -Backward Chaining - Resolution – Knowledge Representation - Ontological Engineering - Categories and Objects – Events - Mental Events and Mental Objects - Reasoning Systems for Categories - Reasoning with Default Information - Prolog Programming.

**UNIT III UNCERTAINTY**

9

Non monotonic reasoning-Fuzzy Logic-Fuzzy rules-fuzzy inference-Temporal Logic-Temporal Reasoning-Neural Networks-Neuro-fuzzy Inference.

**UNIT IV LEARNING**

9

Probability basics - Bayes Rule and its Applications - Bayesian Networks – Exact and Approximate Inference in Bayesian Networks - Hidden Markov Models - Forms of Learning - Supervised Learning - Learning Decision Trees – Regression and Classification with Linear Models - Artificial Neural Networks – Nonparametric Models - Support Vector Machines - Statistical Learning - Learning with Complete Data - Learning with Hidden Variables- The EM Algorithm – Reinforcement Learning

**UNIT V INTELLIGENCE AND APPLICATIONS**

9

Natural language processing-Morphological Analysis-Syntax analysis-Semantic Analysis-All applications – Language Models - Information Retrieval – Information Extraction - Machine Translation – Machine Learning - Symbol-Based – Machine Learning: Connectionist – Machine Learning.

**TOTAL: 45 PERIODS****OUTCOMES:**

Upon completion of the course, the students will be able to

- Provide a basic exposition to the goals and methods of Computational Intelligence.
- Study of the design of intelligent computational techniques.
- Apply the Intelligent techniques for problem solving
- Improve problem solving skills using the acquired knowledge in the areas of, reasoning, natural language understanding, computer vision, automatic programming and machine learning.

**TEXT BOOKS:**

1. Stuart Russell, Peter Norvig, —Artificial Intelligence: A Modern ApproachI, Third Edition, Pearson Education / Prentice Hall of India, 2010.
2. Elaine Rich and Kevin Knight, —Artificial IntelligenceI, Third Edition, Tata McGraw-Hill, 2010.

**REFERENCES:**

1. Patrick H. Winston. "Artificial Intelligence", Third edition, Pearson Edition, 2006.
2. Dan W.Patterson, —Introduction to Artificial Intelligence and Expert SystemsI, PHI, 2006.
3. Nils J. Nilsson, —Artificial Intelligence: A new SynthesisI, Harcourt Asia Pvt. Ltd., 2000.

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# **U\_turn Accident Prevention using IOT**



**A PROJECT REPORT**

*Submitted by*

**BHUVANESHWARI.B**

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**HEMALATHA.S**

**621117205010**

**NANDHINI.A**

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*in partial fulfillment for the award of the degree*

of

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in


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**CHINNASALEM**

**ANNA UNIVERSITY :: CHENNAI-600 025**

**APRIL 2021**

  
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**ANNA UNIVERSITY: CHENNAI-600 025**

**BONAFIDE CERTIFICATE**

Certified that this project report “U\_TURN ACCIDENT PREVENTION USING IOT ” is the bonafide work of “**B. BHUVANESHWARI, S. HEMALATHA, A. NANDHINI, D. PRIYADHARSHINI**” who carried out the project work under my supervision.



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MR.A. JOSEPHSELVAKUMAR,M.E.,

**SUPERVISOR**

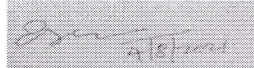
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**INTERNAL EXAMINER**




**EXTERNAL EXAMINER**

  
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## ABSTRACT

In the developing countries accident is the major cause of death. The most unfortunate thing is that we don't learn from our mistakes on road. Out of these 15% of the accidents are due to the carelessness by the drivers which can be either they drive above the speed limit or they do not oversee the obstacles on the road. Main cause of accidents and crashes are due to human errors. Most of the accidents occurs at natural places like mountain roads and curve roads. In the mountain roads as well as in T-roads in developed areas, there will be tight curves and the roads will be narrow. In these kinds of situations the driver of a vehicle cannot see vehicles coming from opposite side. Thousands of people lose their lives because of this problem. The solution for this problem is alerting the driver about the vehicle. This is done by keeping an ultrasonic sensor in one side of the road before the curve and keeping a LED light after the curve, so that if vehicle comes from one end of the curve sensor senses and LED light glows at the opposite side. By looking at the LED light on/off criteria driver can become alert and can slow down the speed of the vehicle.

  
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**CHINNASALEM-606 201, KALLAKURICHI DT.**

IT8501

WEB TECHNOLOGY

L T P C  
3 0 0 3

OBJECTIVES:

- To understand about client-server communication and protocols used during communication.
- To design interactive web pages using Scripting languages.
- To learn server side programming using servlets and JSP.
- To develop web pages using XML/XSLT.

UNIT I WEB SITE BASICS AND HTML 9

Web Essentials: Clients, Servers, and Communication. The Internet-Basic Internet Protocols -The World Wide Web-HTTP request message-response message-Web Clients Web Servers, Markup Languages: XHTML. An Introduction to HTML History-Versions-Basic XHTML Syntax and Semantics- Some Fundamental HTML Elements-Relative URLs-Lists-tables-Frames-Forms-HTML 5.

UNIT II CSS AND CLIENT SIDE SCRIPTING 9

Style Sheets: CSS-Introduction to Cascading Style Sheets-Features-Core Syntax-Style Sheets and HTML- Style Rule Cascading and Inheritance-Text Properties-Box Model Normal Flow Box Layout- Beyond the Normal Flow-CSS3.0. Client-Side Programming: The JavaScript Language-History and Versions Introduction JavaScript in Perspective-Syntax-Variables and Data Types-Statements-Operators-Literals-Functions-Objects-Arrays-Built-in Objects-JavaScript Debuggers.

UNIT III SERVER SIDE SCRIPTING 9

Host Objects: Browsers and the DOM-Introduction to the Document Object Model DOM History and Levels-Intrinsic Event Handling- Modifying Element Style-The Document Tree-DOM Event Handling- Accommodating Noncompliant Browsers Properties of window. Server-Side Programming: Java Servlets- Architecture -Overview-A Servlet-Generating Dynamic Content-Life Cycle- Parameter Data-Sessions-Cookies-URL Rewriting-Other Capabilities-Data Storage Servlets and Concurrency- Databases and Java Servlets.

UNIT IV JSP AND XML 9

Separating Programming and Presentation: JSP Technology Introduction-JSP and Servlets-Running JSP Applications Basic JSP- JavaBeans Classes and JSP-Tag Libraries and Files-Support for the Model-View-Controller Paradigm- Databases and JSP. Representing Web Data: XML-Documents and Vocabularies-Versions and Declaration-Namespaces- DOM based XML processing Event-oriented Parsing: SAX-Transforming XML Documents-Selecting XML Data: XPATH-Template based Transformations: XSLT-Displaying XML Documents in Browsers.

UNIT V AJAX AND WEB SERVICES 9

AJAX: Ajax Client Server Architecture-XML Http Request Object-Call Back Methods. Web Services: JAX-RPC-Concepts-Writing a Java Web Service-Writing a Java Web Service Client-Describing Web Services: WSDL- Representing Data Types: XML Schema- Communicating Object Data: SOAP Related Technologies-Software Installation-Storing Java Objects as Files.

TOTAL 45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

- Design simple web pages using markup languages like HTML and XHTML.
- Create dynamic web pages using DHTML and java script that is easy to navigate and use.
- Program server side web pages that have to process request from client side web pages.
- Represent web data using XML and develop web pages using JSP.
- Understand various web services and how these web services interact.

TEXT BOOK:

1. Jeffrey C. Jackson, "Web Technologies--A Computer Science Perspective", Pearson Education, 2006.

REFERENCES

1. Robert. W. Sebesta, "Programming the World Wide Web", Fourth Edition, Pearson Education, 2007.
2. Deitel, Deitel, Goldberg, "Internet & World Wide Web How To Program", Third Edition, Pearson Education, 2006.
3. Marty Hall and Larry Brown, "Core Web Programming" Second Edition, Volume I and II, Pearson Education, 2001.
4. Bates, —Developing Web Applications, Wiley, 2006.

  
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# Certificate of Internship

This is presented to

**RAMANI M**

II year IT Student of Idhaya Engineering College for Women  
for completing the internship on **WEB DEVELOPMENT**  
from 04th to 13th May of 2021.

**MANISH D**  
Team Leader

**Dr. R. GURUMANI**, M.E., Ph.D., M.B.A., M.I.S.T.E., F.I.A.  
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**VENKATESH N**  
Head Supervisor




# Certificate of Internship

This is presented to

**NISHA M**

II year IT Student of Idhaya Engineering College for Women  
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**MANISH D**  
Team Leader

  
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\_\_\_\_\_  
**VENKATESH N**  
Head Supervisor




# Certificate of Internship

This is presented to

**DAYANAMARY C**

II year IT Student of Idhaya Engineering College for Women  
for completing the internship on **WEB DEVELOPMENT**  
from 04th to 13th May of 2021.

  
\_\_\_\_\_  
**MANISH D**  
Team Leader

  
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**VENKATESH N**  
Head Supervisor





# Certificate of Internship

This is presented to

**MAGIMAI ILAKKIYA MARY C**

II year IT Student of Idhaya Engineering College for Women  
for completing the internship on **WEB DEVELOPMENT**  
from 04th to 13th May of 2021.

  
\_\_\_\_\_  
**MANISH D**  
Team Leader

  
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**Dr. R. GURUMANI, M.E., Ph.D., M.B.A., M.I.S.T.E., F.I.E.**  
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# Certificate of Internship

This is presented to

**ABINAYA S**

II year IT Student of Idhaya Engineering College for Women  
for completing the internship on **WEB DEVELOPMENT**  
from 04th to 13th May of 2021.

  
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**MANISH D**  
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**Dr. R. GURUMANI**, M.E., Ph.D., M.B.A., M.ISTE., CIP  
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**VENKATESH N**  
Head Supervisor



# Certificate of Internship

This is presented to

**YASHWINI A**

II year CSE Student of Idhaya Engineering College for Women  
for completing the internship on **MOBILE OS AND  
APP DEVELOPMENT** from 03rd to 12th May of 2021.

**MANISH D**  
Team Leader

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# Certificate of Internship

This is presented to

**VANISRI K**

II year IT Student of Idhaya Engineering College for Women  
for completing the internship on **WEB DEVELOPMENT**  
from 04th to 13th May of 2021.

**MANISH D**  
Team Leader

**Dr.R.GURUMANI**, M.E., Ph.D., M.B.A., M.ISTE., P.E.,  
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**VENKATESH N**  
Head Supervisor

IT8602

**MOBILE COMMUNICATION**

L T P C  
3 0 0 3

**OBJECTIVES:**

**The student should be made to:**

- Understand the basic concepts of mobile computing
- Understand Wireless LAN, Bluetooth and WiFi Technologies
- Be familiar with the network protocol stack
- Learn the basics of mobile telecommunication system
- Be exposed to Ad-Hoc networks

**UNIT I INTRODUCTION**

9

Introduction to Mobile Computing – Applications of Mobile Computing- Generations of Mobile Communication Technologies-MAC Protocols—SDMA-TDMA-FDMA- CDMA.

**UNIT II MOBILE TELECOMMUNICATION SYSTEM**

9

GSM – Architecture – Protocols – Connection Establishment – Frequency Allocation – Routing –Mobility Management – Security –GPRS- UMTS- Architecture

**UNIT III WIRELESS NETWORKS**

9

Wireless LANs and PANs – IEEE 802.11 Standard – Architecture – Services – Blue Tooth- Wi-Fi –WiMAX

**UNIT IV MOBILE NETWORK LAYER**

9

Mobile IP – DHCP – AdHoc– Proactive and Reactive Routing Protocols – Multicast Routing-Vehicular Ad Hoc networks (VANET) –MANET Vs VANET – Security

**UNIT V MOBILE TRANSPORT AND APPLICATION LAYER**

9

Mobile TCP– WAP – Architecture – WDP – WTLS – WTP –WSP – WAE – WTA Architecture – WML

**TOTAL:45 PERIODS**

**OUTCOMES:**

**At the end of the course, the student should be able to:**

- Explain the basics of mobile telecommunication system
- Illustrate the generations of telecommunication systems in wireless network
- Understand the architecture of Wireless LAN technologies
- Determine the functionality of network layer and Identify a routing protocol for a given Ad hoc networks
- Explain the functionality of Transport and Application layer

**TEXT BOOKS:**

1. Jochen Schiller, —Mobile CommunicationsI, PHI, Second Edition, 2003.
2. Prasant Kumar Pattnaik, Rajib Mall, —Fundamentals of Mobile ComputingI, PHI Learning Pvt.Ltd, New Delhi — 2012

**REFERENCES:**

1. Dharma Prakash Agarwal, Qing and An Zeng, "Introduction to Wireless and Mobile systems", Thomson Asia Pvt Ltd, 2005.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, —Principles of Mobile ComputingI, Springer, 2003.
3. William.C.Y.Lee,—Mobile Cellular Telecommunications-Analog and Digital SystemsI, Second Edition, Tata Mc Graw Hill Edition ,2006.
4. C.K.Toth, —AdHoc Mobile Wireless NetworksI, First Edition, Pearson Education, 2002.
5. Android Developers : <http://developer.android.com/index.html>
6. Apple Developer : <https://developer.apple.com/>
7. Windows Phone Dev Center : <http://developer.windowsphone.com>
8. BlackBerry Developer : <http://developer.blackberry.com>

*Rave*  
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# Hybrid Event and Booking System



A PROJECT REPORT

*Submitted by*

**ANANTHI .S**

**621117205004**

**ANUPRIYA .C**

**621117205005**

**VAITHEESHWARI .S**

**621117205022**

*in partial fulfillment for the award of the degree*

*of*

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*in*

**INFORMATION TECHNOLOGY**

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**APRIL 2021**

**i**

  
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**BONAFIDE CERTIFICATE**

Certified that this project report "ADVANCED SKIN DISEASE DIAGNOSIS USING CNN" is the bonafide work of "S. ANANTHI, C. ANUPRIYA, S.VAITHEESHWARI" who carried out the project work under my supervision.

*P. Senthil*

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**INTERNAL EXAMINER**

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21/12/2021

**EXTERNAL EXAMINER**

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## ABSTRACT

Parking is costly and limited in almost every major city in the world. Innovative parking systems for meeting near-term parking demand are needed. This project proposes a novel, secure, and intelligent parking system (Smart Parking) based on imminent to best support the urban core. These persistent parking problems could be turned into new opportunities, brought by current trends in meeting the globally connected continuum. This project reveals a work-in-progress to capitalize on private land properties for parking, in order to relieve stress on public agencies, create new sources of revenue, and enlist new entities in the intermediary market. These intermediaries, labelled as Parking Service Providers (or PSPs) play a broker role through advertising parking lots on a shared cloud platform. To streamline these business collaborations and related processes, physical parking lots are augmented with Internet connectivity allowing cloud-provided applications to congregate these lots into a larger inventory.. From the point of users' view, Smart Parking is a secure and intelligent parking service. The parking reservation is safe and privacy preserved. The parking navigation is convenient and efficient. The whole parking process will be a non-stop service. From the point of management's view, Smart Parking is an intelligent parking system. Based on the prediction, new business promotion can be made, for example, on-sale prices and new parking fees. In Smart Parking, new promotions can be published through wireless network.

  
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**IT8201**

**INFORMATION TECHNOLOGY ESSENTIALS**

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**OBJECTIVES:**

- To introduce the concept of Internet, Networks and its working principles.
- To know scripting languages.
- To understand various applications related to Information Technology.

**UNIT I WEB ESSENTIALS**

Creating a Website - Working principle of a Website - Browser fundamentals - Authoring tools - Types of servers: Application Server - Web Server - Database Server

9

**UNIT II SCRIPTING ESSENTIALS**

Need for Scripting languages - Types of scripting languages - Client side scripting - Server side scripting - PHP - Working principle of PHP - PHP Variables - Constants - Operators — Flow Control and Looping - Arrays - Strings - Functions - File Handling - PHP and MySQL - PHP and HTML - Cookies - Simple PHP scripts

9

**UNIT III NETWORKING ESSENTIALS**

Fundamental computer network concepts - Types of computer networks - Network layers - TCP/IP model - Wireless Local Area Network - Ethernet - WiFi - Network Routing - Switching - Network components

9

**UNIT IV MOBILE COMMUNICATION ESSENTIALS**

Cell phone working fundamentals - Cell phone frequencies & channels - Digital cell phone components - Generations of cellular networks - Cell phone network technologies / architecture -Voice calls & SMS

9

**UNIT V APPLICATION ESSENTIALS**

Creation of simple interactive applications - Simple database applications - Multimedia applications - Design and development of information systems – Personal Information System – Information retrieval system – Social networking applications

9

**TOTAL: 45 PERIODS**

**OUTCOMES:**

**On Completion of the course, the students should be able to:**

- Design and deploy web-sites
- Design and deploy simple web-applications
- Create simple database applications
- Develop information system
- Describe the basics of networking and mobile communications

**TEXT BOOKS:**

1. Robin Nixon, "Learning PHP, MySQL, JavaScript, CSS & HTML5" Third Edition, O'REILLY,2014.
2. James F. Kurose, —Computer Networking: A Top-Down Approach, Sixth Edition, Pearson,2012.

**REFERENCES:**

1. Gottapu Sasibhushana Rao, "Mobile Cellular Communication", Pearson, 2012.
2. R. Kelly Rainer , Casey G. Cegielski , Brad Prince, Introduction to Information Systems, FifthEdition, Wiley Publication, 2014.
3. it-ebooks.org

*R. G. Mani*  
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**CHINNASALEM-606 201. KALLAKURICHI DT.**

IT8602

MOBILE COMMUNICATION

L T P C  
3 0 0 3

OBJECTIVES:

The student should be made to:

- Understand the basic concepts of mobile computing
- Understand Wireless LAN, Bluetooth and WiFi Technologies
- Be familiar with the network protocol stack
- Learn the basics of mobile telecommunication system
- Be exposed to Ad-Hoc networks

UNIT I INTRODUCTION 9

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UNIT II MOBILE TELECOMMUNICATION SYSTEM 9

GSM – Architecture – Protocols – Connection Establishment – Frequency Allocation – Routing –Mobility Management – Security –GPRS- UMTS- Architecture

UNIT III WIRELESS NETWORKS 9

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UNIT IV MOBILE NETWORK LAYER 9

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UNIT V MOBILE TRANSPORT AND APPLICATION LAYER 9

Mobile TCP– WAP – Architecture – WDP – WTLS – WTP –WSP – WAE – WTA Architecture – WML

TOTAL:45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

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4. C.K.Toth, —AdHoc Mobile Wireless NetworksI, First Edition, Pearson Education, 2002.
5. Android Developers : <http://developer.android.com/index.html>
6. Apple Developer : <https://developer.apple.com/>
7. Windows Phone Dev Center : <http://developer.windowsphone.com>
8. BlackBerry Developer : <http://developer.blackberry.com>

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# Hybrid Event and Booking System



A PROJECT REPORT

*Submitted by*

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**APRIL 2021**

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**ANNA UNIVERSITY: CHENNAI-600 025**

**BONAFIDE CERTIFICATE**

Certified that this project report "ADVANCED SKIN DISEASE DIAGNOSIS USING CNN" is the bonafide work of "S. ANANTHI, C. ANUPRIYA, S.VAITHEESHWARI" who carried out the project work under my supervision.

*P. Senthil*

**SIGNATURE**

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**SUPERVISOR**

Associate Professor/CSE,

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*P. Senthil*

**INTERNAL EXAMINER**

*[Signature]*  
21/11/2021

**EXTERNAL EXAMINER**

*[Signature]*  
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**PRINCIPAL**  
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## ABSTRACT

Parking is costly and limited in almost every major city in the world. Innovative parking systems for meeting near-term parking demand are needed. This project proposes a novel, secure, and intelligent parking system (Smart Parking) based on imminent to best support the urban core. These persistent parking problems could be turned into new opportunities, brought by current trends in meeting the globally connected continuum. This project reveals a work-in-progress to capitalize on private land properties for parking, in order to relieve stress on public agencies, create new sources of revenue, and enlist new entities in the intermediary market. These intermediaries, labelled as Parking Service Providers (or PSPs) play a broker role through advertising parking lots on a shared cloud platform. To streamline these business collaborations and related processes, physical parking lots are augmented with Internet connectivity allowing cloud-provided applications to congregate these lots into a larger inventory.. From the point of users' view, Smart Parking is a secure and intelligent parking service. The parking reservation is safe and privacy preserved. The parking navigation is convenient and efficient. The whole parking process will be a non-stop service. From the point of management's view, Smart Parking is an intelligent parking system. Based on the prediction, new business promotion can be made, for example, on-sale prices and new parking fees. In Smart Parking, new promotions can be published through wireless network.

  
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CS8091

**BIG DATA ANALYTICS**

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**OBJECTIVES:**

- To know the fundamental concepts of big data and analytics.
- To explore tools and practices for working with big data
- To learn about stream computing.
- To know about the research that requires the integration of large amounts of data.

**UNIT I INTRODUCTION TO BIG DATA** 9

Evolution of Big data - Best Practices for Big data Analytics - Big data characteristics - Validating - The Promotion of the Value of Big Data - Big Data Use Cases- Characteristics of Big Data Applications - Perception and Quantification of Value -Understanding Big Data Storage - A General Overview of High- Performance Architecture - HDFS - MapReduce and YARN - Map Reduce Programming Model

**UNIT II CLUSTERING AND CLASSIFICATION** 9

Advanced Analytical Theory and Methods: Overview of Clustering - K-means - Use Cases - Overview of the Method - Determining the Number of Clusters - Diagnostics - Reasons to Choose and Cautions - Classification: Decision Trees - Overview of a Decision Tree - The General Algorithm - Decision Tree Algorithms - Evaluating a Decision Tree - Decision Trees in R - Naïve Bayes - Bayes' Theorem -Naïve Bayes Classifier.

**UNIT III ASSOCIATION AND RECOMMENDATION SYSTEM** 9

Advanced Analytical Theory and Methods: Association Rules - Overview - Apriori Algorithm - Evaluation of Candidate Rules - Applications of Association Rules - Finding Association& finding similarity - Recommendation System: Collaborative Recommendation-Content Based Recommendation -Knowledge Based Recommendation-Hybrid Recommendation Approaches.

**UNIT IV STREAM MEMORY** 9

Introduction to Streams Concepts – Stream Data Model and Architecture - Stream Computing, Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating moments – Counting oneness in a Window – Decaying Window – Real time Analytics Platform(RTAP) applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions. Using Graph Analytics for Big Data: Graph Analytics

**UNIT V NOSQL DATA MANAGEMENT FOR BIG DATA AND VISUALIZATION** 9

NoSQL Databases : Schema-less Models: Increasing Flexibility for Data Manipulation-Key Value Stores- Document Stores - Tabular Stores - Object Data Stores - Graph Databases Hive - Sharding —Hbase – Analyzing big data with twitter - Big data for E-Commerce Big data for blogs - Review of Basic Data Analytic Methods using R.

**TOTAL: 45 PERIODS**

**OUTCOMES:**

Upon completion of the course, the students will be able to:

- Work with big data tools and its analysis techniques
- Analyze data by utilizing clustering and classification algorithms
- Learn and apply different mining algorithms and recommendation systems for large volumes of data
- Learn NoSQL databases and management.

**TEXT BOOKS:**

1. Anand Rajaraman and Jeffrey David Ullman, "Mining of Massive Datasets", Cambridge University Press, 2012.
2. David Loshin, "Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph", Morgan Kaufmann/Elsevier Publishers, 2013.

**REFERENCES:**

1. EMC Education Services, "Data Science and Big Data Analytics: Analyzing, Visualizing and Presenting Data", Wiley publishers, 2015.
2. Bart Baesens, "Analytics in a Big Data World: The Essential Guide to Data Science and its Applications", Wiley Publishers, 2015.
3. Dietmar Jannach and Markus Zanker, "Recommender Systems: An Introduction", Cambridge University Press, 2010.
4. Kim H. Pries and Robert Dunningan, "Big Data Analytics: A Practical Guide for Managers " CRC Press, 2015.

*Buveni*  
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**CHINNASALEM-606 201, KALLAKURICHI DT.**



**ONLINE IDENTIFICATION AND DATA RECOVERY  
FOR PMU USING DATA MANIPULATION ATTACK**



**A PROJECT REPORT**

*Submitted by*

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*in partial fulfillment for the award of the degree*

*of*

**BACHELOR OF TECHNOLOGY**

**IN**


**INFORMATION TECHNOLOGY**

**IDHAYA ENGINEERING COLLEGE FOR WOMEN**

**CHINNASALEM**

**ANNA UNIVERSITY:: CHENNAI-600 025**

**APRIL 2021**

  
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**BONAFIDE CERTIFICATE**

Certified that this project report "ONLINE IDENTIFICATION AND DATA RECOVERY FOR PMU USING DATA MANIPULATION ATTACK" is the bonafide work of "S.ACCELIA, J.CHANDHARALAKA, K.MANJULA, V.PRAVEENA" who carried out the project work under my supervision.



**SIGNATURE**

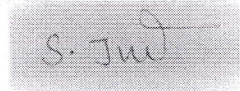
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## ABSTRACT

Some of the modern smart grid infrastructures, phasor measurement units (PMUs) for instance, are vulnerable to cyber attacks due to their ever-increasing dependence on information and communications technologies. In general, existing solutions to cyber attacks focus on creating redundancy and/or enhancing security levels of sensing and communication networks. These solutions require intensive offline efforts and therefore are economically expensive. Further, they are generally inefficient when dealing with dynamic attacks. This paper proposes a novel density-based spatial clustering approach for online detection, classification, and data recovery for data manipulation attacks to PMU measurements. The proposed method is purely data-driven and is applicable to simultaneous multi-measurement attacks without requiring additional hardware in the existing infrastructure. The proposed approach is also independent of the conventional state estimation (SE). Comprehensive case studies demonstrate the effectiveness of the proposed method.

  
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**OBJECTIVES:**

- To develop an understanding and awareness how issues such as content, information architecture, motion, sound, design, and technology merge to form effective and compelling interactive experiences for a wide range of audiences and end users.
- To become familiar with various software programs used in the creation and implementation of multi-media and appreciate the importance of technical ability and creativity within design practice.
- To gain knowledge about graphics hardware devices and software used and understand the two-dimensional graphics and their transformations.
- To understand the three-dimensional graphics and their transformations and appreciate illumination and color models
- To become familiar with understand clipping techniques and to become familiar with Blender Graphics

**UNIT I ILLUMINATION AND COLOR MODEL 9**

Light sources - basic illumination models — halftone patterns and dithering techniques; Properties of light - Standard primaries and chromaticity diagram; Intuitive colour concepts - RGB colour model - YIQ colour model - CMY colour model - HSV colour model - HLS colour model; Colour selection. Output primitives — points and lines, line drawing algorithms, loading the frame buffer, line function; circle and ellipse generating algorithms; Pixel addressing and object geometry, filled area primitives.

**UNIT II TWO-DIMENSIONAL GRAPHICS 9**

Two dimensional geometric transformations — Matrix representations and homogeneous coordinates, composite transformations; Two dimensional viewing — viewing pipeline, viewing coordinate reference frame; window-to-viewport coordinate transformation, Two dimensional viewing functions; clipping operations — point, line, and polygon clipping algorithms.

**UNIT III THREE-DIMENSIONAL GRAPHICS 9**

Three dimensional concepts; Three dimensional object representations — Polygon surfaces and tables- Plane equations - Polygon meshes; Curved Lines and surfaces, Quadratic surfaces; Blobby objects; Spline representations — Bezier curves and surfaces. TRANSFORMATION AND VIEWING: Three dimensional geometric and modeling transformations; Three dimensional viewing — viewing pipeline, viewing coordinates, Projections, Clipping; Visible surface detection methods.

**UNIT IV MULTIMEDIA SYSTEM DESIGN & MULTIMEDIA FILE HANDLING 9**

Multimedia basics – Multimedia applications – Multimedia system architecture – Evolving technologies for multimedia – Defining objects for multimedia systems – Multimedia data interface standards – Multimedia databases. Compression and decompression – Data and file format standards – Multimedia I/O technologies – Digital voice and audio – Video image and animation – Full motion video – Storage and retrieval technologies.

**UNIT V HYPERMEDIA 9**

Multimedia authoring and user interface - Hypermedia messaging - Mobile messaging – Hypermedia message component – Creating hypermedia message – Integrated multimedia message standards – Integrated document management – Distributed multimedia systems. **CASE STUDY: BLENDER GRAPHICS** Blender Fundamentals – Drawing Basic Shapes – Modelling – Shading & Textures

**TOTAL: 45 PERIODS****OUTCOMES:****At the end of the course, the students should be able to:**

- Design two dimensional graphics.
- Apply two dimensional transformations.
- Design three dimensional graphics.
- Apply three dimensional transformations

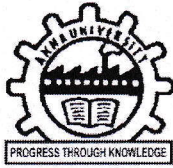
**TEXT BOOKS:**

1. Donald Hearn and Pauline Baker M, —Computer Graphics", Prentice Hall, New Delhi, 2007 [UNIT I — III ]
2. Andleigh, P. K and Kiran Thakrar, —Multimedia Systems and Designl, PHI, 2003. [ UNIT IV, V ]

**REFERENCES:**

1. Judith Jeffcoate, —Multimedia in practice: Technology and Applicationsl, PHI, 1998.
2. Foley, Vandam, Feiner and Hughes, Computer Graphics: Principles and Practicel, 2<sup>nd</sup> Edition, Pearson Education, 2003.
3. Jeffrey McConnell, —Computer Graphics: Theory into Practicel, Jones and Bartlett Publishers, 2006.
4. Hill F S Jr., "Computer Graphics", Maxwell Macmillan , 1990.

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# **FAULT INJECTION ANALYSIS**



**A PROJECT REPORT**

*Submitted by*

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**CHINNASALEM**

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**BONAFIDE CERTIFICATE**

Certified that this project report “ **FAULT INJECTION ANALYSIS** “ is the work “**ASHA MARY.M, PRIYANKA.P, SHAHIKA PARWEEN.M**“ who carried out the project under my supervision.

*P. Sumathi*

*Archana*

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## ABSTRACT

Fault injection is needed for different purposes such as analyzing the reaction of a system in a faculty environment or validating fault-detection and/or fault-correction techniques. In this project we propose a simulation-based fault injection tool able to work at different abstraction levels and with user- defined fault models. By exploiting the facilities provided by a functional verification environment it allows to speed up the entire fault injection process from the creation of the workload to the analysis of the results of injection campaigns. Moreover, the adoption of techniques to optimize the fault list significantly reduces the simulation time. Being the tool targeted to the validation of dependable systems, it includes a way to extract information from the Failure Mode and Effect Analysis and to correlate fault injection results with estimates. A great number of new security tools have been developed to solve the problems of IP networks, but some doubts were raised about the efficiency of those systems. There are some techniques used to evaluate the vulnerabilities of a network, but their results are limited and few tools aim to facilitate and automate the evaluation of security network mechanisms. This article presents a network fault injection system especially created to test network security equipment, aiming to solve the inexistence of this type of tool and to full the gap between packet injectors and vulnerability scanners.

# **M.E-COMMUNICATION SYSTEMS**

**OBJECTIVES:**

The students should be made to be

- Learn M2M developments and satellite applications
- Understand Satellite Communication In Ipv6 Environment

**UNIT I OVERVIEW OF SATELLITE COMMUNICATION**

9

Overview of satellite communication and orbital mechanics Link budget Parameters, Link budget calculations, Auxiliary Equations, Performance Calculations.

**UNIT II M2M DEVELOPMENTS AND SATELLITE APPLICATIONS**

9

Overview of the Internet of Things and M2M- M2M Applications Examples and Satellite Support- Satellite Roles Context and Applications- Antennas for Satellite M2M Applications- M2M Market Opportunities for Satellite Operators- Ultra HD Video/TV and Satellite Implications- High Throughput Satellites (HTS) and Ka/Ku Spot Beam Technologies- Aeronautical, Maritime and other Mobility Services.

**UNIT III SATELLITE COMMUNICATION IN IPV6 ENVIRONMENT**

9

Overview of IPv6 and its benefits for Satellite Networks - Migration and Coexistence--Implementation scenarios and support- Preparations for IPv6 in Satellite communication- Satellite specific Protocol issues in IPv6 — Impact of IPv6 on Satellite Network architecture and services-Detailed transitional plan- IPv6 demonstration over satellites - Key results and recommendations.

**UNIT IV SATELLITE NAVIGATION AND GLOBAL POSITIONING SYSTEM**

9

Over view of Radio and Satellite Navigation, GPS Principles, Signal model and Codes, Satellite Signal Acquisition, Mathematical model of GPS observables, Methods of processing GPS data , GPS Receiver Operation and Differential GPS. IRNSS, GAGAN, GLONASS and Galileo.

**UNIT V DEEP SPACE NETWORKS AND INTER PLANETARY MISSIONS**

9

Introduction — Functional description - Design procedure and performance criterion-Mars exploration Rover- Mission and space craft summary-Telecommunication subsystem overview-Ground Subsystem-Telecom subsystem and Link performance Telecom subsystem Hardware and software Chandrayaan-1 Mission - Mission and space craft summary-Telecommunication subsystem overview- Ground Subsystem-Telecom subsystem and Link performance. Mangalyaan Mission - Mission and space craft summary-Telecommunication subsystem overview- Ground Subsystem-Telecom subsystem and Link performance.

**OUTCOMES:**

At the end of this course, the student should be able to:

- Discuss satellite navigation and global positioning system
- Outline deep space networks and inter planetary missions

**REFERENCES:**

1. Adimurthy.V, " Concept design and planning of India's first interplanetary mission" CurrentScience, VOL. 109, NO. 6, 1054 25 SEPTEMBER 2015.
2. Anil K. Maini, Varsha Agrawal, 'Satellite Technology: Principles and Applications', Third Edition, Wiley, 2014.
3. Daniel Minoli' "Innovations in Satellite Communication and Satellite Technology" Wiley, 2015
4. Daniel Minoli, "Satellite Systems Engineering in an IPv6 Environment", CRC Press, FirstEdition, 2009.
5. Hofmann-Wellenhof B., Lichtenegger H., and Elmar Wasle, "Global Navigational Satellite Systems" Springer-Verlag, 2008.
6. Jim Taylor, " Deep Space Communications" John Wiley & Sons, 2016.
7. Louis J. Ippolito, Jr. "Satellite Communications Systems Engineering: Atmospheric Effects, Satellite Link Design and System Performance", Second Edition, 2017
8. <http://www.isro.gov.in/pslv-c25-mars-orbiter-mission>
9. [https://en.wikipedia.org/wiki/Mars\\_Orbiter\\_Mission](https://en.wikipedia.org/wiki/Mars_Orbiter_Mission)
10. <https://en.wikipedia.org/wiki/Chandrayaan-1>

*Renu*  
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**OBJECTIVES :**

The students should be made to:

- Understand the need and concept of security
- Learn cryptosystems

**UNIT I INTRODUCTION AND NUMBER THEORY**

9

Introduction to Information Security, Computer Security & Network Security. Need For Security. Security — Goals, Attacks, Security Services and Mechanisms, and Techniques. Number Theory and Mathematics for Symmetric Cryptography- Finite Arithmetic, Congruence Arithmetic-Linear Congruence and Quadratic Congruence. Mathematics for Asymmetric-Key Cryptography: Fermat's Theorem and Euler's Theorem, Primes, Primality Testing, Factorization, CRT, Exponentiation. Classical Symmetric-Key Ciphers –Substitution Ciphers, Transposition Ciphers.

**UNIT II SYMMETRIC AND ASYMMETRIC CRYPTOSYSTEMS**

9

Modern Symmetric-Key Cipher - Block Ciphers (DES, 3DES, AES and its mode of operations), Stream Ciphers, Asymmetric-Key Cryptosystem- RSA, ElGamal, ECC, Key Management - Diffie- Hellman (DH) Mechanism, Kerberos — Needham Schroeder Protocol.

**UNIT III AUTHENTICATION, DIGITAL SIGNATURES AND CERTIFICATES**

9

Message Integrity & Message Authentication - Message Authentication Code (MAC), Cryptographic Hash Functions — Birthday Attacks, Digital Signatures - Digital Signature Standards (FIPS 186-2), DSA (ANSI X9.30), RSA (ANSI X9.31) – Public Key Distribution – RSA schemes, Digital Certificates - PKI Certificates, PKI Life Cycle Management.

**UNIT IV TRUSTED IDENTITY**

9

Entity Authentication: Password System- Fixed and One time Passwords (S/Key) RFC 2289 – Callback Systems, Zero Knowledge, Challenge and Response Systems – RADIUS — ITU-T X.509.

**UNIT V SECURITY AT LAYERS**

9

Network Layer Security - IPSec, Transport Layer Security- SSL/TLS, SSH, Application Layer Security –PGP, S/MIME, Firewall - Concepts, Architecture, Packet Filtering, Proxy Services and Bastion Hosts.

**TOTAL: 45 PERIODS****OUTCOMES:**

At the end of this course, the students should be able to:

- Explain digital signature standards
- Discuss authentication
- Explain security at different layers

**REFERENCES:**

1. Behrouz A.Forouzan, "Cryptography and Network Security", Special Edition, Tata McGraw Hill,2007.
2. Bruce Schneier, "Applied Cryptography", John Wiley & Sons, 1994.
3. Charlie Kaufmann, Radia Perlman, Mike Speciner, "Network Security", Second Edition, PrenticeHall, 2002
4. Douglas R.Stinson, "Cryptography: Theory and Practice", CRC Press Series on DiscreteMathematics and its Applications, 1995.
5. David M. Durton, "Elementary Number Theory", Tata McGraw Hill, Sixth Edition, 2009.
6. William Stallings "Cryptography and Network Security: Principles and Practice", 3rd Edition,Pearson Education, 2002.
7. William Stallings "Network Security Essentials: Applications and Standards", 2nd Edition,

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**OBJECTIVES:**

- To understand the basics of signal-space analysis and digital transmission.
- To understand the coherent and noncoherent receivers and its impact on different channel characteristics.
- To understand the different Equalizers
- To understand the different block coded and convolutional coded digital communications systems.
- To understand the basics of Multicarrier and Multiuser Communications.

**UNIT I COHERENT AND NON-COHERENT COMMUNICATION 9**

Coherent receivers – Optimum receivers in WGN – IQ modulation & demodulation – Noncoherent receivers in random phase channels; MFSK receivers – Rayleigh and Rician channels – Partially coherent receivers – DPSK; M-PSK; M-DPSK-BER Performance Analysis. Carrier Synchronization-Bit synchronization.

**UNIT II EQUALIZATION TECHNIQUES 9**

Band Limited Channels- ISI – Nyquist Criterion- Controlled ISI-Partial Response signals- Equalization algorithms – Viterbi Algorithm – Linear equalizer – Decision feedback equalization – Adaptive Equalization algorithms.

**UNIT III BLOCK CODED DIGITAL COMMUNICATION 9**

Architecture and performance — Binary block codes; Orthogonal; Biorthogonal; Transorthogonal — Shannon's channel coding theorem; Channel capacity; Matched filter; Concepts of Spread spectrum communication — Coded BPSK and DPSK demodulators— Linear block codes; Hamming; Golay; Cyclic; BCH ; Reed – Solomon codes. Space time block codes.

**UNIT IV CONVOLUTIONAL CODED DIGITAL COMMUNICATION 9**

Representation of codes using Polynomial, State diagram, Tree diagram, and Trellis diagram —Decoding techniques using Maximum likelihood, Viterbi algorithm, Sequential and Threshold methods  
– Error probability performance for BPSK and Viterbi algorithm, Turbo Coding.

**UNIT V MULTICARRIER AND MULTIUSER COMMUNICATIONS 9**

Single Vs multicarrier modulation, orthogonal frequency division multiplexing (OFDM), Modulation and demodulation in an OFDM system, An FFT algorithmic implementation of an OFDM system, Bit and power allocation in multicarrier modulation, Peak-to-average ratio in multicarrier modulation. Introduction to CDMA systems, multiuser detection in CDMA systems — optimum multiuser receiver, suboptimum detectors, successive interference cancellation.

**TOTAL : 45 PERIODS**

**OUTCOMES:****Upon Completion of the course, the students will be able to:**

- Develop the ability to understand the concepts of signal space analysis for coherent and non-coherent receivers.
- Conceptually appreciate different Equalization techniques
- Possess knowledge on different block codes and convolutional codes.
- Comprehend the generation of OFDM signals and the techniques of multiuser detection.

**REFERENCES:**

1. Bernard Sklar, "Digital Communications", second edition, Pearson Education, 2001.
2. John G. Proakis, "Digital Communication", Fifth Edition, Mc Graw Hill Publication, 2008.
3. M.K.Simon, S.M.Hinedi and W.C.Lindsey, "Digital communication techniques; Signal Design and Detection", Prentice Hall of India, New Delhi, 1995.
4. Richard Van Nee & Ramjee Prasad, "OFDM for Multimedia Communications" Artech House Publication, 2001.
5. Stephen G. Wilson, "Digital Modulation and Coding", First Indian Reprint, Pearson Education, 2003.
6. Simon Haykin, "Digital communications", John Wiley and sons, 1993.

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**IMAGE TO TEXT AND TEXT TO SPEECH  
SYNTHESIS FOR VISUALLY IMPAIRED  
PEOPLE USING OCR IN RASPEBRRY PI**



**PHASE II REPORT**

*Submitted by*

**A.ANUSUYA**

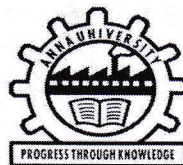
**(Register No: 621119403001)**

*in partial fulfillment for the award of the degree of*

**MASTER OF ENGINEERING**

**IN**

**Electronics and Communication Engineering**



**IDHAYA ENGINEERING COLLEGE FOR WOMEN,**

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**ANNA UNIVERSITY, CHENNAI**

**APRIL 2021**

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## BONAFIDE CERTIFICATE

Certified that this Report titled “**IMAGE TO TEXT AND TEXT TO SPEECH SYNTHESIS FOR VISUALLY IMPAIRED PEOPLE USING OCR IN RASPEBRRY PI**” is bonafide work of **Anusuya. A** (Register No: 621119403003) who carried out the work under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

*P. A. Jeeva*

*S. J. Catherine Mary*

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Submitted for the Project Phase II viva voce held on **02/08/21**

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## ABSTRACT

Human communication today is mainly via speech and text. To access information in a text, a person needs to have vision. However, those who are deprived of vision can gather information using their hearing capability. The proposed method is a camera based assistive text reading to help blind person and the travelers in reading the text present on the text labels, printed notes and products in their own respective languages. It combines the concept of Optical Character Recognition (OCR), text to Speech Synthesizer (TTS) and translator in Raspberry pi. Optical character recognition (OCR) is the identification of printed characters using photoelectric devices and computer software. It converts images of typed, handwritten or printed text into machine encoded text from scanned document or from subtitle text superimposed on an image. Text-to-Speech conversion is a method that scans and reads any language letters and numbers that are in the image using OCR technique and then translates it into any desired language and at last it gives audio output of the translated text. The audio output is heard through the raspberry pi's audio jack using speakers or earphones.

  
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**OBJECTIVES:**

- To understand the image fundamentals.
- To understand the various image segmentation techniques.
- To extract features for image analysis.
- To introduce the concepts of image registration and image fusion.
- To illustrate 3D image visualization.

**UNIT I FUNDAMENTALS OF DIGITAL IMAGE PROCESSING**

9

Elements of visual perception, brightness, contrast, hue, saturation, mach band effect, 2D image transforms-DFT, DCT, KLT,SVD, Image enhancement in spatial and frequency domain, Review of Morphological image processing.

**UNIT II SEGMENTATION**

9

Edge detection, Thresholding, Region growing, Fuzzy clustering, Watershed algorithm, Active contour models, Texture feature based segmentation, Graph based segmentation, Wavelet based Segmentation - Applications of image segmentation.

**UNIT III FEATURE EXTRACTION**

9

First and second order edge detection operators, Phase congruency, Localized feature extraction - detecting image curvature, shape features, Hough transform, shape skeletonization, Boundary descriptors, Moments, Texture descriptors- Autocorrelation, Co-occurrence features, Runlength features, Fractal model based features, Gabor filter, wavelet features.

**UNIT IV REGISTRATION AND IMAGE FUSION**

9

Registration - Preprocessing, Feature selection - points, lines, regions and templates Feature correspondence - Point pattern matching, Line matching, Region matching, Template matching, Transformation functions - Similarity transformation and Affine Transformation. Resampling — Nearest Neighbour and Cubic Splines. Image Fusion - Overview of image fusion, pixel fusion, wavelet based fusion -region based fusion.

**UNIT V 3D IMAGE VISUALIZATION**

9

Sources of 3D Data sets, Slicing the Data set, Arbitrary section planes, The use of color, Volumetric display, Stereo Viewing, Ray tracing, Reflection, Surfaces, Multiple connected surfaces, Image processing in 3D, Measurements on 3D images.

**TOTAL: 45 PERIODS****OUTCOMES:**

Upon Completion of the course, the students will be able to

- Explain the fundamentals digital image processing.
- Describe image various segmentation and feature extraction techniques for image analysis.
- Discuss the concepts of image registration and fusion.
- Explain 3D image visualization.

**REFERENCES:**

1. Ardeshir Goshtasby, "2D and 3D Image registration for Medical, Remote Sensing and Industrial Applications", John Wiley and Sons, 2005.
2. Anil K. Jain, 'Fundamentals of Digital Image Processing', Pearson Education, Inc., 2002.
3. John C. Russ, "The Image Processing Handbook", CRC Press, 2007.
4. Mark Nixon, Alberto Aguado, "Feature Extraction and Image Processing", Academic Press, 2008.
5. Rafael C. Gonzalez, Richard E. Woods, 'Digital Image Processing', Pearson, Education, Inc., Second Edition, 2004.
6. Rick S. Blum, Zheng Liu, "Multisensor image fusion and its Applications", Taylor & Francis, 2006.

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**OBJECTIVES:**

- The student comprehends mathematical description and modelling of discrete time random signals.
- The student is conversant with important theorems and random signal processing algorithms.
- The student learns relevant figures of merit such as power, energy, bias and consistency.
- The student is familiar with estimation, prediction, filtering, multirate concepts and techniques.

**UNIT I DISCRETE RANDOM SIGNAL PROCESSING 9+6**

Discrete random processes – Ensemble averages – Wide sense stationary process – Properties - Ergodic process – Sample mean & variance - Auto-correlation and Auto-correlation matrices- Properties – White noise process – Wiener Khitchine relation - Power spectral density – Filtering random process – Spectral Factorization Theorem – Special types of Random Processes – AR, MA, ARMA Processes – Yule-Walker equations.

**UNIT II SPECTRUM ESTIMATION 9+6**

Bias and Consistency of estimators - Non-Parametric methods – Periodogram – Modified Periodogram – Barlett's method – Welch's method – Blackman-Tukey method – Parametric methods – AR, MA and ARMA spectrum estimation - Performance analysis of estimators.

**UNIT III SIGNAL MODELING AND OPTIMUM FILTERS 9+6**

Introduction- Least square method – Pade approximation – Prony's method – Levinson Recursion – Lattice filter - FIR Wiener filter – Filtering – Linear Prediction – Non Causal and Causal IIR Wiener Filter – Mean square error – Discrete Kalman filter.

**UNIT IV ADAPTIVE FILTERS 9+6**

FIR Adaptive filters - Newton's steepest descent method – Widrow Hoff LMS Adaptive algorithm – Convergence – Normalized LMS – Applications – Noise cancellation - channel equalization – echo canceller – Adaptive Recursive Filters - RLS adaptive algorithm – Exponentially weighted RLS- sliding window RLS.

**UNIT V MULTIRATE SIGNAL PROCESSING 9+6**

Decimation - Interpolation – Sampling Rate conversion by a rational factor I/D – Multistage implementation of sampling rate conversion – Polyphase filter structures – Applications of multirate signal processing.

**TOTAL 45+30: 75 PERIODS****OUTCOMES:**

- Formulate time domain and frequency domain description of Wide Sense Stationary process in terms of matrix algebra and relate to linear algebra concepts.
- State W-K theorem, spectral factorization theorem, spectrum estimation, bias and consistency of estimators.
- Wiener filtering, LMS algorithms, Levinson recursion algorithm, applications of adaptive filters
- Decimation, interpolation, Sampling rate conversion, Applications of multirate signal processing

**REFERENCES:**

1. John G. Proakis, Dimitris G. Manolakis, "Digital Signal Processing", Prentice Hall of India, New Delhi, 2005.
2. Monson H. Hayes, "Statistical Digital Signal Processing and Modeling", John Wiley and Sons Inc., New York, 2006.
3. P. P. Vaidyanathan, "Multirate Systems and Filter Banks", Prentice Hall, 1992.
4. S. Kay, "Modern spectrum Estimation theory and application", Prentice Hall, Englewood Cliffs, NJ 1988.
5. Simon Haykin, "Adaptive Filter Theory", Prentice Hall, Englewood Cliffs, NJ 1986.
6. Sophocles J. Orfanidis, "Optimum Signal Processing", McGraw-Hill, 2000.

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**OBJECTIVES:**

The students should be made to understand:

- Optical system components like optical amplifiers, wavelength converters.
- Up-to-date survey of development in Optical Network Architectures.
- Packet switching.
- Network design perspectives.
- Different Optical Network management techniques and functions.

**UNIT I**

9

Introduction to Optical Networks: Telecommunications Networks Architecture, Services, circuit switching and packet switching, Optical Networks: Multiplexing Techniques, Second generation Optical Networks, Optical Packet Switching, Transmission Basics: Wavelength, frequencies, and channel spacing, Wavelength standards, Optical power and loss, Network Evolution, Nonlinear Effects: Self-phase Modulation, Cross-phase Modulation, Four Wave mixing, Solitons. Components: Couplers, Isolators and Circulators, Multiplexers and Filters, Optical Amplifiers, Transmitters, Detectors, Switches, Wavelength Converters.

**UNIT II**

9

Transmission System Engineering: System Model, Power Penalty, Transmitter, Receiver, Optical Amplifiers, Crosstalk, Dispersion, Wavelength Stabilization, Overall Design Considerations, Optical Internets: Migration to IP optical networking, IP and Optical backbone, IP Routing table, MPLS and optical cross connect table, Protocol stack Alternatives, Internetworking SS7 and Legacy Transport, Internet transport network protocol stack.

**UNIT III**

9

SONET, SDH and Optical Transport Networks (OTNs): SONET and SDH: SONET multiplexing hierarchy, Frame structure, Functional Component, problem detection, concatenation. Architecture of Optical Transport Networks (OTNs): Digital wrapper, in-band and out-of band control signalling, Importance of Multiplexing and multiplexing hierarchies, SONET multiplexing hierarchies, SDH multiplexing hierarchies, New Optical Transport, OTN layered Model, Generic Framing Procedure (GFP)

**UNIT IV**

9

WDM, Network topologies, MPLS and Optical Networks: WDM: WDM operation, Dense Wavelength Division Multiplexing (DWDM), Erbium-doped Fiber (EDF), WDM amplifiers, Add-Drop Multiplexers, Wavelength Continuity Property, Higher dispersion for DWDM, Tunable DWDM Lasers.

**UNIT V**

9

Network topologies and protection schemes: Robust networks, Line and path protection switching, Types of topology, Point to point topology, bi-directional line-switched ring (BLSR), meshed topology, Passive optical networks, Metro optical networks 28 MPLS and Optical Networks: IS label switching, Forwarding equivalence class (FEC), Types of MPLS nodes, Label distribution and binding, label swapping and traffic forwarding, MPLS support of Virtual Private Networks (VPN), MPLS traffic engineering, Multi protocol Lambda switching (MPIS).

**TOTAL : 45 PERIODS****OUTCOMES:**

At the end of the course, the student should be able to:

- Design and Analyze Network Components
- Assess and Evaluate optical networks

**REFERENCES:**

1. Rajiv Ramaswami and Kumar Sivarajan, "Optical Networks – Practical Perspective", 3<sup>rd</sup> Edition, Morgan - Kaufmann Publishers.
2. Optical Networks, Third Generation Transport Systems, Uyles Black, Pearson

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**PREVENTION OF ACCIDENTS DUE TO  
DROWSINESS OF DRIVERS BY EFFECTIVE  
IDENTIFICATION OF DROWSINESS USING  
IMAGE PROCESSING**



PHASE II REPORT

*Submitted by*

**DIVYABHARATHI T**

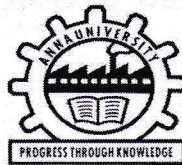
(Register No: 621119403003)

*in partial fulfillment for the award of the degree of*

**MASTER OF ENGINEERING**

**IN**

**Electronics and Communication Engineering**



**IDHAYA ENGINEERING COLLEGE FOR WOMEN,**

**CHINNASALEM**

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION**

**ENGINEERING**

**ANNA UNIVERSITY, CHENNAI**

**APRIL 2021**

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Certified that this Report titled **“PREVENTION OF ACCIDENTS DUE TO DROWSINESS OF DRIVERS BY EFFECTIVE IDENTIFICATION OF DROWSINESS USING IMAGE PROCESSING”** is bonafide work of **Divyabharathi. T** (Register No: 621119403003) who carried out the work under my supervision. Certified further that to the best of my knowledge the work reported here in does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

  
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## ABSTRACT

Nowadays, more and more professions require long-term concentration. Drivers must keep a close eye on the road, so they can react to sudden events immediately. Driver fatigue often becomes a direct cause of many traffic accidents. Therefore, there is a need to develop the systems that will detect and notify a driver of her/him bad psychophysical condition, which could significantly reduce the number of fatigue-related car accidents. However, the development of such systems encounters many difficulties related to fast and proper recognition of a driver's fatigue symptoms. One of the technical possibilities to implement driver drowsiness detection systems is to use the vision-based approach. This article presents the currently used driver drowsiness detection systems. Here we are detecting the driver drowsiness by estimating vision system of him.

  
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**M.E-COMPUTER SCIENCE  
ENGINEERING**

**OBJECTIVES:**

- To understand the usage of algorithms in computing.
- To learn and use hierarchical data structures and its operations
- To learn the usage of graphs and its applications.
- To select and design data structures and algorithms that is appropriate for problems.
- To study about NP Completeness of problems.

**UNIT I                   ROLE OF ALGORITHMS IN COMPUTING**

12

Algorithms – Algorithms as a Technology- Insertion Sort – Analyzing Algorithms – Designing Algorithms- Growth of Functions: Asymptotic Notation – Standard Notations and Common Functions- Recurrences: The Substitution Method – The Recursion-Tree Method

**UNIT II                   HIERARCHICAL DATA STRUCTURES**

12

Binary Search Trees: Basics – Querying a Binary search tree – Insertion and Deletion- Red-Black trees: Properties of Red-Black Trees – Rotations – Insertion – Deletion -B-Trees: Definition of B-trees – Basic operations on B-Trees – Deleting a key from a B-Tree- Fibonacci Heaps: structure – Mergeable-heap operations- Decreasing a key and deleting a node-Bounding the maximum degree.

**UNIT III                GRAPHS**

12

Elementary Graph Algorithms: Representations of Graphs – Breadth-First Search – Depth-First Search – Topological Sort – Strongly Connected Components- Minimum Spanning Trees: Growing a Minimum Spanning Tree – Kruskal and Prim- Single-Source Shortest Paths: The Bellman-Ford algorithm – Single-Source Shortest paths in Directed Acyclic Graphs – Dijkstra's Algorithm; All-Pairs Shortest Paths: Shortest Paths and Matrix Multiplication – The Floyd- Warshall Algorithm;

**UNIT IV                ALGORITHM DESIGN TECHNIQUES**

12

Dynamic Programming: Matrix-Chain Multiplication – Elements of Dynamic Programming – Longest Common Subsequence- Greedy Algorithms: An Activity-Selection Problem – Elements of the Greedy Strategy- Huffman Codes.

**UNIT V                NP COMPLETE AND NP HARD**

12

NP-Completeness: Polynomial Time – Polynomial-Time Verification – NP- Completeness and Reducibility – NP-Completeness Proofs – NP-Complete Problems

**TOTAL: 60 PERIODS****OUTCOMES:****Upon the completion of the course the students should be able to:**

- Design data structures and algorithms to solve computing problems
- Design algorithms using graph structure and various string matching algorithms to solve real-life problems
- Apply suitable design strategy for problem solving

**REFERENCES:**

1. Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman, —Data Structures and AlgorithmsI, Pearson Education, Reprint 2006.
2. Robert Sedgewick and Kevin Wayne, —ALGORITHMSII, Fourth Edition, Pearson Education.
3. S.Sridhar, IDesign and Analysis of AlgorithmsI, First Edition, Oxford University Press. 2014
4. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, —Introduction to Algorithms, Third Edition, Prentice-Hall, 2011.

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**OBJECTIVES:**

- To understand the competitive advantages of big data analytics
- To understand the big data frameworks
- To learn data analysis methods
- To learn stream computing
- To gain knowledge on Hadoop related tools such as HBase, Cassandra, Pig, and Hive for big data analytics

**UNIT I****INTRODUCTION TO BIG DATA**

7

Big Data – Definition, Characteristic Features – Big Data Applications - Big Data vs Traditional Data - Risks of Big Data - Structure of Big Data - Challenges of Conventional Systems - Web Data – Evolution of Analytic Scalability - Evolution of Analytic Processes, Tools and methods - Analysis vs Reporting - Modern Data Analytic Tools

**UNIT II****HADOOP FRAMEWORK**

9

Distributed File Systems - Large-Scale File System Organization – HDFS concepts - MapReduce Execution, Algorithms using MapReduce, Matrix-Vector Multiplication – Hadoop YARN

**UNIT III****DATA ANALYSIS**

13

Statistical Methods: Regression modelling, Multivariate Analysis - Classification: SVM & Kernel Methods - Rule Mining - Cluster Analysis, Types of Data in Cluster Analysis, Partitioning Methods, Hierarchical Methods, Density Based Methods, Grid Based Methods, Model Based Clustering Methods, Clustering High Dimensional Data - Predictive Analytics – Data analysis using R.

**UNIT IV****MINING DATA STREAMS**

7

Streams: Concepts – Stream Data Model and Architecture - Sampling data in a stream - Mining Data Streams and Mining Time-series data - Real Time Analytics Platform (RTAP) Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.

**UNIT V****BIG DATA FRAMEWORKS**

9

Introduction to NoSQL – Aggregate Data Models – Hbase: Data Model and Implementations – Hbase Clients – Examples – .Cassandra: Data Model – Examples – Cassandra Clients – Hadoop Integration. Pig – Grunt – Pig Data Model – Pig Latin – developing and testing Pig Latin scripts. Hive – Data Types and File Formats – HiveQL Data Definition – HiveQL Data Manipulation – HiveQL Queries

**TOTAL: 45 PERIODS****OUTCOMES:**

**At the end of this course, the students will be able to:**

- Understand how to leverage the insights from big data analytics
- Analyze data by utilizing various statistical and data mining approaches
- Perform analytics on real-time streaming data
- Understand the various NoSQL alternative database models

**REFERENCES:**

1. Bill Franks, —Taming the Big Data Tidal Wave: Finding Opportunities in Huge DataStreams with Advanced Analytics, Wiley and SAS Business Series, 2012.
2. David Loshin, "Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph", 2013.
3. Michael Berthold, David J. Hand, —Intelligent Data Analysis, Springer, Second Edition, 2007.
4. Michael Minelli, Michelle Chambers, and Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley, 2013.
5. P. J. Sadalage and M. Fowler, "NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence", Addison-Wesley Professional, 2012.
6. Richard Cotton, "Learning R – A Step-by-step Function Guide to Data Analysis, , O'Reilly Media, 2013.

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**MACHINE LEARNING TECHNIQUES**

L T P C  
3 0 0 3

**OBJECTIVES:**

- To introduce students to the basic concepts and techniques of Machine Learning.
- To have a thorough understanding of the Supervised and Unsupervised learning techniques
- To study the various probability based learning techniques
- To understand graphical models of machine learning algorithms

**UNIT I INTRODUCTION**

9

Learning – Types of Machine Learning – Supervised Learning – The Brain and the Neuron – Design a Learning System – Perspectives and Issues in Machine Learning – Concept Learning Task – Concept Learning as Search – Finding a Maximally Specific Hypothesis – Version Spaces and the Candidate Elimination Algorithm – Linear Discriminants – Perceptron – Linear Separability – Linear Regression.

**UNIT II LINEAR MODELS**

9

Multi-layer Perceptron – Going Forwards – Going Backwards: Back Propagation Error – Multi-layer Perceptron in Practice – Examples of using the MLP – Overview – Deriving Back-Propagation – Radial Basis Functions and Splines – Concepts – RBF Network – Curse of Dimensionality – Interpolations and Basis Functions – Support Vector Machines.

**UNIT III TREE AND PROBABILISTIC MODELS**

9

Learning with Trees – Decision Trees – Constructing Decision Trees – Classification and Regression Trees – Ensemble Learning – Boosting – Bagging – Different ways to Combine Classifiers – Probability and Learning – Data into Probabilities – Basic Statistics – Gaussian Mixture Models – Nearest Neighbor Methods – Unsupervised Learning – K means Algorithms – Vector Quantization – Self Organizing Feature Map

**UNIT IV DIMENSIONALITY REDUCTION AND EVOLUTIONARY MODELS**

9

Dimensionality Reduction – Linear Discriminant Analysis – Principal Component Analysis – Factor Analysis – Independent Component Analysis – Locally Linear Embedding – Isomap – Least Squares Optimization – Evolutionary Learning – Genetic algorithms – Genetic Offspring: - Genetic Operators – Using Genetic Algorithms – Reinforcement Learning – Overview – Getting Lost Example – Markov Decision Process

**UNIT V GRAPHICAL MODELS**

9

Markov Chain Monte Carlo Methods – Sampling – Proposal Distribution – Markov Chain Monte Carlo – Graphical Models – Bayesian Networks – Markov Random Fields – Hidden Markov Models – Tracking Methods

**TOTAL: 45 PERIODS**

**OUTCOMES:**

**Upon completion of this course, the students will be able to:**

- Distinguish between, supervised, unsupervised and semi-supervised learning
- Apply the appropriate machine learning strategy for any given problem
- Suggest supervised, unsupervised or semi-supervised learning algorithms for any given problem
- Design systems that uses the appropriate graph models of machine learning
- Modify existing machine learning algorithms to improve classification efficiency

**REFERENCES:**

- 1 Ethem Alpaydin, —Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series)I, Third Edition, MIT Press, 2014
- 2 Jason Bell, —Machine learning – Hands on for Developers and Technical ProfessionalsI, First Edition, Wiley, 2014
- 3 Peter Flach, —Machine Learning: The Art and Science of Algorithms that Make Sense of DataI, First Edition, Cambridge University Press, 2012.
- 4 Stephen Marsland, —Machine Learning – An Algorithmic PerspectiveI, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014.

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**OBJECTIVES:**

- Understand system requirements for mobile applications.
- Generate suitable design using specific mobile development frameworks.
- Generate mobile application design.
- Implement the design using specific mobile development frameworks.
- Deploy the mobile applications in marketplace for distribution.

**UNIT I INTRODUCTION 5**

Introduction to mobile applications – Embedded systems - Market and business drivers for mobile applications – Publishing and delivery of mobile applications – Requirements gathering and validation for mobile applications.

**UNIT II BASIC DESIGN 8**

Introduction – Basics of embedded systems design – Embedded OS - Design constraints for mobile applications, both hardware and software related – Architecting mobile applications – User interfaces for mobile applications – touch events and gestures – Achieving quality constraints – performance, usability, security, availability and modifiability.

**UNIT III ADVANCED DESIGN 8**

Designing applications with multimedia and web access capabilities – Integration with GPS and social media networking applications – Accessing applications hosted in a cloud computing environment – Design patterns for mobile applications.

**UNIT IV ANDROID 12**

Introduction – Establishing the development environment – Android architecture – Activities and views – Interacting with UI – Persisting data using SQLite – Packaging and deployment – Interaction with server side applications – Using Google Maps, GPS and Wifi – Integration with social media applications.

**UNIT V IOS 12**

Introduction to Objective C – iOS features – UI implementation – Touch frameworks – Data persistence using Core Data and SQLite – Location aware applications using Core Location and Map Kit – Integrating calendar and address book with social media application – Using Wifi - iPhone marketplace.

**TOTAL :45 PERIODS****OUTCOMES:****Upon completion of the course, the students should be able to:**

- Describe the requirements for mobile applications.
- Explain the challenges in mobile application design and development.
- Develop design for mobile applications for specific requirements.
- Implement the design using Android SDK.
- Implement the design using Objective C and iOS.
- Deploy mobile applications in Android and iPhone marketplace for distribution.

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**A ROBUST HAND GESTURE RECOGNITION  
METHOD VIA MACHINE LEARNING  
ALGORITHMS**



PHASE II REPORT

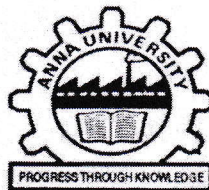
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**MASTER OF ENGINEERING IN  
COMPUTER SCIENCE AND ENGINEERING**



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**APRIL 2021**

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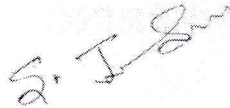
  
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## BONAFIDE CERTIFICATE

Certified that this report titled "A ROBUST HAND GESTURE RECOGNITION METHOD VIA MACHINE LEARNING ALGORITHMS" is the bonafide work of "PRINCY DIANA A (621119405002)" who carried out the project work under my supervision. Certified further that to the best of my knowledge the work reported here in does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.



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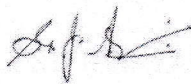
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## ABSTRACT

Hand Gesture Recognition is an engaging way to interact with the people. A primary goal of this Gesture Recognition Research is to create a system which can identify Hand Gestures and recognize the Hand Sign Languages and then converting the message into the text and speech. The translated text and speech reduce the demand of intermediate translators of the Sign Language and also provides a feasible Communication. The system recognizes live motion of the hand gestures and detects sign and the message. This Hand Gesture recognition system is used for interfacing between computer and human using Sign Language. Hand Gesture Recognition System is gaining more attention because of their demand in Communication system and also in Security Systems. Though they have sign language, they have to depend on some sort of visual communication. This system detects the hand gestures i.e. sign language through the web camera and converts it into speech and text through Machine Learning algorithm. The machine learning algorithms includes KNN , Deep Learning , and Tensor Flow to recognize a number of different gestures classes.

**OBJECTIVES:**

- To understand the concepts of virtualization and virtual machines
- To gain expertise in server, network and storage virtualization.
- To understand and deploy practical virtualization solutions and enterprise solutions
- To gain knowledge on the concept of virtualization that is fundamental to cloud computing
- To understand the various issues in cloud computing
- To be able to set up a private cloud
- To understand the security issues in the grid and the cloud environment

**UNIT I VIRTUALIZATION 9**

Basics of Virtual Machines - Process Virtual Machines – System Virtual Machines – Emulation – Interpretation – Binary Translation - Taxonomy of Virtual Machines. Virtualization – Management Virtualization – Hardware Maximization – Architectures – Virtualization Management – Storage Virtualization – Network Virtualization

**UNIT II VIRTUALIZATION INFRASTRUCTURE 9**

Comprehensive Analysis – Resource Pool – Testing Environment – Server Virtualization – Virtual Workloads – Provision Virtual Machines – Desktop Virtualization – Application Virtualization – Implementation levels of virtualization – virtualization structure – virtualization of CPU, Memory and I/O devices – virtual clusters and Resource Management – Virtualization for data center automation.

**UNIT III CLOUD PLATFORM ARCHITECTURE 9**

Cloud deployment models: public, private, hybrid, community – Categories of cloud computing: Everything as a service: Infrastructure, platform, software- A Generic Cloud Architecture Design – Layered cloud Architectural Development – Virtualization Support and Disaster Recovery – Architectural Design Challenges - Public Cloud Platforms : GAE, AWS – Inter-cloud Resource Management

**UNIT IV PROGRAMMING MODEL 9**

Introduction to Hadoop Framework - Mapreduce, Input splitting, map and reduce functions, specifying input and output parameters, configuring and running a job – Developing Map Reduce Applications - Design of Hadoop file system – Setting up Hadoop Cluster - Cloud Software Environments - Eucalyptus, Open Nebula, Open Stack, Nimbus

**UNIT V CLOUD SECURITY 9**

Cloud Infrastructure security: network, host and application level – aspects of data security, provider data and its security, Identity and access management architecture, IAM practices in the cloud, SaaS, PaaS, IaaS availability in the cloud - Key privacy issues in the cloud – Cloud Security and Trust Management

**TOTAL : 45 PERIODS****OUTCOMES:**

Upon completion of this course, the students should be able to:

- Employ the concepts of storage virtualization, network virtualization and its management
- Apply the concept of virtualization in the cloud computing
- Identify the architecture, infrastructure and delivery models of cloud computing
- Develop services using Cloud computing
- Apply the security models in the cloud environment

**REFERENCES:**

1. Danielle Ruest, Nelson Ruest, —Virtualization: A Beginner's Guide, McGraw-Hill Osborne Media, 2009.
2. Jim Smith, Ravi Nair, "Virtual Machines: Versatile Platforms for Systems and Processes", Elsevier/Morgan Kaufmann, 2005
3. John W. Rittinghouse and James F. Ransome, "Cloud Computing: Implementation, Management, and Security", CRC Press, 2010.
4. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.
5. Tim Mather, Subra Kumaraswamy, and Shahed Latif, "Cloud Security and Privacy", O'Reilly Media, Inc., 2009.
6. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach", McGraw-Hill Osborne Media, 2009.

**OBJECTIVES:**

- To understand the architecture of embedded processor, microcontroller and peripheral devices.
- To interface memory and peripherals with embedded systems.
- To study the embedded network environment.
- To understand challenges in Real time operating systems.
- To study, analyze and design applications on embedded systems.

**UNIT I EMBEDDED PROCESSORS**

9

Embedded Computers - Characteristics of Embedded Computing Applications - Challenges in Embedded Computing System Design - Embedded System Design Process- Formalism for System Design - Structural Description - Behavioural Description - ARM Processor - Intel ATOM Processor.

**UNIT II EMBEDDED COMPUTING PLATFORM**

9

CPU Bus Configuration - Memory Devices and Interfacing - Input/Output Devices and Interfacing - System Design - Development and Debugging - Emulator - Simulator - JTAG Design Example - Alarm Clock - Analysis and Optimization of Performance - Power and Program Size.

**UNIT III EMBEDDED NETWORK ENVIRONMENT**

9

Distributed Embedded Architecture - Hardware And Software Architectures - Networks for Embedded Systems - I2C - CAN Bus - SHARC Link Supports - Ethernet - Myrinet - Internet - Network-based Design - Communication Analysis - System Performance Analysis - Hardware Platform Design - Allocation and Scheduling - Design Example - Elevator Controller.

**UNIT IV REAL-TIME CHARACTERISTICS**

9

Clock Driven Approach - Weighted Round Robin Approach - Priority Driven Approach - Dynamic versus Static Systems - Effective Release Times and Deadlines - Optimality of the Earliest Deadline First (EDF) Algorithm - Challenges in Validating Timing Constraints in Priority Driven Systems - Off-Line versus On-Line Scheduling.

**UNIT V SYSTEM DESIGN TECHNIQUES**

9

Design Methodologies - Requirement Analysis - Specification - System Analysis and Architecture Design - Quality Assurance - Design Examples - Telephone PBX - Ink jet printer - Personal Digital Assistants - Set-Top Boxes.

**TOTAL: 45 PERIODS****OUTCOME:****Upon completion of the course, the students should be able to**

- Understand different architectures of embedded processor, microcontroller and peripheral devices. Interface memory and peripherals with embedded systems.
- Work with embedded network environment.
- Understand challenges in Real time operating systems.
- Design and analyze applications on embedded systems.

**REFERENCES:**

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2. Andrew N Sloss, D. Symes, C. Wright, I Arm system developers guidel, MorganKauffman/Elsevier, 2006.
3. Arshdeep Bahga, Vijay Madiseti, " Internet of Things: A Hands-on-Approach" VPT First Edition, 2014
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5. Frank Vahid and Tony Givargis, —Embedded System Design: A Unified Hardware/Software IntroductionI, John Wiley & Sons.
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*Gweni*  
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**OBJECTIVES:**

- To understand the fundamentals of Internet of Things
- To learn about the basics of IOT protocols
- To build a small low cost embedded system using Raspberry Pi.
- To apply the concept of Internet of Things in the real world scenario.

**UNIT I INTRODUCTION TO IoT**

9

Internet of Things - Physical Design- Logical Design- IoT Enabling Technologies - IoT Levels & Deployment Templates - Domain Specific IoTs - IoT and M2M - IoT System Management with NETCONF-YANG- IoT Platforms Design Methodology

**UNIT II IoT ARCHITECTURE**

9

M2M high-level ETSI architecture - IETF architecture for IoT - OGC architecture - IoT reference model - Domain model - information model - functional model - communication model - IoT reference architecture

**UNIT III IoT PROTOCOLS**

9

Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Unified Data Standards – Protocols – IEEE 802.15.4 – BACNet Protocol – Modbus– Zigbee Architecture – Network layer – 6LowPAN - CoAP - Security

**UNIT IV BUILDING IoT WITH RASPBERRY PI & ARDUINO**

9

Building IOT with RASPBERRY PI- IoT Systems - Logical Design using Python – IoT Physical Devices & Endpoints - IoT Device -Building blocks -Raspberry Pi -Board - Linux on Raspberry Pi - Raspberry Pi Interfaces -Programming Raspberry Pi with Python - Other IoT Platforms - Arduino.

**UNIT V CASE STUDIES AND REAL-WORLD APPLICATIONS**

9

Real world design constraints - Applications - Asset management, Industrial automation, smartgrid, Commercial building automation, Smart cities - participatory sensing - Data Analytics for IoT – Software & Management Tools for IoT Cloud Storage Models & Communication APIs - Cloud for IoT - Amazon Web Services for IoT.

**TOTAL : 45 PERIODS****OUTCOMES:**

Upon completion of this course, the students should be able to:

- Analyze various protocols for IoT
- Develop web services to access/control IoT devices.
- Design a portable IoT using Raspberry Pi
- Deploy an IoT application and connect to the cloud.
- Analyze applications of IoT in real time scenario

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4. Jan Ho" ller, Vlasios Tsiatsis , Catherine Mulligan, Stamatis , Karnouskos, Stefan Avesand. David Boyle, "From Machine-to-Machine to the Internet of Things - Introduction to a New Age of Intelligence", Elsevier, 2014.
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**A CLINICAL DECISION SUPPORT  
FRAMEWORK FOR HETEROGENEOUS DATA  
SOURCES FOR MEDICAL MANAGEMENT**



PHASE II REPORT

*Submitted by*

**SHARMILA DEVIN**

(Register No: 621119405002)

*in partial fulfillment for the award of the degree of*

**MASTER OF ENGINEERING**

**IN**

**Computer Science and Engineering**




**IDHAYA ENGINEERING COLLEGE FOR WOMEN,  
CHINNASALEM**

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**ANNA UNIVERSITY, CHENNAI**

**APRIL 2021**

  
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## BONAFIDE CERTIFICATE

Certified that this Report titled "A **CLINICAL DECISION SUPPORT FRAMEWORK FOR HETEROGENEOUS DATA SOURCES FOR MEDICAL MANAGEMENT**" is bonafide work of **Sharmila Devi N** (Register No: 621119405002) who carried out the work under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.



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Submitted for the Project Phase II viva voce held on **02/08/21**



**INTERNAL EXAMINER**




**EXTERNAL EXAMINER**

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## ABSTRACT

To keep pace with the developments in medical informatics, health medical data is being collected continually. But, owing to the diversity of its categories and sources, medical data has become highly complicated in many hospitals that it now needs Clinical Decision Support (CDS) system for its management. To effectively utilize the accumulating health data, we propose a CDS framework that can integrate heterogeneous health data from different sources, such as laboratory test results, basic information of patients, and health records into a consolidated representation of features of all patients. Using the electronic health medical data so created, multi-label classification was employed to recommend a list of diseases and thus assist physicians in diagnosing or treating their patients' health issues more efficiently. Once the physician diagnoses the disease of a patient, the next step is to consider the likely complications of that disease, which can lead to more diseases. Previous studies reveal that correlations do exist among some diseases. Considering these correlations, a k-nearest neighbor's algorithm is improved for multi-label learning by using correlations among labels (CML- $k$ NN). The CML- $k$ NN algorithm first exploits the dependency between every two labels to update the origin label matrix and then performs multi-label learning to estimate the probabilities of labels by using the integrated features. Finally, it recommends the top N diseases to the physicians.

  
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