ANNAI VAILANKANNI COLLEGE OF ENGINEERING

(A Christian Minority Institution)

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Website: www.avce.edu.in

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AUTHENTICATION CERTIFICATE

The project work evaluation of PG students for the academic year 2022-2023 was conducted in October 2023. The data for 2023-2024 is not under our assessment period.

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Academic Year 2022-23 (EVEN- Semester)

CE 8811 - PROJECT WORK DETAILS

Sl.No	Batch No	REG NO	NAME OF THE STUDENT	F THE SUPERVISOR WITH	TITLE OF THE PROJECT WORK
1	B-1	960119103001	CHITRA A	MRS.M.MORRIN GRACIDA,ME., Assitant Professor AVCE 9601173	Experimental Investigation on Behaviour Of Strength Aspects of Concrete Using COCO-PEAT
2		960119103003	LAKSHMI E		
3		960119103301	RAJAN K		
1	B-2	960119103002	KARTHIKA C	MS.J.REMILA, ME., Assistant Profesor AVCE 9601213	Comparison on Replacement of Oyster Shells as Coarse Aggregate in Concrete
2		960119103004	SUBINRAJ T		
3		960119103005	UMA R		

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EXPERIMENTAL INVESTIGATON ON BEHAVIOR OF STRENGTH ASPECTS OF CONCRETE USING COCO-PEAT

A PROJECT REPORT

Submitted by

LAKSHMI. E	960119103003
CHITRA. A	960119103001
RAJAN. K	960119103301

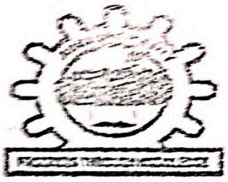
in partial fulfilment for the award of the degree

of

BACHELOR OF ENGINEERING

in

CIVIL ENGINEERING



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BONAFIDE CERTIFICATE

Certified that project report "EXPERIMENTAL INVESTIGATON ON BEHAVIOR OF STRENGTH ASPECTS OF CONCRETE USING COCO-PEAT" is the bonafide work done by "LAKSHMI .E (969119103003), CHITRA. A (960119103001), RAJAN. K (960119103301)" who carried out the project work under my supervision.

22/5/23

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INTERNAL EXAMINER

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ABSTRACT

Concrete is a construction material composed of cement, aggregates (fine and coarse aggregates), water and admixtures.

Today many researches are ongoing into the use of fine aggregate replacements, using many waste materials like, saw dust, wooden powder, sugar cane bagasse ash or sugarcane residue etc.

In this study, coco peat was used as a partial replacement to the concrete ingredient i.e. fine aggregate and the mechanical properties like compressive strength and split tensile strength were measured and the effect of coco peat on strength of concrete.

For checking strength effect of partial replacement of fine aggregate by coco peat, the fine aggregate is replaced at 1%, 2%, 3% and 4%.

The physical and chemical properties such as specific gravity, fineness modulus, water absorption etc., were experimentally determined.

For this study, concrete mixtures were prepared, for low grade M20.

Strength studies like compressive strength and split tensile strength were conducted and comparisons have to be made with the conventional concrete.

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COMPARISION ON PARTIAL REPLACEMENT OF OYSTER SHELLS AS COARSE AGGREGATE IN CONCRETE

A PROJECT REPORT

Submitted by

KARTHIKA.C	960119103002
SUBIN RAJ.T	960119103004
UMA.R	960119103005

In partial fulfillment for the award of the degree

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The project report submitted for the viva voce held on 22/05/2023....

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ACKNOWLEDGEMENT

First I would like to thank the almighty GOD for this wonderful presence with us for selecting this project.

We express our profound gratitude to Mr.D.PETER JESUDHAS,M.B.A. Chairman of Annai Vailankanni College of Engineering for providing this grateful opportunity to take up this project.

We express our sincere thanks to our principal, Dr.A.ABILASH M.E.,PhD., Annai Vailankanni College of Engineering for having made available the required facilities for the successful completion of the project.

We express our sincere thanks to our head of the department Mrs.M.MORRIN GRACIDA M.E. who extended her helping hands and effective guidance for completing this project.

This is a great pleasure to express our deep sense of gratitude and thanks to our guide Miss. J. REMILA M.E for her ideas effective support and continued encouragement, which enabled for successful completion of this project.

We also express our thanks to other staff members of Civil Engineering Department for their valuable supports.

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CHAPTER-9

CONCLUSION

Based on this experimental study, it is concluded that the mix can be made by replacing oyster shell for coarse aggregate without decreasing strength. 15% of replacement of oyster shell for coarse aggregate has produced maximum compressive strength and split tensile strength.

The comparative with ordinary concrete with oyster shell replaced concrete gave better performance in strength. Thus the study gave the results in increasing the strength of the concrete by replacing the oyster shell for coarse aggregate.

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TEXTBOOKS:

1. Subramanya.K ,"Flow in open channels", Tata McGraw Hill, New Delhi, 2000.
2. Modi P.N and Seth.S.M "Hydraulics and Fluid Mechanics including Hydraulic Machines", Standard Book House New Delhi, 2009.
3. Chandramouli P.N.,"Applied Hydraulic Engineering", Yes Dee Publishing Pvt. Ltd., 2017.

REFERENCES:

1. Ven Te Chow, "Open Channel Hydraulics", McGraw Hill, New York, 2009.
2. Hanif Chaudhry.M., "Open Channel Flow", Second Edition, Springer, 2007.
3. Rajesh Srivastava, "Flow through open channels", Oxford University Press, New Delhi, 2008.
4. Jain.A.K., " Fluid Mechanics" (Including Hydraulic Machines), Khanna Publishers, Twelfth Edition, 2016.
5. Subramanya.K., " Fluid Mechanics and Hydraulic Machines", Tata McGraw Hill Education Private Limited, New Delhi, 2010.

CE8404 **CONCRETE TECHNOLOGY** **L T P C**
3 0 0 3

OBJECTIVE:

- To impart knowledge to the students on the properties of materials for concrete by suitable tests, mix design for concrete and special concretes.

UNIT I CONSTITUENT MATERIALS **9**

Cement - Different types - Chemical composition and Properties – Hydration of cement - Tests on cement - IS Specifications - Aggregates – Classification - Mechanical properties and tests as per BIS - Grading requirements – Water - Quality of water for use in concrete.

UNIT II CHEMICAL AND MINERAL ADMIXTURES **9**

Accelerators – Retarders - Plasticizers - Super plasticizers - Water proofers - Mineral Admixtures like Fly Ash, Silica Fume, Ground Granulated Blast Furnace Slag and Metakaoline - Effects on concrete properties.

UNIT III PROPORTIONING OF CONCRETE MIX **9**

Principles of Mix Proportioning - Properties of concrete related to Mix Design - Physical properties of materials required for Mix Design - Design Mix and Nominal Mix - BIS Method of Mix Design - Mix Design Examples

UNIT IV FRESH AND HARDENED PROPERTIES OF CONCRETE **9**

Workability - Tests for workability of concrete - Segregation and Bleeding - Determination of strength Properties of Hardened concrete - Compressive strength – split tensile strength - Flexural strength - Stress-strain curve for concrete - Modulus of elasticity – durability of concrete – water absorption – permeability – corrosion test – acid resistance.

UNIT V SPECIAL CONCRETES **9**

Light weight concretes - foam concrete- self compacting concrete – vacuum concrete - High strength concrete - Fibre reinforced concrete – Ferrocement - Ready mix concrete – SIFCON - Shotcrete – Polymer concrete - High performance concrete - Geopolymer Concrete

TOTAL: 45 PERIODS

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1	B-1	960119104003	ANTONY NIVI SNEHA A	Mrs.Anon K Jenifer ME., Assistant professor AVCE	LEAF DISEASE IDENTIFICATION USING IMAGE PROCESSING BASED ON CNN ALGORITHM
2		960119104009	KANAKAVALLI L		
3		960119104017	SIVARANJINI K		
1	B-2	960119104005	AVINESH V	Mrs.Sweety Amiss ME., Assistant professor AVCE	VOICE BASED ONLINE EXAMINATION FOR VISUALLY CHALLENGED CANDIDATES
2		960119104006	BALA SURESH K		
3		960119104010	KAVIN M		
1	B-3	960119104001	ABIRAMI A	Mrs.Sivakala.S ME., Assistant professor AVCE	REAL TIME CLICKBAIT AND BIOMETRIC ATM USER AUTHENTICATION AND MULTIPLE BANK TRANSACTION SYSTEM
2		960119104014	RANISHKA M		
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1	B-4	960119104012	MARIA PRATHIBA A	Mrs.Anon K Jenifer ME., Assistant professor AVCE	MALICIOUS MINING CODE DETECTION USING MACHINE LEARNING ALGARITHMS
2		960119104013	PRATHEESH F		
3		960119104018	SOWMIYA M		
1	B-5	960119104004	ASIA JULIET S	Mrs.Anon K Jenifer ME., Assistant professor AVCE	DRIVER DRWSINESS DETECTION BASED ON FACE FEATURE AND PERCLOS
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LEAF DISEASE IDENTIFICATION USING IMAGE PROCESSING BASED ON CNN ALGORITHM

A PROJECT REPORT

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ABSTRACT

The detection of plant leaf is a very important factor to prevent serious outbreak. Automatic detection of plant disease is essential research topic. The commitment of a plant is very imperative for both human life and condition. More often than not when the illness of a plant has not been dealt with, the plant bites the dust or may cause leaves drop, blossoms and organic products drop and so on . In this paper, we have presented a strategy named as Bacterial searching improvement based Convolution Neural Network (CNN) for recognizable proof and characterization of plant leaf illnesses naturally. For doling out ideal weight to Convolution Neural Network (CNN) we utilize bacterial searching streamlining (BFO) that further expands the speed and exactness of the system to recognize and arrange the districts tainted of various infections on the plant leafs.

CHAPTER 9

CONCLUSION AND FUTURE ENHANCEMENT:

9.1 Conclusion:

The plant serves as the bas ic need for any living organisms. They are the most important and integral part of our surroundings. Just like a human or other living organism does plant do suffer from different kind of diseases. Such diseases are harmful to plant in a number of ways like can affect the growth of the plant, flowers, fruits, and leaves etc. due to which a plant may even die. So in this work, we have proposed a novel method named as Bacterial foraging optimization based Convolution Neural Network (BCNN) for identification and classification of plant leaf diseases. The results, when compared with other methods, show that the proposed method achieves higher performance both in terms of identification and classification of plant leaf diseases.

9.2 Future enhancement:

In future work, we can extend our approach to improve the accuracy using neural network classification algorithms in order to increase the recognition rate and severity of the detected disease.

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VOICE BASED ONLINE EXAMINATION FOR VISUALLY CHALLENGED CANDIDATES

A PROJECT REPORT

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ABSTRACT

The evaluation of physically challenged is always a challenging task as any evaluation of them is compared with that of normal candidates. The case of visually challenged is still more difficult as vision is a numero uno sensor in the field of study and knowledge enhancement and evaluation of them on pair with another candidate is very difficult. The aim of this project is to present an approach for E-evaluation model for the visually challenged students/candidates for the screening tests conducted by the different voice based examination authorities. The major attempt is made to use the personal computer and avoid the use of a scriber by the candidate so that candidate can take the voice based exam independently. This voice recognition using Google Text To Speech Algorithm (GTTS). A portion of the PC keyboard is slightly modified in its software functionality to help them in undergoing the test using GTTS. Also described is the functioning of this model of E-Evaluation and its relative advantages.

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CHAPTER 10

CONCLUSION AND FUTURE ENHANCEMENT

Online Voice based examination has been developed and the system was tested with proper data. The system results in regular timing preparation of the required output. In comparison with the manual system, the benefit under a computer system considerable in to saving of manpower, working hour and efforts.

It can observe that the information required can be obtained with ease and accuracy in the computerized system. The user with minimum knowledge about computer can be able operate the system easily. Online message has been provided to help the user to take necessary, correct action while using the system. In futurethis software can be used by any institute as it can be modified easily; additional features can be added without interrupting the normal functioning of the system.

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Real Time Secure Clickbait and Biometric ATM User Authentication and Multiple Bank Transaction System

A PROJECT REPORT

Submitted by

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RANISHKA M (960119104014)

RONALD A (960119104015)

In partial fulfillment for the award of the degree

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ABSTRACT

ATM or Automated Teller Machines are widely used by people nowadays. Performing cash withdrawal transaction with ATM is increasing day by day. ATM is very important device throughout the world. The existing conventional ATM is vulnerable to crimes because of the rapid technology development. A total of 270,000 reports have been reported regarding debit card fraud and this was the most reported form of identity theft in 2021. A secure and efficient ATM is needed to increase the overall experience, usability, and convenience of the transaction at the ATM. In today's world, the area of computer vision is advancing at a breakneck pace. The recent progress in biometric identification techniques, including finger printing, retina scanning, and facial recognition has made a great effort to rescue the unsafe situation at the ATM. Specifically, the goal of this project is to give a computer vision method to solve the security risk associated with accessing ATM machines. This project proposes an automatic teller machine security model that uses electronic facial recognition using Deep Convolutional Neural Network. If this technology becomes widely used, faces would be protected as well as their accounts. Face Verification Clickbait Link will be generated and sent to bank account holder to verify the identity of unauthorized user through some dedicated artificial intelligent agents, for remote certification.

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CHAPTER 10
CONCLUSION AND FURTURE SCOPE

10.1 CONCLUSION

Biometrics as means of identifying and authenticating account owners at the Automated Teller Machines gives the needed and much anticipated solution to the problem of illegal transactions. In this project, we have developed to proffer a solution to the much-dreaded issue of fraudulent transactions through Automated Teller Machine by biometrics and Unknown Face Forwarder that can be made possible only when the account holder is physically or far present. Thus, it eliminates cases of illegal transactions at the ATM points without the knowledge of the authentic owner. Using a biometric feature for identification is strong and it is further fortified when another is used at authentication level. The ATM security design incorporates the possible proxy usage of the existing security tools (such as ATM Card) and information (such as PIN) into the existing ATM security mechanisms. It involves, on real-time basis, the bank account owner in all the available and accessible transactions.

MALICIOUS MINING CODE DETECTION USING MACHINE LEARNING ALGORITHMS

A PROJECT REPORT

Submitted by

MARIA PRATHIBA A (960119104012)

PRATHEESH F (960119104013)

SOWMIYA M (960119104018)

In partial fulfillment for the award of the degree

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BONAFIDECERTIFICATE

Certified that this report **"MALICIOUS MINING CODE DETECTION USING MACHINE LEARNING ALGORITHMS"** is the bonafide work of **Maria Prathiba A(960119104012), Pratheesh F (960119104013), Sowmiya M (960119104018)** who carried out the project work under my supervision.

22/5/23
SIGNATURE

Mrs.Anon.K.Jenifer,ME(Ph.D),
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Submitted for the Project Viya Voice held on 22-05-2023 at **Annai Vailankanni College Of Engineering,** Pottalkulam, Kanyakumari.

22/5/23
INTERNAL EXAMINER

22/5/2023
EXTERNAL EXAMINER

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ABSTRACT

Malware detection developer faced a problem for a generation of new signature of malware code. A very famous and recognized technique is pattern-based malware code detection technique. This leads to the evasion of signatures that are built based on the code syntax. In this paper, we discuss some well-known method of malware detection based on semantic feature extraction technique. In current decade, most of authors focused on malware feature extraction process for generic detection process. The effectiveness of the Malicious Sequence Pattern Matching technique for malware detection invites for moderation and improvement of the current system and method. Some authors used rule mining technique, some other used graph technique and some also focused on feature clustering process of malware detection.

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CHAPTER 9

CONCLUTION AND FUTURE WORK

9.1 CONCLUSION

To develop a data-mining- based detection framework called Malicious Sequential Pattern based Malware Detection (MSPMD), which is composed of the proposed sequential pattern mining algorithm (MSPE) and SVM classifier. It first extracts instruction sequences from the PE file samples and conducts feature selection before mining; then MSPE is applied to generate malicious sequential patterns. For the testing file samples, after feature representation, SVM classifier is constructed for malware detection. The promising experimental results on real data collection demonstrate that our frame works out performs other alternate data mining base detection methods in identifying new malicious executables. Unlike the previous research which are unable to mined is criminative features, we propose to use sequence mining algorithm on instruction sequence to extract well representative features.

DRIVER DROWSINESS DETECTION BASED ON FACE FEATURE AND PERCLOS

A PROJECT REPORT

Submitted by

ASIA JULIET S (960119104004)
ISHWARYA P (960119104008)
LIPTO SHAJIN R (960119104011)

in partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

IN

COMPUTER SCIENCE AND ENGINEERING

ANNAI VAILANKANNI COLLEGE OF ENGINEERING
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MAY 2023

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BONAFIDE CERTIFICATE

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ABSTRACT

Driving vehicles are complex and require undivided attention to prevent road accidents. Fatigue and distraction are a major risk factor that causes traffic accidents, severe injuries, and a high risk of death. Some progress has been made for driver drowsiness detection using a contact-based method that utilizes vehicle parts such as steering angle and pressure on the pedal and physiological signals like electrocardiogram and electromyogram. However, a contactless system is more potential for real-world conditions. we propose a computer vision based method to detect driver's drowsiness from a video taken by a camera. The method attempts to recognize the face and then detecting the eye in every frame. From the detected eye, iris regions for left and right eyes are used to calculate the PERCLOS measure (the percentage of total time that eye is closed). The proposed method was evaluated based on public YawDD video dataset. The results found that PERCLOS value when the driver is alert is lower than when the driver is drowsy.

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CHAPTER 9
CONCLUSION AND FUTURE ENHANCEMENT

9.1 CONCLUSION

In this paper, we have presented the concept and implemented a system to detect driver drowsiness using computer vision which focuses to notify the driver if he is drowsy. The proposed system has the capability to detect the real time state of the driver in day and night conditions with the help of a camera. The detection of the Face and Eyes applied based on the symmetry. We have developed a non-intrusive prototype of a computer vision-based system for real-time monitoring of the driver's drowsiness.

9.2 FUTURE ENHANCEMENT

For future work, the objective will be to reduce the percentage error, that is, reduce the amount of false alarms. To achieve this, development of additional entities or experiments will be done, using better drivers and incorporating new analysis modules, for example, facial expressions(yawns).

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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.

IT8072 **EMBEDDED SYSTEMS** **L T P C 3 0 0 3**

OBJECTIVES:

- To learn the architecture and programming of ARM processor.
- To become familiar with the embedded computing platform design and analysis.
- To get thorough knowledge in interfacing concepts
- To design an embedded system and to develop programs

UNIT I INTRODUCTION TO EMBEDDED COMPUTING AND ARM PROCESSORS **9**

Complex systems and micro processors– Embedded system design process –Design example: Model train controller- Instruction sets preliminaries - ARM Processor – CPU: programming input and output- supervisor mode, exceptions and traps – Co-processors- Memory system mechanisms – CPU performance- CPU power consumption.

UNIT II EMBEDDED COMPUTING PLATFORM DESIGN **9**

The CPU Bus-Memory devices and systems–Designing with computing platforms – consumer electronics architecture – platform-level performance analysis - 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 III SENSOR INTERFACING WITH ARDUINO **9**

Basics of hardware design and functions of basic passive components-sensors and actuators-Arduino code - library file for sensor interfacing-construction of basic applications

UNIT IV EMBEDDED FIRMWARE **9**

Reset Circuit, Brown-out Protection Circuit-Oscillator Unit - Real Time Clock-Watchdog Timer - Embedded Firmware Design Approaches and Development Languages.

UNIT V EMBEDDED C PROGRAMMING **9**

Introduction-Creating 'hardware delays' using Timer 0 and Timer 1-Reading switches-Adding Structure to the code-Generating a minimum and maximum delay-Example: Creating a portable hardware delay- Timeout mechanisms-Creating loop timeouts-Testing loop timeouts- hardware timeouts-Testing a hardware timeout

TOTAL : 45 PERIODS

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CS8082

MACHINE LEARNING TECHNIQUES

L T P C
3 0 0 3

OBJECTIVES:

- To understand the need for machine learning for various problem solving
- To study the various supervised, semi-supervised and unsupervised learning algorithms in machine learning
- To understand the latest trends in machine learning
- To design appropriate machine learning algorithms for problem solving

UNIT I INTRODUCTION 9

Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search.

UNIT II NEURAL NETWORKS AND GENETIC ALGORITHMS 9

Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evaluation and Learning.

UNIT III BAYESIAN AND COMPUTATIONAL LEARNING 9

Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

UNIT IV INSTANT BASED LEARNING 9

K- Nearest Neighbour Learning – Locally weighted Regression – Radial Basis Functions – Case Based Learning.

UNIT V ADVANCED LEARNING 9

Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning

TOTAL :45 PERIODS

OUTCOMES:

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

- Differentiate between supervised, unsupervised, semi-supervised machine learning approaches
- Discuss the decision tree algorithm and indentity and overcome the problem of overfitting
- Discuss and apply the back propagation algorithm and genetic algorithms to various problems
- Apply the Bayesian concepts to machine learning
- Analyse and suggest appropriate machine learning approaches for various types of problems

TEXT BOOK:

1. Tom M. Mitchell, "Machine Learning", McGraw-Hill Education (India) Private Limited, 2013.

REFERENCES:

1. Ethem Alpaydín, "Introduction to Machine Learning (Adaptive Computation and Machine Learning)", The MIT Press 2004.
2. Stephen Marsland, "Machine Learning: An Algorithmic Perspective", CRC Press, 2009.

REFERENCES:

1. Adrian Perrig, J. D. Tygar, "Secure Broadcast Communication: In Wired and Wireless Networks", Springer, 2006.
2. Carlos De Morais Cordeiro, Dharma Prakash Agrawal "Ad Hoc and Sensor Networks: Theory and Applications (2nd Edition), World Scientific Publishing, 2011.
3. C.Siva Ram Murthy and B.S.Manoj, "Ad Hoc Wireless Networks – Architectures and Protocols", Pearson Education, 2004.
4. C.K.Toh, "Ad Hoc Mobile Wireless Networks", Pearson Education, 2002.
5. Erdal Çayırcı , Chunming Rong, "Security in Wireless Ad Hoc and Sensor Networks", John Wiley and Sons, 2009.
6. Holger Karl, Andreas willig, Protocols and Architectures for Wireless Sensor Networks, John Wiley & Sons, Inc .2005.
7. Subir Kumar Sarkar, T G Basavaraju, C Puttamadappa, "Ad Hoc Mobile Wireless Networks", Auerbach Publications, 2008.
8. Waltenegus Dargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks Theory and Practice", John Wiley and Sons, 2010.

CP5292 **INTERNET OF THINGS** **L T P C**

3 0 0 3

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 RASPERRY 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, smart grid, Commercial building automation, Smart cities - participatory sensing - Data Analytics for IoT – Software & Management Tools for IoT Cloud Storage Models & Communication APIs - Cloud for IoT -

TEXTBOOKS:

1. Singhal J.P. "Disaster Management", Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN-13: 978-9380386423
2. Tushar Bhattacharya, "Disaster Science and Management", McGraw Hill India Education Pvt. Ltd., 2012. **ISBN-10:** 1259007367, **ISBN-13:** 978-1259007361]
3. Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011
4. Kapur Anu Vulnerable India: A Geographical Study of Disasters, IIAS and Sage Publishers, New Delhi, 2010:

REFERENCES

1. Govt. of India: Disaster Management Act , Government of India, New Delhi, 2005
2. Government of India, National Disaster Management Policy,2009.

EC8093 **DIGITAL IMAGE PROCESSING** **L T P C 3 0 0 3**

OBJECTIVES:

- To become familiar with digital image fundamentals
- To get exposed to simple image enhancement techniques in Spatial and Frequency domain.
- To learn concepts of degradation function and restoration techniques.
- To study the image segmentation and representation techniques.
- To become familiar with image compression and recognition methods

UNIT I DIGITAL IMAGE FUNDAMENTALS **9**

Steps in Digital Image Processing – Components – Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels - Color image fundamentals - RGB, HSI models, Two-dimensional mathematical preliminaries, 2D transforms - DFT, DCT.

UNIT II IMAGE ENHANCEMENT **9**

Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering– Smoothing and Sharpening Spatial Filtering, Frequency Domain: Introduction to Fourier Transform– Smoothing and Sharpening frequency domain filters – Ideal, Butterworth and Gaussian filters, Homomorphic filtering, Color image enhancement.

UNIT III IMAGE RESTORATION **9**

Image Restoration - degradation model, Properties, Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering

UNIT IV IMAGE SEGMENTATION **9**

Edge detection, Edge linking via Hough transform – Thresholding - Region based segmentation – Region growing – Region splitting and merging – Morphological processing- erosion and dilation, Segmentation by morphological watersheds – basic concepts – Dam construction – Watershed segmentation algorithm.

UNIT V IMAGE COMPRESSION AND RECOGNITION **9**

Need for data compression, Huffman, Run Length Encoding, Shift codes, Arithmetic coding, JPEG standard, MPEG. Boundary representation, Boundary description, Fourier Descriptor, Regional Descriptors – Topological feature, Texture - Patterns and Pattern classes - Recognition based on matching.

TOTAL : 45 PERIODS

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Academic Year 2022-23 (EVEN- Semester)

EC8811 PROJECT WORK

Sl.No	Batch No	REG NO	NAME OF THE STUDENT	NAME OF THE SUPERVISOR WITH STAFF ID	TITLE OF THE PROJECT WORK
1	B-1	960119106001	AARTHI S	MR.J.JAYAKUMAR	SMART METER FIRMWARE FOR MONITOR AND CONTROL THE ELECTRICAL APPLIANCES CONSUMPTION
2		960119106003	AKILAN N		
3		960119106008	KAVITHA V		
4		960119106016	SANTHOSH G		
1	B-2	960119106011	NANTHINI A	MRS.E.RAJESHWARI	RTO DASHBOARD FOR VEHICLE ACCIDENT REPORTING AND RESCUE SYSTEM
2		960119106015	RABISHA V		
3		960119106014	PONSEKAR C		
4		960119106006	DHANESH R		
5		960119106009	LIJU L		
1	B-3	960119106017	SARANYA T	MR.R.ROBERT	LUNG CANCER DETECTION USING MAT LAB
2		960119106018	THANAREKA R		
3		960119106005	BABISHA M		
4		960119106013	NAVEEN KUMAR S		
1	B-4	960119106002	AKALYA M	MRS.P.RENUKA	IMPLEMENTATION OF BIOMETRIC ATTEDANCE IN SIMULATION LAB OF AVCE
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3		960119106007	JERISHA C		
4		960119106012	NANTHINI N S		

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23/5/23

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BONAFIDE CERTIFICATE

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23/5/23

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TEXTBOOKS:

1. Singhal J.P. "Disaster Management", Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN-13: 978-9380386423
2. Tushar Bhattacharya, "Disaster Science and Management", McGraw Hill India Education Pvt. Ltd., 2012. **ISBN-10:** 1259007367, **ISBN-13:** 978-1259007361]
3. Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011
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EC8093 **DIGITAL IMAGE PROCESSING**

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OBJECTIVES:

- To become familiar with digital image fundamentals
- To get exposed to simple image enhancement techniques in Spatial and Frequency domain.
- To learn concepts of degradation function and restoration techniques.
- To study the image segmentation and representation techniques.
- To become familiar with image compression and recognition methods

UNIT I DIGITAL IMAGE FUNDAMENTALS **9**

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UNIT III IMAGE RESTORATION **9**

Image Restoration - degradation model, Properties, Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering

UNIT IV IMAGE SEGMENTATION **9**

Edge detection, Edge linking via Hough transform – Thresholding - Region based segmentation – Region growing – Region splitting and merging – Morphological processing- erosion and dilation, Segmentation by morphological watersheds – basic concepts – Dam construction – Watershed segmentation algorithm.

UNIT V IMAGE COMPRESSION AND RECOGNITION **9**

Need for data compression, Huffman, Run Length Encoding, Shift codes, Arithmetic coding, JPEG standard, MPEG. Boundary representation, Boundary description, Fourier Descriptor, Regional Descriptors – Topological feature, Texture - Patterns and Pattern classes - Recognition based on matching.

TOTAL, 45 PERIODS

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2. Carlos De Morais Cordeiro, Dharma Prakash Agrawal "Ad Hoc and Sensor Networks: Theory and Applications (2nd Edition), World Scientific Publishing, 2011.
3. C.Siva Ram Murthy and B.S.Manoj, "Ad Hoc Wireless Networks – Architectures and Protocols", Pearson Education, 2004.
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6. Holger Karl, Andreas willig, Protocols and Architectures for Wireless Sensor Networks; John Wiley & Sons, Inc .2005.
7. Subir Kumar Sarkar, T G Basavaraju, C Puttamadappa, "Ad Hoc Mobile Wireless Networks", Auerbach Publications, 2008.
8. Waltenegus Dargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks Theory and Practice", John Wiley and Sons, 2010.

CP5292 **INTERNET OF THINGS** **L T P C**

3 0 0 3

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 RASPERRY 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, smart grid, Commercial building automation, Smart cities - participatory sensing - Data Analytics for IoT – Software & Management Tools for IoT Cloud Storage Models & Communication APIs - Cloud for IoT -

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CU5097 **WIRELESS ADHOC AND SENSOR NETWORKS** **L T P C**
3 0 0 3

OBJECTIVES:

- To understand the basics of Ad-hoc & Sensor Networks.
- To learn various fundamental and emerging protocols of all layers.
- To study about the issues pertaining to major obstacles in establishment and efficient management of Ad-hoc and sensor networks.
- To understand the nature and applications of Ad-hoc and sensor networks.
- To understand various security practices and protocols of Ad-hoc and Sensor Networks.

UNIT I MAC & TCP IN AD HOC NETWORKS **9**

Fundamentals of WLANs – IEEE 802.11 Architecture - Self configuration and Auto configuration-Issues in Ad-Hoc Wireless Networks – MAC Protocols for Ad-Hoc Wireless Networks – Contention Based Protocols - TCP over Ad-Hoc networks-TCP protocol overview - TCP and MANETs – Solutions for TCP over Ad-Hoc Networks.

UNIT II ROUTING IN AD HOC NETWORKS **9**

Routing in Ad-Hoc Networks- Introduction-Topology based versus Position based Approaches-Proactive, Reactive, Hybrid Routing Approach-Principles and issues – Location services - DREAM – Quorums based location service – Grid – Forwarding strategies – Greedy packet forwarding – Restricted directional flooding- Hierarchical Routing- **Issues and Challenges in providing QoS.**

UNIT III MAC, ROUTING & QOS IN WIRELESS SENSOR NETWORKS **9**

Introduction – Architecture - Single node architecture – Sensor network design considerations – Energy Efficient Design principles for WSNs – Protocols for WSN – Physical Layer : Transceiver Design considerations – MAC Layer Protocols – IEEE 802.15.4 Zigbee – Link Layer and Error Control issues - Routing Protocols – Mobile Nodes and Mobile Robots - Data Centric & Contention Based Networking – Transport Protocols & QOS – Congestion Control issues – Application Layer support.

UNIT IV SENSOR MANAGEMENT **9**

Sensor Management - Topology Control Protocols and Sensing Mode Selection Protocols - Time synchronization - Localization and positioning – Operating systems and Sensor Network programming – Sensor Network Simulators.

UNIT V SECURITY IN AD HOC AND SENSOR NETWORKS **9**

Security in Ad-Hoc and Sensor networks – Key Distribution and Management – Software based Anti-tamper techniques – water marking techniques – Defense against routing attacks - Secure Adhoc routing protocols – Broadcast authentication WSN protocols – TESLA – Biba – Sensor Network Security Protocols – SPINS.

TOTAL : 45 PERIODS

OUTCOMES:

Upon Completion of the course, the students should be able to

- Identify different issues in wireless ad hoc and sensor networks.
- To analyze protocols developed for ad hoc and sensor networks.
- To identify and address the security threats in ad hoc and sensor networks.
- Establish a Sensor network environment for different type of applications.

TEXT BOOK:

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

REFERENCES

1. B. Sklar, "Digital Communication Fundamentals and Applications", 2nd Edition, Pearson Education, 2009
2. B.P.Lathi, "Modern Digital and Analog Communication Systems" 3rd Edition, Oxford University Press 2007.
3. H P Hsu, Schaum Outline Series - "Analog and Digital Communications", TMH 2006
4. J.G Proakis, "Digital Communication", 4th Edition, Tata Mc Graw Hill Company, 2001.

EC8553 DISCRETE-TIME SIGNAL PROCESSING **L T P C**
4 0 0 4

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**

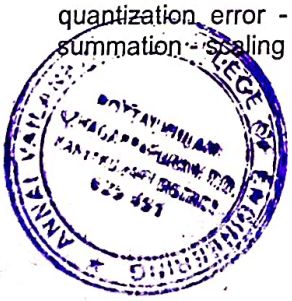
Characteristics of practical frequency selective filters. characteristics of commonly used analog filters - Butterworth filters, Chebyshev filters. Design of IIR filters from analog filters (LPF, HPF, BPF, BRF) - Approximation of derivatives, Impulse invariance method, Bilinear transformation. Frequency 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.



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EC8562 **DIGITAL SIGNAL PROCESSING LABORATORY** L T P C 0 0 4 2

OBJECTIVES:

The student should be made:

- To perform basic signal processing operations such as Linear Convolution, Circular Convolution, Auto Correlation, Cross Correlation and Frequency analysis in MATLAB
- To implement FIR and IIR filters in MATLAB and DSP Processor
- To study the architecture of DSP processor
- To design a DSP system to demonstrate the Multi-rate and Adaptive signal processing concepts.

LIST OF EXPERIMENTS: MATLAB / EQUIVALENT SOFTWARE PACKAGE

1. Generation of elementary Discrete-Time sequences
2. Linear and Circular convolutions
3. Auto correlation and Cross Correlation
4. Frequency Analysis using DFT
5. Design of FIR filters (LPF/HPF/BPF/BSF) and demonstrates the filtering operation
6. Design of Butterworth and Chebyshev IIR filters (LPF/HPF/BPF/BSF) and demonstrate the filtering operations

DSP PROCESSOR BASED IMPLEMENTATION

1. Study of architecture of Digital Signal Processor
2. Perform MAC operation using various addressing modes
3. Generation of various signals and random noise
4. Design and demonstration of FIR Filter for Low pass, High pass, Band pass and Band stop filtering
5. Design and demonstration of Butter worth and Chebyshev IIR Filters for Low pass, High pass, Band pass and Band stop filtering
6. Implement an Up-sampling and Down-sampling operation in DSP Processor

TOTAL: 60 PERIODS

OUTCOMES:

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

- Carryout basic signal processing operations
- Demonstrate their abilities towards MATLAB based implementation of various DSP systems
- Analyze the architecture of a DSP Processor
- Design and Implement the FIR and IIR Filters in DSP Processor for performing filtering operation over real-time signals
- Design a DSP system for various applications of DSP

EC8561 **COMMUNICATION SYSTEMS LABORATORY** L T P C 0 0 4 2

OBJECTIVES:

The student should be made:

- To visualize the effects of sampling and TDM
- To Implement AM & FM modulation and demodulation
- To implement PCM & DM
- To simulate Digital Modulation schemes
- To simulate Error control coding schemes

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UNIT V INTRODUCTION TO DIGITAL SIGNAL PROCESSORS 12

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

TOTAL:60PERIODS

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
- Design multirate 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. Ifeachor & 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 Graw Hill, 2007.
4. Andreas Antoniou, "Digital Signal Processing", Tata Mc Graw Hill, 2006.

EC8552 COMPUTER ARCHITECTURE AND ORGANIZATION **L T P C**
3 0 0 3

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, High performance 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.

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Academic Year 2022-23 (EVEN- Semester)
ME 8811 - PROJECT WORK DETAILS

Sl.No	Batch No	REG NO	NAME OF THE STUDENT	NAME OF THE SUPERVISOR WITH STAFF ID	TITLE OF THE PROJECT WORK
1	B-1	960119114002	ASHISH KUMAR .J	Mr.Bijilson Mansingh B ME., Assistant professor AVCE 9601232	ANALYSIS OF AXIAL FLOW PROPELLER FAN
2		960119114003	BINOLIN .G.M		
3		960119114020	SIVA SANKAR .N		
4		960119114023	THANUSH .J		
1	B-2	960119114004	DINESH KUMAR .L	Mr M ARUN JEYAKUMAR ME., Assistant professor AVCE 9613081	Cutting Tool with Multi-Coatings
2		960119114011	MUTHU VIJAYAN .T		
3		960119114024	THARMA RAJ .M		
4		960119114025	UDAYA KUMAR .S		
1	B-3	960119114005	JENISH KUMAR .V	Dr.N ABILASH PhD. PROFESSOR AVCE	A Fundamentally Approach to Air-Cooled Heat Exchangers
2		960119114010	MUJISH .M		
3		960119114026	VASANTH .M		
1	B-4	960119114007	KAVIYARASU .R	Mr.N.Manikandan ME., Assistant professor AVCE 9601005	Ultra High Temperature Ceramics For Hypersonic Vehicle Applications Especially Missile Nose Cones
2		960119114015	PALANI RAJ .S		
3		960119114016	SANGEETH. S		
4		960119114028	YUVARAJA VISHNU .R		
1	B-5	960119114017	SATHISH KUMAR .G	Mr.C. JEGATHESAN ME., Assistant professor AVCE 9601048	CFD ANALYSIS OF HEAT TRANSFER IN A HELICAL COIL HEAT EXCHANGER
2		960119114022	SUMITHRA .S		
3		960119114027	VINOTH R		
4		960119114304	GEORGE NISHANTH A		
1	B-6	960119114009	MIRLIN SANJAY .S	Mr.N.Manikandan ME., Assistant professor AVCE 9601005	Design and thermal analysis of rocket nozzle
2		960119114013	NAVEEN .V		
3		960119114014	NITHEESH .R		
4		960119114019	SIVA AKILESH .K		
1	B-7	960119114301	ABINESH A	MrJ PRABHU ME., Assistant professor AVCE 9501045	Design and analysis of solar panel supporting structure in wind effect
2		960119114302	ASHOK KUMAR C		
3		960119114305	MUTHUKUMAR M		
1	B-8	960119114006	KARTHICK .A	MrJ PRABHU ME., Assistant professor AVCE 9501045	Design and thermal analyzing of rocket nose
2		960119114012	NAGASELVAN .S		
3		960119114701	MOHANA RENGAN E		

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DESIGN AND ANALYSIS OF AXIAL FLOW PROPELLER FAN

A PROJECT REPORT

Submitted by

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SIVA SANKAR.N	**(960119114020)**
THANUSH.J	**(960119114023)**

in partial fulfillment for the award of the degree

of

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in

MECHANICAL ENGINEERING

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MAY 2023

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Certified that this report titled **"DESIGN AND ANALYSIS OF AXIAL FLOW PROPELLER FAN"** is the bonafide work of **ASHISH KUMAR.J (960119114002), BINOLIN.G.M (960119114003), SIVA SANKAR.N (960119114020), THANUSH.J (960119114023)** who carried out the work under my supervision.

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ABSTRACT

In order to conserve natural resources and economize energy, weight reduction has been the main focus of aerospace manufacturers in the present scenario. Weight reduction can be achieved primarily by the introduction of better material, design optimization and better manufacturing processes. The propeller blade is one of the potential items for weight reduction in aerospace as it accounts for 10% - 20% of the unspring weight. This achieves the aircraft with more fuel efficiency and improved riding qualities.

The introduction of metal alloys was made it possible to reduce the weight of blade without any reduction on load carrying capacity and stiffness. Since, the composite has more elastic strain energy storage capacity and high strength to weight ratio as compared with those of aluminum, it can used as the blades for aerospace. The design of propeller fan is completed on first phase. In this phase we analyse the different material for propeller fan. Finally, comparison of results and select the best one is done.

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THERMAL ANALYSIS OF DIFFERENT STRUCTURE OF FINS IN ELECTRICAL MOTOR

PROJECT REPORT

Submitted by

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THARMA RAJ.M	960119114024
UDAYA KUMAR.S	960119114025

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Certified that this project report **"THERMAL ANALYSIS STRUCTURE OF FINS IN ELECTRICAL MOTOR "** is the bonafide work of **DINESH KUMAR.L (960119114004), MUTHUVIJAYAN.T (960119114011), THARMARAJ.M (960119114024), UDAYA KUMAR.S (960119114025),** who carried out the project work under my supervision.

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ABSTRACT

With the ever increasing pressures on electric motor manufactures to develop smaller and more efficient electric motors, there is a trend to carry out more thermal analysis in parallel with the traditional electromagnetic design. It has been found that attention to the thermal design can be rewarded by major improvements in the overall performance. Thermal analysis can be done in the Electrical motor fins to optimize the heating released by the motor there by increasing the performance.

In phase I, the electrical motor fin structure can be changed to different shapes such as circular, triangular, slanted and transverse. The fins can be designed in Creo and analysed in ansys. The thermal results can be compared to select best outer fins of electrical motor.

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THERMAL ANALYSIS OF A V12 ENGINE BLOCK

A PROJECT REPORT

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ABSTRACT

A V12 engine often just called a V12 is an internal combustion engine with 12 cylinders. The engine has six cylinders on each side called banks. The two banks form a "V" shaped angle. In most engines, the two banks are at a 60° angle to each other. All twelve pistons turn a common crankshaft. It can be powered by different types of fuels, including gasoline, diesel and natural gas. A V12 engine does not need balance shafts. A V12 angled at 45°, 60°, 120°, or 180° from each other has even firing and is smoother than a straight-6. This provides a smooth running engine for a luxury car. In a racing car, the engine can be made much lighter. This makes the engine more responsive and smoother. In a large heavy- duty engine, a V12 can run slower and prolonging engine life. The main objective of the project is how to develop the model of V 12 engine block using CAD tool creo. These Engine consists major components they are Piston, Connecting Rod Assembly, Crank Shaft, Cylinder head, Cam Shaft, Valves, crank case, oil tank andspark plug. The engine block which are developed in creo are also analyzed in it using ansys. The thermal analysis of engine block is performed for 750o C thermal loading and the results of temperature distribution of the components are shown.

Finally the thermal analysis results of the components are compared and the bestsuited material is selected.

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DESIGN AND ANALYSIS OF CYLINDER HEAD OF 6-STROKE SI ENGINE

A PROJECT REPORT

Submitted by

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ABSTRACT

The term six-stroke engine has been applied to a number of alternative internal combustion engine designs that attempt to improve on traditional two-stroke and four-stroke engines. Claimed advantages may include increased fuel efficiency, reduced mechanical complexity and/or reduced emissions. These engines can be divided into two groups based on the number of pistons that contribute to the six strokes.The present paper deals with design of cylinder & cylinder head with air cooling system for 6 strokes 6 cylinder SI engine. The main objective of design is to reduce weight to power ratio & will result in producing high specific power. The authors have proposed preliminary design of the cylinder & cylinder head of a horizontally opposed SI engine, which develops 120 BHP and possesses the maximum rotational speed of 6000rpm. Four stroke opposed engine is inherently well balanced due to the opposite location of movig masses and also it provides efficient air cooling. For the requirement of weight reduction the material selected for design of cylinder and cylinder head is Aluminum alloy 6063 and aluminum alloy 5052.biles. Modeling and analysis of the intake manifold will be done in this project.

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THERMAL ANALYSIS OF FRICTIONAL MATERIAL OF A TWO-WHEELER CLUTCH LINER

A PROJECT REPORT

Submitted by

SATHISH KUMAR. G	960119114017
SUMITHRA. S	960119114022
GEORGE NISHANTH. A	960119114304
VINOTH. R	960119114027

In partial fulfilment for the award of the degree

of

BACHELOR OF ENGINEERING

in

MECHANICAL ENGINEERING

ANNAI VAILANKANNI COLLEGE OF ENGINEERING,
TAMILNADU-629 401

ANNA UNIVERSITY: CHENNAI 600 025

MAY 2023

PRINCIPAL
ANNAI VAILANKANNI COLLEGE OF ENGINEERING
POTTALKULAM
AZHAGAPPAPURAM - 629 401
KANYAKUMARI DIST.

ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report **"THERMAL ANALYSIS OF FRICTIONAL MATERIAL OF A TWO-WHEELER CLUTCH LINER"** is the bonafide work of **"SATHISH KUMAR. G (960119114017), SUMITHRA. S (960119114022), GEORGE NISHANTH. A (960119114304), VINOTH. R (960119114304)"** who carried out the project work under my supervision.

SIGNATURE

Mr. N. MANIKANDAN M.E.,

HEAD OF THE DEPARTMENT,

ASSISTANT PROFESSOR,

Department of Mechanical Engineering,

Annai Vailankanni College of Engineering,

AVK Nagar, Azhagappapuram PO,

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SIGNATURE

Mr. C. JEGATHESAN M.E.,

SUPERVISOR,

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Department of Mechanical Engineering,

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The project report submitted for the viva voce held on 23.05.2023

INTERNAL EXAMINER

EXTERNAL EXAMINER

ANNAI VAILANKANNI COLLEGE OF ENGINEERING POTTALKULAM AZHAGAPPAPURAM DISTRICT 629 401 KANYAKUMARI DISTRICT

PRINCIPAL
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ABSTRACT

The objective of the project is to Design and Analysis of Clutch Lining using different materials. A Clutch is a machine member used to connect the driving shaft to a driven shaft, so that the driven shaft may be started or stopped at will, without stopping the driving shaft. A common and well-known application for the clutch is in automotive vehicles where it is used to connect the engine and the gearbox. Here the clutch enables to crank and start the engine disengaging the transmission and change the gear to alter the torque on the wheel. The clutch lining is what prevents from slipping. Clutch linings are a type of friction material, similar to brake linings. They have a much different function, however; used to transfer the motion of one mechanical component to another by keeping two surfaces in contact.

Various materials have been used for the disc-friction facings, including asbestos in the past. Modern clutches typically use a compound organic resin with copper wire facing or a ceramic material. Ceramic materials are typically used in heavy applications such as racing or heavy-duty hauling, though the harder ceramic materials increase flywheel and pressure plate wear. In this project we use Kevlar, Silicon Carbide, carbon steel for clutch liner.

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DESIGN AND THERMAL ANALYSIS OF SOLAR PANEL SUPPORTING STRUCTURE

A PROJECT REPORT

Submitted by

ABINESH.A (960119114301)
ASHOK KUMAR .C (960119114302)
MUTHU KUMAR. M (960119114305)

in partial fulfillment of the award of the degree

of

BACHELOR OF ENGINEERING

in

MECHANICAL ENGINEERING

ANNAI VAILANKANNI COLLEGE OF ENGINEERING

ANNA UNIVERSITY : CHENNAI 600 025

MAY 2023

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ANNA UNIVERSITY, CHENNAI

BONAFIDE CERTIFICATE

Certified that this report titled " **DESIGN AND THERMAL ANALYSIS OF SOLAR PANEL SUPPORTING STRUCTURE**" is the bonafide work of **ABINESH.A (960119114301), ASHOK KUMAR.C (960119114302), MUTHUKUMAR.M (960119114305),** who carried out the work under my supervision.

SIGNATURE

HEAD OF DEPARTMENT

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Assistant professor and Head
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PO, kanyakumari - 629401

SIGNATURE

SUPERVISOR

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Submitted for the B.E Degree project viva -voce held on 23/5/2023

INTERNAL EXAMINER

EXTERNAL EXAMINER

ANNAI VAILANKANNI COLLEGE OF ENGINEERING
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ABSTRACT

The use of renewable energy resources is increasing rapidly. Following this trend, the implementation of large area solar arrays is considered to be essential. Many design approaches for the supporting structures have been presented in order to achieve maximum efficiency. They are loaded mainly by aerodynamic pressures. International governance as well as the competition between industries define that they must withstand the enormous loads that result from large air acceleration. Moreover, they must have a life assurance of more than 20 yrs. Optimization plays a very key role in product design and prevents unnecessary inventory from satisfying functional needs. But optimization with apt design helps to build efficient products in the everyday competing market. Stress analysis plays an important role in optimizing the design. Due to the advance in computer-based finite element software's design process is made simple by easier simulation methods fast replacing prototype built up and testing. In the current work, a solar panel-aiding structure is designed to take rotational loads for safe operation. So the design should consider the loads coming on the structure for rotation along with the inertia effect of the rotating members. The model of the solar supporting structure and thermal analysis of the model is done in this project

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DESIGN AND THERMAL ANALYSING OF MISSILE NOSE CONE

A PROJECT REPORT

submitted by

A.KARTHICK(960119114006)

E.MOHANA RENGAN(960119114701)

S. NAGA SELVAN (960119114013)

in partial fulfilment for the award of the degree

of

BACHELOR OF ENGINEERING

in

MECHANICAL ENGINEERING

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BONAFIDE CERTIFICATE

Certified that this project report "**DESIGN AND THERMAL ANALYSING OF MISSILE NOSE CONE**" is the bonafide work of "**A.KARTHICK (960119114006), E.MOHANA RENGAN(960119114701)and S. NAGA SELVAN(960119114012)** " who carried out the project work under my supervision

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Submitted for the project viva voce examination held on 23.5.23....

INTERNAL EXAMINER

EXTERNAL EXAMINER

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DESIGN AND THERMAL ANALYZING OF MISSILE NOSE CONE

ABSTRACT

A new nose cones concept that guarantees an addition in act over existing ordinary nose cones is talked about in this paper the term nose cone is utilized to allude to the forward most area of a rocket, guided rocket or air ship. The cone is shaped to offer least aerodynamic resistance. The aerodynamic structure of the nose cone area of any vehicle or body intended to go through a compressible fluid medium, (for example, a rocket or airplane rocket or projectile), a vital issue is the assurance of the nose cone geometrical shape for ideal execution. This undertaking assesses the rocket nose cone analysis by utilizing the accompanying materials, for example, AL alloy, Ti-6Al-4V and steel. A cone display is taken from the concepts of obtuse nose cone and structured in the CAD programming creo. Further this nose cone configuration is imported to the Analysis programming named as Ansys and plays out the thermal analysis. At long last the outcomes are thought about and classified.

ME8811	PROJECT WORK	L	T	P	C
		0	0	20	10

OBJECTIVE:

- To develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same. To train the students in preparing project reports and to face reviews and viva voce examination.

The students in a group of 3 to 4 works on a topic approved by the head of the department under the guidance of a faculty member and prepares a comprehensive project report after completing the work to the satisfaction of the supervisor. The progress of the project is evaluated based on a minimum of three reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The project work is evaluated based on oral presentation and the project report jointly by external and internal examiners constituted by the Head of the Department.

TOTAL: 300 PERIODS

OUTCOME:

- On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

ME8091	AUTOMOBILE ENGINEERING	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To understand the construction and working principle of various parts of an automobile.
- To have the practice for assembling and dismantling of engine parts and transmission system

UNIT I VEHICLE STRUCTURE AND ENGINES 9

Types of automobiles vehicle construction and different layouts, chassis, frame and body, Vehicle aerodynamics (various resistances and moments involved), IC engines –components-functions and materials, variable valve timing (VVT).

UNIT II ENGINE AUXILIARY SYSTEMS 9

Electronically controlled gasoline injection system for SI engines, Electronically controlled diesel injection system (Unit injector system, Rotary distributor type and common rail direct injection system), Electronic ignition system (Transistorized coil ignition system, capacitive discharge ignition system), Turbo chargers (WGT, VGT), Engine emission control by three way catalytic converter system, Emission norms (Euro and BS).

UNIT III TRANSMISSION SYSTEMS 9

Clutch-types and construction, gear boxes- manual and automatic, gear shift mechanisms, Over drive, transfer box, fluid flywheel, torque converter, propeller shaft, slip joints, universal joints, Differential and rear axle, Hotchkiss Drive and Torque Tube Drive.

UNIT IV STEERING, BRAKES AND SUSPENSION SYSTEMS 9

Steering geometry and types of steering gear box-Power Steering, Types of Front Axle, Types of Suspension Systems, Pneumatic and Hydraulic Braking Systems, Antilock Braking System (ABS), electronic brake force distribution (EBD) and Traction Control.

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UNIT IV GEARS AND GEAR TRAINS 9

Law of toothed gearing – Involutes and cycloidal tooth profiles –Spur Gear terminology and definitions –Gear tooth action – contact ratio – Interference and undercutting. Helical, Bevel, Worm, Rack and Pinion gears [Basics only]. Gear trains – Speed ratio, train value – Parallel axis gear trains – Epicyclic Gear Trains.

UNIT V FRICTION IN MACHINE ELEMENTS 9

Surface contacts – Sliding and Rolling friction – Friction drives – Friction in screw threads – Bearings and lubrication – Friction clutches – Belt and rope drives – Friction in brakes- Band and Block brakes.

TOTAL: 45 PERIODS

OUTCOMES:

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

CO1 Discuss the basics of mechanism
CO2 Calculate velocity and acceleration in simple mechanisms
CO3 Develop CAM profiles
CO4 Solve problems on gears and gear trains
CO5 Examine friction in machine elements

TEXT BOOKS:

1. F.B. Sayyad, "Kinematics of Machinery", MacMillan Publishers Pvt Ltd., Tech-max Educational resources, 2011.
2. Rattan, S.S, "Theory of Machines", 4th Edition, Tata McGraw-Hill, 2014.
3. Uicker, J.J., Pennock G.R and Shigley, J.E., "Theory of Machines and Mechanisms", 4 Edition, Oxford University Press, 2014.

REFERENCES:

1. Allen S. Hall Jr., "Kinematics and Linkage Design", Prentice Hall, 1961
2. Cleghorn. W. L, "Mechanisms of Machines", Oxford University Press, 2014
3. Ghosh. A and Mallick, A.K., "Theory of Mechanisms and Machines", 3rd Edition Affiliated East-West Pvt. Ltd., New Delhi, 2006.
4. John Hannah and Stephens R.C., "Mechanics of Machines", Viva Low-Prices Student Edition, 1999.
5. Thomas Bevan, "Theory of Machines", 3rd Edition, CBS Publishers and Distributors, 2005.

ME8451 MANUFACTURING TECHNOLOGY – II

L	T	P	C
3	0	0	3

OBJECTIVES:

- To understand the concept and basic mechanics of metal cutting, working of standard machine tools such as lathe, shaping and allied machines, milling, drilling and allied machines, grinding and allied machines and broaching.
- To understand the basic concepts of Computer Numerical Control (CNC) of machine tools and CNC Programming

UNIT I THEORY OF METAL CUTTING 9

Mechanics of chip formation, single point cutting tool, forces in machining, Types of chip, cutting tools– nomenclature, orthogonal metal cutting, thermal aspects, cutting tool materials, tool wear, tool life, surface finish, cutting fluids and Machinability.

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REFERENCES

1. Davis, Jason and Rhonda LIss.Effective Academic Writing (Level 3) Oxford University Press: Oxford, 2006
2. E. Suresh Kumar and et al. Enriching Speaking and Writing Skills. Second Edition. Orient Black swan: Hyderabad, 2012
3. Withrow, Jeans and et al. Inspired to Write. Readings and Tasks to develop writing skills. Cambridge University Press: Cambridge, 2004
4. Goatly, Andrew. Critical Reading and Writing. Routledge: United States of America, 2000
5. Petelin, Roslyn and Marsh Durham. The Professional Writing Guide: Knowing Well and Knowing Why. Business & Professional Publishing: Australia, 2004

ME8595 **THERMAL ENGINEERING – II** **L T P C** **3 0 0 3**

OBJECTIVES:

- To apply the thermodynamic concepts for Nozzles, Boilers, Turbines, and Refrigeration & Air Conditioning Systems.
- To understand the concept of utilising residual heat in thermal systems.

UNIT I STEAM NOZZLE **9**

Types and Shapes of nozzles, Flow of steam through nozzles, Critical pressure ratio, Variation of mass flow rate with pressure ratio. Effect of friction. Metastable flow.

UNIT II BOILERS **9**

Types and comparison. Mountings and Accessories. Fuels - Solid, Liquid and Gas. Performance calculations, Boiler trial.

UNIT III STEAM TURBINES **9**

Types, Impulse and reaction principles, Velocity diagrams, Work done and efficiency – optimal operating conditions. Multi-staging, compounding and governing.

UNIT IV COGENERATION AND RESIDUAL HEAT RECOVERY **9**

Cogeneration Principles, Cycle Analysis, Applications, Source and utilisation of residual heat. Heat pipes, Heat pumps, Recuperative and Regenerative heat exchangers. Economic Aspects.

UNIT V REFRIGERATION AND AIR – CONDITIONING **9**

Vapour compression refrigeration cycle, Effect of Superheat and Sub-cooling, Performance calculations, Working principle of air cycle, vapour absorption system, and Thermoelectric refrigeration. Air conditioning systems, concept of RSHF, GSHF and ESHF, Cooling load calculations. Cooling towers – concept and types.

TOTAL:45 PERIODS

OUTCOMES:

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

CO1 Solve problems in Steam Nozzle

CO2 Explain the functioning and features of different types of Boilers and auxiliaries and calculate performance parameters.

CO3 Explain the flow in steam turbines, draw velocity diagrams for steam turbines and solve problems.

CO4 Summarize the concept of Cogeneration, Working features of Heat pumps and Heat exchangers

CO5 Solve problems using refrigerant table / charts and psychrometric charts

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ME8072 **RENEWABLE SOURCES OF ENERGY** **L T P C**
3 0 0 3

OBJECTIVE:

- At the end of the course, the students are expected to identify the new methodologies / technologies for effective utilization of renewable energy sources.

UNIT I INTRODUCTION **9**

World Energy Use – Reserves of Energy Resources – Environmental Aspects of Energy Utilisation – Renewable Energy Scenario in Tamil nadu, India and around the World – Potentials - Achievements / Applications – Economics of renewable energy systems.

UNIT II SOLAR ENERGY **9**

Solar Radiation – Measurements of Solar Radiation - Flat Plate and Concentrating Collectors – Solar direct Thermal Applications – Solar thermal Power Generation - Fundamentals of Solar Photo Voltaic Conversion – Solar Cells – Solar PV Power Generation – Solar PV Applications.

UNIT III WIND ENERGY **9**

Wind Data and Energy Estimation – Types of Wind Energy Systems – Performance – Site Selection – Details of Wind Turbine Generator – Safety and Environmental Aspects

UNIT IV BIO - ENERGY **9**

Biomass direct combustion – Biomass gasifiers – Biogas plants – Digesters – Ethanol production – Bio diesel – Cogeneration - Biomass Applications

UNIT V OTHER RENEWABLE ENERGY SOURCES **9**

Tidal energy – Wave Energy – Open and Closed OTEC Cycles – Small Hydro-Geothermal Energy – Hydrogen and Storage - Fuel Cell Systems – Hybrid Systems.

TOTAL : 45 PERIODS

OUTCOMES:

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

CO1 Discuss the importance and Economics of renewable Energy
CO2 Discuss the method of power generation from Solar Energy
CO3 Discuss the method of power generation from Wind Energy
CO4 Explain the method of power generation from Bio Energy
CO5 Explain the Tidal energy, Wave Energy, OTEC, Hydro energy, Geothermal Energy, Fuel Cells and Hybrid Systems.

TEXT BOOKS:

1. Rai. G.D., "Non Conventional Energy Sources", Khanna Publishers, New Delhi, 2011.
2. Twidell, J.W. & Weir, A., "Renewable Energy Sources", EFN Spon Ltd., UK, 2006.

REFERENCES:

1. Chetan Singh Solanki, Solar Photovoltaics, "Fundamentals, Technologies and Applications", PHI Learning Private Limited, New Delhi, 2015.
2. David M. Mousdale – "Introduction to Biofuels", CRC Press, Taylor & Francis Group, USA 2017
3. Freris. L.L., "Wind Energy Conversion Systems", Prentice Hall, UK, 1990.
4. Godfrey Boyle, "Renewable Energy, Power for a Sustainable Future", Oxford University Press, U.K., 2012.
5. Johnson Gary, L. "Wind Energy Systems", Prentice Hall, New York, 1985

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OUTCOMES:

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

- Describe the architecture and programming of ARM processor.
- Explain the concepts of embedded systems
- Understand the Concepts of peripherals and interfacing of sensors.
- Capable of using the system design techniques to develop firmware
- Illustrate the code for constructing a system

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)
2 https://www.coursera.org/learn/interface-with-arduino#syllabus (Unit III)
3 .Michael J. Pont, "Embedded C", 2 nd Edition, Pearson Education, 2008.(Unit IV & V)

REFERENCES:

1.Shibu K.V, "Introduction to Embedded Systems", McGraw Hill.2014
2.Jonathan W.Valvano, "Embedded Microcomputer Systems Real Time Interfacing", Third Edition Cengage Learning, 2012
3 Raj Kamal, "Embedded Systems-Architecture,programming and design", 3 edition,TMH.2015
4. Lyla, "Embedded Systems", Pearson , 2013
6. David E. Simon, "An Embedded Software Primer", Pearson Education,2000.

CS8072 AGILE METHODOLOGIES

L	T	P	C
3	0	0	3

OBJECTIVES:

- To provide students with a theoretical as well as practical understanding of agile software development practices and how small teams can apply them to create high-quality software.
- To provide a good understanding of software design and a set of software technologies and APIs.
- To do a detailed examination and demonstration of Agile development and testing techniques.
- To understand the benefits and pitfalls of working in an Agile team.
- To understand Agile development and testing.

UNIT I AGILE METHODOLOGY 9

Theories for Agile Management – Agile Software Development – Traditional Model vs. Agile Model - Classification of Agile Methods – Agile Manifesto and Principles – Agile Project Management – Agile Team Interactions – Ethics in Agile Teams - Agility in Design, Testing – Agile Documentations – Agile Drivers, Capabilities and Values

UNIT II AGILE PROCESSES 9

Lean Production - SCRUM, Crystal, Feature Driven Development- Adaptive Software Development - Extreme Programming: Method Overview – Lifecycle – Work Products, Roles and Practices.

UNIT III AGILITY AND KNOWLEDGE MANAGEMENT 9

Agile Information Systems – Agile Decision Making - Earl'S Schools of KM – Institutional Knowledge Evolution Cycle – Development, Acquisition, Refinement, Distribution, Deployment , Leveraging – KM in Software Engineering – Managing Software Knowledge – Challenges of Migrating to Agile Methodologies – Agile Knowledge Sharing – Role of Story-Cards – Story-Card Maturity Model (SMM).

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UNIT V ALTERNATIVE ENERGY SOURCES 9

Use of Natural Gas, Liquefied Petroleum Gas, Bio-diesel, Bio-ethanol, Gasohol and Hydrogen in Automobiles- Engine modifications required –Performance, Combustion and Emission Characteristics of SI and CI engines with these alternate fuels - Electric and Hybrid Vehicles, Fuel Cell Note: Practical Training in dismantling and assembling of Engine parts and Transmission Systems should be given to the students.

TOTAL: 45 PERIODS

OUTCOMES:

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

CO1 recognize the various parts of the automobile and their functions and materials.
CO2 discuss the engine auxiliary systems and engine emission control.
CO3 distinguish the working of different types of transmission systems.
CO4 explain the Steering, Brakes and Suspension Systems.
CO5 predict possible alternate sources of energy for IC Engines.

TEXT BOOKS:

1. Jain K.K. and Asthana .R.B, "Automobile Engineering" Tata McGraw Hill Publishers, New Delhi, 2002.
2. Kirpal Singh, "Automobile Engineering", Vol 1 & 2, Seventh Edition, Standard Publishers, New Delhi, 13th Edition 2014..

REFERENCES:

1. Ganesan V. "Internal Combustion Engines", Third Edition, Tata McGraw-Hill, 2012.
2. Heinz Heisler, "Advanced Engine Technology," SAE International Publications USA, 1998.
3. Joseph Heitner, "Automotive Mechanics," Second Edition, East-West Press, 1999.
4. Martin W, Stockel and Martin T Stockle , "Automotive Mechanics Fundamentals," The Good heart - Will Cox Company Inc, USA ,1978.
5. Newton ,Steeds and Garet, "Motor Vehicles", Butterworth Publishers,1989.

PR8592 WELDING TECHNOLOGY **L T P C 3 0 0 3**

OBJECTIVE:

- To understand the basics of welding and to know about the various types of welding processes

UNIT I GAS AND ARC WELDING PROCESSES: 9

Fundamental principles – Air Acetylene welding, Oxyacetylene welding, Carbon arc welding, Shielded metal arc welding, Submerged arc welding, TIG & MIG welding, Plasma arc welding and Electroslag welding processes - advantages, limitations and applications.

UNIT II RESISTANCE WELDING PROCESSES: 9

Spot welding, Seam welding, Projection welding, Resistance Butt welding, Flash Butt welding, Percussion welding and High frequency resistance welding processes - advantages, limitations and applications.

UNIT III SOLID STATE WELDING PROCESSES: 9

Cold welding, Diffusion bonding, Explosive welding, Ultrasonic welding, Friction welding, Forge welding, Roll welding and Hot pressure welding processes - advantages, limitations and applications.

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Academic Year 2022-23 (EVEN- Semester)

CS 8811 - PROJECT WORK DETAILS

Sl.No	Batch No	REG NO	NAME OF THE STUDENT	NAME OF THE SUPERVISOR WITH STAFF ID	TITLE OF THE PROJECT WORK
1	B-1	960119104003	ANTONY NIVI SNEHA A	Mrs.Anon K Jenifer ME., Assistant professor AVCE	LEAF DISEASE IDENTIFICATION USING IMAGE PROCESSING BASED ON CNN ALGORITHM
2		960119104009	KANAKAVALLI L		
3		960119104017	SIVARANJINI K		
1	B-2	960119104005	AVINESH V	Mrs.Sweety Amiss ME., Assistant professor AVCE	VOICE BASED ONLINE EXAMINATION FOR VISUALLY CHALLENGED CANDIDATES
2		960119104006	BALA SURESH K		
3		960119104010	KAVIN M		
1	B-3	960119104001	ABIRAMI A	Mrs.Sivakala.S ME., Assistant professor AVCE	REAL TIME CLICKBAIT AND BIOMETRIC ATM USER AUTHENTICATION AND MULTIPLE BANK TRANSACTION SYSTEM
2		960119104014	RANISHKA M		
3		960119104015	RONALD A		
1	B-4	960119104012	MARIA PRATHIBA A	Mrs.Anon K Jenifer ME., Assistant professor AVCE	MALICIOUS MINING CODE DETECTION USING MACHINE LEARNING ALGARITHMS
2		960119104013	PRATHEESH F		
3		960119104018	SOWMIYA M		
1	B-5	960119104004	ASIA JULIET S	Mrs.Anon K Jenifer ME., Assistant professor AVCE	DRIVER DRWSINESS DETECTION BASED ON FACE FEATURE AND PERCLOS
2		960119104008	ISHWARYA P		
3		960119104011	LIPTO SHAJIN R		

HOD

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PRINCIPAL

LEAF DISEASE IDENTIFICATION USING IMAGE PROCESSING BASED ON CNN ALGORITHM

A PROJECT REPORT

Submitted by

ANTONY NIVI SNEHA A (960119104003)

KANAKAVALLI L (960119104009)

SIVARANJINI K (960119104017)

In partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

IN

COMPUTER SCIENCE AND ENGINEERING

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BONAFIDE CERTIFICATE

Certified that this report **"LEAF DISEASE IDENTIFICATION USING IMAGE PROCESSING BASED ON CNN ALGORITHM"** is the bonafide work of **ANTONY NIVI SNEHA A (960119104003), KANAKAVALLI L (960119104009), and SIVARANJINI K (960119104017)** who carried out the project work under my supervision.

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22/5/2023

INTERNAL EXAMINER

22/5/2023

EXTERNAL EXAMINER

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ABSTRACT

The detection of plant leaf is a very important factor to prevent serious outbreak. Automatic detection of plant disease is essential research topic. The commitment of a plant is very imperative for both human life and condition. More often than not when the illness of a plant has not been dealt with, the plant bites the dust or may cause leaves drop, blossoms and organic products drop and so on . In this paper, we have presented a strategy named as Bacterial searching improvement based Convolution Neural Network (CNN) for recognizable proof and characterization of plant leaf illnesses naturally. For doling out ideal weight to Convolution Neural Network (CNN) we utilize bacterial searching streamlining (BFO) that further expands the speed and exactness of the system to recognize and arrange the districts tainted of various infections on the plant leafs.

CHAPTER 9

CONCLUSION AND FUTURE ENHANCEMENT:

9.1 Conclusion:

The plant serves as the bas ic need for any living organisms. They are the most important and integral part of our surroundings. Just like a human or other living organism does plant do suffer from different kind of diseases. Such diseases are harmful to plant in a number of ways like can affect the growth of the plant, flowers, fruits, and leaves etc. due to which a plant may even die. So in this work, we have proposed a novel method named as Bacterial foraging optimization based Convolution Neural Network (BCNN) for identification and classification of plant leaf diseases. The results, when compared with other methods, show that the proposed method achieves higher performance both in terms of identification and classification of plant leaf diseases.

9.2 Future enhancement:

In future work, we can extend our approach to improve the accuracy using neural network classification algorithms in order to increase the recognition rate and severity of the detected disease.

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VOICE BASED ONLINE EXAMINATION FOR VISUALLY CHALLENGED CANDIDATES

A PROJECT REPORT

Submitted by

AVINESH V (960119104005)

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KAVIN M (960119104010)

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of

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IN

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ABSTRACT

The evaluation of physically challenged is always a challenging task as any evaluation of them is compared with that of normal candidates. The case of visually challenged is still more difficult as vision is a numero uno sensor in the field of study and knowledge enhancement and evaluation of them on pair with another candidate is very difficult. The aim of this project is to present an approach for E-evaluation model for the visually challenged students/candidates for the screening tests conducted by the different voice based examination authorities. The major attempt is made to use the personal computer and avoid the use of a scriber by the candidate so that candidate can take the voice based exam independently. This voice recognition using Google Text To Speech Algorithm (GTTS). A portion of the PC keyboard is slightly modified in its software functionality to help them in undergoing the test using GTTS. Also described is the functioning of this model of E-Evaluation and its relative advantages.

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CHAPTER 10

CONCLUSION AND FUTURE ENHANCEMENT

Online Voice based examination has been developed and the system was tested with proper data. The system results in regular timing preparation of the required output. In comparison with the manual system, the benefit under a computer system considerable in to saving of manpower, working hour and efforts.

It can observe that the information required can be obtained with ease and accuracy in the computerized system. The user with minimum knowledge about computer can be able operate the system easily. Online message has been provided to help the user to take necessary, correct action while using the system. In futurethis software can be used by any institute as it can be modified easily; additional features can be added without interrupting the normal functioning of the system.

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Real Time Secure Clickbait and Biometric ATM User Authentication and Multiple Bank Transaction System

A PROJECT REPORT

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Certified that this report **"REAL TIME SECURE CLICKBAIT AND BIOMETRIC ATM USER AUTHENTICATION AND MULTIPLE BANK TRANSACTION SYSTEM"** is the bonafide work of **Abirami A (960119104001), Ranishka M (960119104014), Ronald A (960119104015)** who carried out the project work under my supervision.

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ABSTRACT

ATM or Automated Teller Machines are widely used by people nowadays. Performing cash withdrawal transaction with ATM is increasing day by day. ATM is very important device throughout the world. The existing conventional ATM is vulnerable to crimes because of the rapid technology development. A total of 270,000 reports have been reported regarding debit card fraud and this was the most reported form of identity theft in 2021. A secure and efficient ATM is needed to increase the overall experience, usability, and convenience of the transaction at the ATM. In today's world, the area of computer vision is advancing at a breakneck pace. The recent progress in biometric identification techniques, including finger printing, retina scanning, and facial recognition has made a great effort to rescue the unsafe situation at the ATM. Specifically, the goal of this project is to give a computer vision method to solve the security risk associated with accessing ATM machines. This project proposes an automatic teller machine security model that uses electronic facial recognition using Deep Convolutional Neural Network. If this technology becomes widely used, faces would be protected as well as their accounts. Face Verification Clickbait Link will be generated and sent to bank account holder to verify the identity of unauthorized user through some dedicated artificial intelligent agents, for remote certification.

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CHAPTER 10
CONCLUSION AND FURTURE SCOPE

10.1 CONCLUSION

Biometrics as means of identifying and authenticating account owners at the Automated Teller Machines gives the needed and much anticipated solution to the problem of illegal transactions. In this project, we have developed to proffer a solution to the much-dreaded issue of fraudulent transactions through Automated Teller Machine by biometrics and Unknown Face Forwarder that can be made possible only when the account holder is physically or far present. Thus, it eliminates cases of illegal transactions at the ATM points without the knowledge of the authentic owner. Using a biometric feature for identification is strong and it is further fortified when another is used at authentication level. The ATM security design incorporates the possible proxy usage of the existing security tools (such as ATM Card) and information (such as PIN) into the existing ATM security mechanisms. It involves, on real-time basis, the bank account owner in all the available and accessible transactions.

MALICIOUS MINING CODE DETECTION USING MACHINE LEARNING ALGORITHMS

A PROJECT REPORT

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ABSTRACT

Malware detection developer faced a problem for a generation of new signature of malware code. A very famous and recognized technique is pattern-based malware code detection technique. This leads to the evasion of signatures that are built based on the code syntax. In this paper, we discuss some well-known method of malware detection based on semantic feature extraction technique. In current decade, most of authors focused on malware feature extraction process for generic detection process. The effectiveness of the Malicious Sequence Pattern Matching technique for malware detection invites for moderation and improvement of the current system and method. Some authors used rule mining technique, some other used graph technique and some also focused on feature clustering process of malware detection.

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CHAPTER 9

CONCLUTION AND FUTURE WORK

9.1 CONCLUSION

To develop a data-mining- based detection framework called Malicious Sequential Pattern based Malware Detection (MSPMD), which is composed of the proposed sequential pattern mining algorithm (MSPE) and SVM classifier. It first extracts instruction sequences from the PE file samples and conducts feature selection before mining; then MSPE is applied to generate malicious sequential patterns. For the testing file samples, after feature representation, SVM classifier is constructed for malware detection. The promising experimental results on real data collection demonstrate that our frame works out performs other alternate data mining base detection methods in identifying new malicious executables. Unlike the previous research which are unable to mined is criminative features, we propose to use sequence mining algorithm on instruction sequence to extract well representative features.

DRIVER DROWSINESS DETECTION BASED ON FACE FEATURE AND PERCLOS

A PROJECT REPORT

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ABSTRACT

Driving vehicles are complex and require undivided attention to prevent road accidents. Fatigue and distraction are a major risk factor that causes traffic accidents, severe injuries, and a high risk of death. Some progress has been made for driver drowsiness detection using a contact-based method that utilizes vehicle parts such as steering angle and pressure on the pedal and physiological signals like electrocardiogram and electromyogram. However, a contactless system is more potential for real-world conditions. we propose a computer vision based method to detect driver's drowsiness from a video taken by a camera. The method attempts to recognize the face and then detecting the eye in every frame. From the detected eye, iris regions for left and right eyes are used to calculate the PERCLOS measure (the percentage of total time that eye is closed). The proposed method was evaluated based on public YawDD video dataset. The results found that PERCLOS value when the driver is alert is lower than when the driver is drowsy.

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CHAPTER 9
CONCLUSION AND FUTURE ENHANCEMENT

9.1 CONCLUSION

In this paper, we have presented the concept and implemented a system to detect driver drowsiness using computer vision which focuses to notify the driver if he is drowsy. The proposed system has the capability to detect the real time state of the driver in day and night conditions with the help of a camera. The detection of the Face and Eyes applied based on the symmetry. We have developed a non-intrusive prototype of a computer vision-based system for real-time monitoring of the driver's drowsiness.

9.2 FUTURE ENHANCEMENT

For future work, the objective will be to reduce the percentage error, that is, reduce the amount of false alarms. To achieve this, development of additional entities or experiments will be done, using better drivers and incorporating new analysis modules, for example, facial expressions(yawns).

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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.

IT8072 **EMBEDDED SYSTEMS** **L T P C 3 0 0 3**

OBJECTIVES:

- To learn the architecture and programming of ARM processor.
- To become familiar with the embedded computing platform design and analysis.
- To get thorough knowledge in interfacing concepts
- To design an embedded system and to develop programs

UNIT I INTRODUCTION TO EMBEDDED COMPUTING AND ARM PROCESSORS **9**

Complex systems and micro processors– Embedded system design process –Design example: Model train controller- Instruction sets preliminaries - ARM Processor – CPU: programming input and output- supervisor mode, exceptions and traps – Co-processors- Memory system mechanisms – CPU performance- CPU power consumption.

UNIT II EMBEDDED COMPUTING PLATFORM DESIGN **9**

The CPU Bus-Memory devices and systems–Designing with computing platforms – consumer electronics architecture – platform-level performance analysis - 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 III SENSOR INTERFACING WITH ARDUINO **9**

Basics of hardware design and functions of basic passive components-sensors and actuators-Arduino code - library file for sensor interfacing-construction of basic applications

UNIT IV EMBEDDED FIRMWARE **9**

Reset Circuit, Brown-out Protection Circuit-Oscillator Unit - Real Time Clock-Watchdog Timer - Embedded Firmware Design Approaches and Development Languages.

UNIT V EMBEDDED C PROGRAMMING **9**

Introduction-Creating 'hardware delays' using Timer 0 and Timer 1-Reading switches-Adding Structure to the code-Generating a minimum and maximum delay-Example: Creating a portable hardware delay- Timeout mechanisms-Creating loop timeouts-Testing loop timeouts- hardware timeouts-Testing a hardware timeout

TOTAL : 45 PERIODS

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CS8082

MACHINE LEARNING TECHNIQUES

L T P C
3 0 0 3

OBJECTIVES:

- To understand the need for machine learning for various problem solving
- To study the various supervised, semi-supervised and unsupervised learning algorithms in machine learning
- To understand the latest trends in machine learning
- To design appropriate machine learning algorithms for problem solving

UNIT I INTRODUCTION 9

Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search.

UNIT II NEURAL NETWORKS AND GENETIC ALGORITHMS 9

Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evaluation and Learning.

UNIT III BAYESIAN AND COMPUTATIONAL LEARNING 9

Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

UNIT IV INSTANT BASED LEARNING 9

K- Nearest Neighbour Learning – Locally weighted Regression – Radial Basis Functions – Case Based Learning.

UNIT V ADVANCED LEARNING 9

Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning

TOTAL :45 PERIODS

OUTCOMES:

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

- Differentiate between supervised, unsupervised, semi-supervised machine learning approaches
- Discuss the decision tree algorithm and indentity and overcome the problem of overfitting
- Discuss and apply the back propagation algorithm and genetic algorithms to various problems
- Apply the Bayesian concepts to machine learning
- Analyse and suggest appropriate machine learning approaches for various types of problems

TEXT BOOK:

1. Tom M. Mitchell, "Machine Learning", McGraw-Hill Education (India) Private Limited, 2013.

REFERENCES:

1. Ethem Alpaydín, "Introduction to Machine Learning (Adaptive Computation and Machine Learning)", The MIT Press 2004.
2. Stephen Marsland, "Machine Learning: An Algorithmic Perspective", CRC Press, 2009.

REFERENCES:

1. Adrian Perrig, J. D. Tygar, "Secure Broadcast Communication: In Wired and Wireless Networks", Springer, 2006.
2. Carlos De Morais Cordeiro, Dharma Prakash Agrawal "Ad Hoc and Sensor Networks: Theory and Applications (2nd Edition), World Scientific Publishing, 2011.
3. C.Siva Ram Murthy and B.S.Manoj, "Ad Hoc Wireless Networks – Architectures and Protocols", Pearson Education, 2004.
4. C.K.Toh, "Ad Hoc Mobile Wireless Networks", Pearson Education, 2002.
5. Erdal Çayırcı , Chunming Rong, "Security in Wireless Ad Hoc and Sensor Networks", John Wiley and Sons, 2009.
6. Holger Karl, Andreas willig, Protocols and Architectures for Wireless Sensor Networks, John Wiley & Sons, Inc .2005.
7. Subir Kumar Sarkar, T G Basavaraju, C Puttamadappa, "Ad Hoc Mobile Wireless Networks", Auerbach Publications, 2008.
8. Waltenegus Dargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks Theory and Practice", John Wiley and Sons, 2010.

CP5292 **INTERNET OF THINGS** **L T P C**

3 0 0 3

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 RASPERRY 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, smart grid, Commercial building automation, Smart cities - participatory sensing - Data Analytics for IoT – Software & Management Tools for IoT Cloud Storage Models & Communication APIs - Cloud for IoT -

TEXTBOOKS:

1. Singhal J.P. "Disaster Management", Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN-13: 978-9380386423
2. Tushar Bhattacharya, "Disaster Science and Management", McGraw Hill India Education Pvt. Ltd., 2012. **ISBN-10:** 1259007367, **ISBN-13:** 978-1259007361]
3. Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011
4. Kapur Anu Vulnerable India: A Geographical Study of Disasters, IIAS and Sage Publishers, New Delhi, 2010:

REFERENCES

1. Govt. of India: Disaster Management Act , Government of India, New Delhi, 2005
2. Government of India, National Disaster Management Policy,2009.

EC8093 **DIGITAL IMAGE PROCESSING** **L T P C 3 0 0 3**

OBJECTIVES:

- To become familiar with digital image fundamentals
- To get exposed to simple image enhancement techniques in Spatial and Frequency domain.
- To learn concepts of degradation function and restoration techniques.
- To study the image segmentation and representation techniques.
- To become familiar with image compression and recognition methods

UNIT I DIGITAL IMAGE FUNDAMENTALS **9**

Steps in Digital Image Processing – Components – Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels - Color image fundamentals - RGB, HSI models, Two-dimensional mathematical preliminaries, 2D transforms - DFT, DCT.

UNIT II IMAGE ENHANCEMENT **9**

Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering– Smoothing and Sharpening Spatial Filtering, Frequency Domain: Introduction to Fourier Transform– Smoothing and Sharpening frequency domain filters – Ideal, Butterworth and Gaussian filters, Homomorphic filtering, Color image enhancement.

UNIT III IMAGE RESTORATION **9**

Image Restoration - degradation model, Properties, Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering

UNIT IV IMAGE SEGMENTATION **9**

Edge detection, Edge linking via Hough transform – Thresholding - Region based segmentation – Region growing – Region splitting and merging – Morphological processing- erosion and dilation, Segmentation by morphological watersheds – basic concepts – Dam construction – Watershed segmentation algorithm.

UNIT V IMAGE COMPRESSION AND RECOGNITION **9**

Need for data compression, Huffman, Run Length Encoding, Shift codes, Arithmetic coding, JPEG standard, MPEG. Boundary representation, Boundary description, Fourier Descriptor, Regional Descriptors – Topological feature, Texture - Patterns and Pattern classes - Recognition based on matching.

TOTAL : 45 PERIODS

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ANNAI VAILANKANNI COLLEGE OF ENGINEERING

AVK Nagar, Pothaiyadi Salai, Azhagappapuram P.O,

Kanyakumari District -629401

Academic Year 2022-23 (EVEN- Semester)

EC8811 PROJECT WORK

Sl.No	Batch No	REG NO	NAME OF THE STUDENT	NAME OF THE SUPERVISOR WITH STAFF ID	TITLE OF THE PROJECT WORK
1	B-1	960119106001	AARTHI S	MR.J.JAYAKUMAR	SMART METER FIRMWARE FOR MONITOR AND CONTROL THE ELECTRICAL APPLIANCES CONSUMPTION
2		960119106003	AKILAN N		
3		960119106008	KAVITHA V		
4		960119106016	SANTHOSH G		
1	B-2	960119106011	NANTHINI A	MRS.E.RAJESHWARI	RTO DASHBOARD FOR VEHICLE ACCIDENT REPORTING AND RESCUE SYSTEM
2		960119106015	RABISHA V		
3		960119106014	PONSEKAR C		
4		960119106006	DHANESH R		
5		960119106009	LIJU L		
1	B-3	960119106017	SARANYA T	MR.R.ROBERT	LUNG CANCER DETECTION USING MAT LAB
2		960119106018	THANAREKA R		
3		960119106005	BABISHA M		
4		960119106013	NAVEEN KUMAR S		
1	B-4	960119106002	AKALYA M	MRS.P.RENUKA	IMPLEMENTATION OF BIOMETRIC ATTEDANCE IN SIMULATION LAB OF AVCE
2		960119106010	MABLE VIMALA S		
3		960119106007	JERISHA C		
4		960119106012	NANTHINI N S		

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Certified that this report titled **"DESIGN AND DEVELOPMENT OF AN SMART ELECTRICITY BILL PAYMENT MANAGEMENT SYSTEM"** is the bonafide work of **AARTHI.S (960119106001) AKILAN.N (960119106003) KAVITHA.V (960119106008) SANTHOSH.G (960119106016)** who carried out the work under my supervision.

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Certified that this report titled "RTO DASHBOARD FOR VEHICLE ACCIDENT REPORTING AND RESCUE SYSTEM" is the bonafide work of LIJU.L (960119106009) ,NANTHINI.A (960119106011), PONSEKAR.C (960119106014) R.V.RABISHA (960119106015) who carried out the work under my supervision.

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Certified that this project report **"LUNG CANCER DETECTION USING KNN AND DEEP NEURAL NETWORKS"** is the bonafide work of **"T. SARANYA(960119106017), M.BABISHA(960119106005), S.NAVEEN KUMAR(960119106013) and R.THANAREKA(960119106018)"** who carried out the project work under my supervision.

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Certified that this report titled "IMPLEMENTATION OF BIOMETRIC ATTENDANCE SYSTEM IN SIMULATION LAB OF AVCE" is the bonafide work of AKALYA.M (960119106002),JERISHA.C (960119106007),MABLE VIMALA.S (960119106010),NANTHINI.NS (960119106012)who carried out the work under my supervision.

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TEXTBOOKS:

1. Singhal J.P. "Disaster Management", Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN-13: 978-9380386423
2. Tushar Bhattacharya, "Disaster Science and Management", McGraw Hill India Education Pvt. Ltd., 2012. **ISBN-10:** 1259007367, **ISBN-13:** 978-1259007361]
3. Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011
4. Kapur Anu Vulnerable India: A Geographical Study of Disasters, IIAS and Sage Publishers, New Delhi, 2010:

REFERENCES

1. Govt. of India: Disaster Management Act , Government of India, New Delhi, 2005
2. Government of India, National Disaster Management Policy,2009.

EC8093 **DIGITAL IMAGE PROCESSING**

L	T	P	C
3	0	0	3

OBJECTIVES:

- To become familiar with digital image fundamentals
- To get exposed to simple image enhancement techniques in Spatial and Frequency domain.
- To learn concepts of degradation function and restoration techniques.
- To study the image segmentation and representation techniques.
- To become familiar with image compression and recognition methods

UNIT I DIGITAL IMAGE FUNDAMENTALS **9**

Steps in Digital Image Processing – Components – Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels - Color image fundamentals - RGB, HSI models, Two-dimensional mathematical preliminaries, 2D transforms - DFT, DCT.

UNIT II IMAGE ENHANCEMENT **9**

Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering– Smoothing and Sharpening Spatial Filtering, Frequency Domain: Introduction to Fourier Transform– Smoothing and Sharpening frequency domain filters – Ideal, Butterworth and Gaussian filters, Homomorphic filtering, Color image enhancement.

UNIT III IMAGE RESTORATION **9**

Image Restoration - degradation model, Properties, Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering

UNIT IV IMAGE SEGMENTATION **9**

Edge detection, Edge linking via Hough transform – Thresholding - Region based segmentation – Region growing – Region splitting and merging – Morphological processing- erosion and dilation, Segmentation by morphological watersheds – basic concepts – Dam construction – Watershed segmentation algorithm.

UNIT V IMAGE COMPRESSION AND RECOGNITION **9**

Need for data compression, Huffman, Run Length Encoding, Shift codes, Arithmetic coding, JPEG standard, MPEG. Boundary representation, Boundary description, Fourier Descriptor, Regional Descriptors – Topological feature, Texture - Patterns and Pattern classes - Recognition based on matching.

TOTAL, 45 PERIODS

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REFERENCES:

1. Adrian Perrig, J. D. Tygar, "Secure Broadcast Communication: In Wired and Wireless Networks", Springer, 2006.
2. Carlos De Morais Cordeiro, Dharma Prakash Agrawal "Ad Hoc and Sensor Networks: Theory and Applications (2nd Edition), World Scientific Publishing, 2011.
3. C.Siva Ram Murthy and B.S.Manoj, "Ad Hoc Wireless Networks – Architectures and Protocols", Pearson Education, 2004.
4. C.K.Toh, "Ad Hoc Mobile Wireless Networks", Pearson Education, 2002.
5. Erdal Çayırcı , Chunming Rong, "Security in Wireless Ad Hoc and Sensor Networks", John Wiley and Sons, 2009.
6. Holger Karl, Andreas willig, Protocols and Architectures for Wireless Sensor Networks; John Wiley & Sons, Inc .2005.
7. Subir Kumar Sarkar, T G Basavaraju, C Puttamadappa, "Ad Hoc Mobile Wireless Networks", Auerbach Publications, 2008.
8. Waltenegus Dargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks Theory and Practice", John Wiley and Sons, 2010.

CP5292 **INTERNET OF THINGS** **L T P C**

3 0 0 3

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 RASPERRY 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, smart grid, Commercial building automation, Smart cities - participatory sensing - Data Analytics for IoT – Software & Management Tools for IoT Cloud Storage Models & Communication APIs - Cloud for IoT -

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CU5097 **WIRELESS ADHOC AND SENSOR NETWORKS** **L T P C**
3 0 0 3

OBJECTIVES:

- To understand the basics of Ad-hoc & Sensor Networks.
- To learn various fundamental and emerging protocols of all layers.
- To study about the issues pertaining to major obstacles in establishment and efficient management of Ad-hoc and sensor networks.
- To understand the nature and applications of Ad-hoc and sensor networks.
- To understand various security practices and protocols of Ad-hoc and Sensor Networks.

UNIT I MAC & TCP IN AD HOC NETWORKS **9**

Fundamentals of WLANs – IEEE 802.11 Architecture - Self configuration and Auto configuration-Issues in Ad-Hoc Wireless Networks – MAC Protocols for Ad-Hoc Wireless Networks – Contention Based Protocols - TCP over Ad-Hoc networks-TCP protocol overview - TCP and MANETs – Solutions for TCP over Ad-Hoc Networks.

UNIT II ROUTING IN AD HOC NETWORKS **9**

Routing in Ad-Hoc Networks- Introduction-Topology based versus Position based Approaches-Proactive, Reactive, Hybrid Routing Approach-Principles and issues – Location services - DREAM – Quorums based location service – Grid – Forwarding strategies – Greedy packet forwarding – Restricted directional flooding- Hierarchical Routing- **Issues and Challenges in providing QoS.**

UNIT III MAC, ROUTING & QOS IN WIRELESS SENSOR NETWORKS **9**

Introduction – Architecture - Single node architecture – Sensor network design considerations – Energy Efficient Design principles for WSNs – Protocols for WSN – Physical Layer : Transceiver Design considerations – MAC Layer Protocols – IEEE 802.15.4 Zigbee – Link Layer and Error Control issues - Routing Protocols – Mobile Nodes and Mobile Robots - Data Centric & Contention Based Networking – Transport Protocols & QOS – Congestion Control issues – Application Layer support.

UNIT IV SENSOR MANAGEMENT **9**

Sensor Management - Topology Control Protocols and Sensing Mode Selection Protocols - Time synchronization - Localization and positioning – Operating systems and Sensor Network programming – Sensor Network Simulators.

UNIT V SECURITY IN AD HOC AND SENSOR NETWORKS **9**

Security in Ad-Hoc and Sensor networks – Key Distribution and Management – Software based Anti-tamper techniques – water marking techniques – Defense against routing attacks - Secure Adhoc routing protocols – Broadcast authentication WSN protocols – TESLA – Biba – Sensor Network Security Protocols – SPINS.

TOTAL : 45 PERIODS

OUTCOMES:

Upon Completion of the course, the students should be able to

- Identify different issues in wireless ad hoc and sensor networks.
- To analyze protocols developed for ad hoc and sensor networks.
- To identify and address the security threats in ad hoc and sensor networks.
- Establish a Sensor network environment for different type of applications.

TEXT BOOK:

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

REFERENCES

1. B. Sklar, "Digital Communication Fundamentals and Applications", 2nd Edition, Pearson Education, 2009
2. B.P.Lathi, "Modern Digital and Analog Communication Systems" 3rd Edition, Oxford University Press 2007.
3. H P Hsu, Schaum Outline Series - "Analog and Digital Communications", TMH 2006
4. J.G Proakis, "Digital Communication", 4th Edition, Tata Mc Graw Hill Company, 2001.

EC8553 DISCRETE-TIME SIGNAL PROCESSING **L T P C**
4 0 0 4

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**

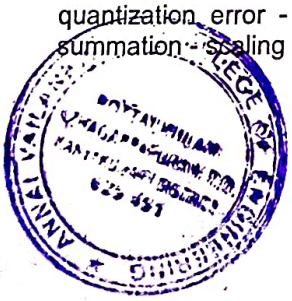
Characteristics of practical frequency selective filters. characteristics of commonly used analog filters - Butterworth filters, Chebyshev filters. Design of IIR filters from analog filters (LPF, HPF, BPF, BRF) - Approximation of derivatives, Impulse invariance method, Bilinear transformation. Frequency 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.



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EC8562 **DIGITAL SIGNAL PROCESSING LABORATORY** L T P C 0 0 4 2

OBJECTIVES:

The student should be made:

- To perform basic signal processing operations such as Linear Convolution, Circular Convolution, Auto Correlation, Cross Correlation and Frequency analysis in MATLAB
- To implement FIR and IIR filters in MATLAB and DSP Processor
- To study the architecture of DSP processor
- To design a DSP system to demonstrate the Multi-rate and Adaptive signal processing concepts.

LIST OF EXPERIMENTS: MATLAB / EQUIVALENT SOFTWARE PACKAGE

1. Generation of elementary Discrete-Time sequences
2. Linear and Circular convolutions
3. Auto correlation and Cross Correlation
4. Frequency Analysis using DFT
5. Design of FIR filters (LPF/HPF/BPF/BSF) and demonstrates the filtering operation
6. Design of Butterworth and Chebyshev IIR filters (LPF/HPF/BPF/BSF) and demonstrate the filtering operations

DSP PROCESSOR BASED IMPLEMENTATION

1. Study of architecture of Digital Signal Processor
2. Perform MAC operation using various addressing modes
3. Generation of various signals and random noise
4. Design and demonstration of FIR Filter for Low pass, High pass, Band pass and Band stop filtering
5. Design and demonstration of Butter worth and Chebyshev IIR Filters for Low pass, High pass, Band pass and Band stop filtering
6. Implement an Up-sampling and Down-sampling operation in DSP Processor

TOTAL: 60 PERIODS

OUTCOMES:

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

- Carryout basic signal processing operations
- Demonstrate their abilities towards MATLAB based implementation of various DSP systems
- Analyze the architecture of a DSP Processor
- Design and Implement the FIR and IIR Filters in DSP Processor for performing filtering operation over real-time signals
- Design a DSP system for various applications of DSP

EC8561 **COMMUNICATION SYSTEMS LABORATORY** L T P C 0 0 4 2

OBJECTIVES:

The student should be made:

- To visualize the effects of sampling and TDM
- To Implement AM & FM modulation and demodulation
- To implement PCM & DM
- To simulate Digital Modulation schemes
- To simulate Error control coding schemes

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1	960121414001	ADARSH KUMAR	DESIGN AND THERMAL ANALYSIS OF SOLAR PANEL SUPPORTING STRUCTURE	MR.J.PRABHU
2	960121414003	S N ALEX	OPTIMIZATION OF FIN PARAMETERS FOR VARIOUS PROFILE AREAS USING GENETIC ALGORITHM	MR.ARUN JEYAKUMAR
3	960121414009	CHINNADURAI K	CFD ANALYSIS OF HEAT TRANSFER IN A HELICAL COIL HEAT EXCHANGER WITH CONSTANT WALL HEAT TRANSFER COEFFICIENT	MR.J.PRABHU
4	960121414010	GUNA SEKARAN A	DESIGN AND THERMAL ANALYZING OF MISSILE NOSE CONE	MR.J.PRABHU
5	960121414013	KARTHISAN A	TEMPERATURE ANALYSIS OF ROCKET NOZZLE CONES	MR.J.PRABHU

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DESIGN AND THERMAL ANALYSIS OF SOLAR PANEL SUPPORTING STRUCTURE

PHASE II REPORT

Submitted by

ADARSH KUMAR

(960121414001)

In partial fulfilment for the award of the degree

of

MASTER OF ENGINEERING

in

THERMAL ENGINEERING

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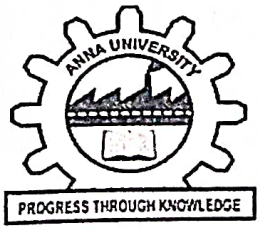

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OCTOBER 2023

ANNA UNIVERSITY: CHENNAI 600 025
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Certified that this Report titled **"DESIGN AND THERMAL ANALYSIS OF SOLAR PANEL SUPPORTING STRUCTURE"** is the bonafide work of **ADARSH KUMAR (960121414001)** 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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ABSTRACT

The use of renewable energy resources is increasing rapidly. Following this trend, the implementation of large area solar arrays is considered to be an essential. Many design approaches of the supporting structures have been presented in order to achieve the maximum efficiency. They are loaded mainly by aerodynamic pressures. International governance as well as the competition between industries define that they must withstand the enormous loads that result from large air acceleration. Moreover, they must have a life assurance of more than 20 yrs. Optimization plays very key role in product design and prevent un-necessary inventory satisfying the functional needs. But optimization with apt design helps to build efficient products in the everyday competing market. Stress analysis plays important role in optimizing the design. Due to the advance in computer based finite element software's design process is made simple by easier simulation methods fast replacing prototype built up and testing. In the current work, a solar panel aiding structure is designed to take rotational loads for safe operation. So, the design should consider the loads coming on the structure for rotation along with inertia effect of the rotating members. The model of solar supporting structure and thermal analyzing of the model is done in this project

CHAPTER 5

CONCLUSIONS

The solar supporting structure has been analyzed under thermal and modal condition for different materials. Cast Iron, stainless steel and al alloy are the three different materials which are compared with the best material. In thermal analysis among the three materials, al alloy was good compared to other material.In modal analysis, al alloy has obtained good results compared to cast iron and stainless steel.

OPTIMIZATION OF FIN PARAMETERS FOR VARIOUS PROFILE AREAS USING GENETIC ALGORITHM

PHASE II REPORT

Submitted by

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In partial fulfillment for the award of the degree of

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BONAFIDE CERTICATE

Certified that this project report titled "**OPTIMIZATION OF FIN PARAMETERS FOR VARIOUS PROFILE AREAS USING GENETIC ALGORITHM**" is the bonafide work of **S.N.ALEX (960121414003)** who carried out the research under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other project report 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

To find the optimal geometries of rectangular fin for maximum heat dissipation. Extended surface heat transfer is the study of heat transfer components with respect to their weights, volume, costs, or more accommodating shapes and of their behavior in a variety of thermal environment. Increasing the exposed cooling surface area is one of the cheap and effective enhancements used in heat sink design. A great deal of research is being put into low cost manufacturing methods of producing extended surfaces that incorporate more fins in smaller heat sink package sizes. The objective functions for finding the optimized profiles of fins are solved by using the genetic algorithms range of fin shapes are investigated and the optimum solutions for various profile area are obtained. This problem contains non-linear equations. A genetic algorithm is a tool gives better results against non-linear problem. Hence we used genetic algorithm for optimization.

Optimization is done by using C++ coding and the results were obtained. Then analysis is done by using Ansys which will support the result whether modify the dimensions from the obtained result will decrease the heat dissipation. Provide information to thermal engineers to what extent any particular extended surface or fin arrangements could improve heat dissipation from a surface to the surrounding fluid. Smaller fin volume in fin design is preferable as the heat is dissipated more effectively. Limited to cases where the correlations for heat transfer coefficients are valid. A very useful for practicing thermal engineer especially in the area of electronic packaging as the parameters for the fin design can easily be found for any chosen profile area.

CHAPTER 7

CONCLUSION & FUTURE SCOPES

Summary

The study is continued with the optimum solutions for various profile area of longitudinal fins. Tables 4.1 and 2 show the results obtained from GA. The result show that the optimal fin thickness and height increase with the profile area. However the aspect ratio of the fin decreases with the profile area. The optimum thickness and height for concave parabolic fin are greater than the rectangular fin for a fixed profile area. The profile area has more effect on fin thickness than other parameter. Concave parabolic fin dissipates more heat than the rectangular one. And it has smaller aspect ratio value.

GA is employed to solve the single fins optimization problems of different fin shapes for convection heat transfer. It has been used successfully as an optimization tool and the results obtained by GA agreed well with the literature data where available. In single fin design, fin shape with curve profile performs better than rectangular fin and cylindrical spine. For a fixed area or volume, concave parabolic profile dissipates about 14 percent more heat than rectangular fin and cylindrical spine, However, from the manufacturing point of view, cylindrical spine is more preferable as it is easy to fabricate. Cylindrical spine has an average aspect ratio of less than 2 compared to other fin shapes. It is desired to choose smaller fin volume in fin design as the heat is dissipated more effectively. Longitudinal fins perform better than spine for a given volume.

The results taken from the simulation using Ansys also strengthen the results obtained from GA. Whether changing the dimensions from the optimized one will lead to decrease in heat dissipation rate.

CFD ANALYSIS OF HEAT TRANSFER IN A HELICAL COIL HEAT EXCHANGER WITH CONSTANT WALL HEAT TRANSFER COEFFICIENT

PHASE II REPORT

Submitted by

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(960121414009)

In partial fulfilment for the award of the degree

of

MASTER OF ENGINEERING

in

THERMAL ENGINEERING

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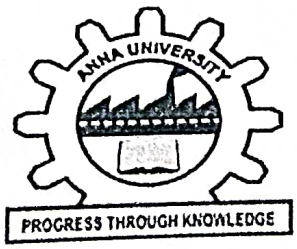

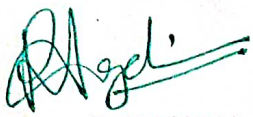

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OCTOBER 2023

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BONAFIDE CERTIFICATE

Certified that this Report titled **"CFD ANALYSIS OF HEAT TRANSFER IN A HELICAL COIL HEAT EXCHANGER WITH CONSTANT WALL HEAT TRANSFER COEFFICIENT"** is the bonafide work of **CHINNADURAI. K (960121414009)** 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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INTERNAL EXAMINER

EXTERNAL EXAMINER

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ABSTRACT

There is a wide application of coiled heat exchanger in the field of cryogenics and other industrial applications for its enhanced heat transfer characteristics and compact structure. Lots of researches are going on to improve the heat transfer rate of the helical coil heat exchanger. Here, in this work, an analysis has been done for a tube-in-tube helical heat exchanger with constant heat transfer coefficient with turbulent flow. There are various factors present that may affect the heat transfer characteristics of the heat exchanger. Here, the experiment has been done by varying the curvature ratio i.e. ratio of coil diameter to inner tube diameter and inlet velocity of the hot fluid in the inner tube. The curvature ratio is varied from 8 to 25 and inlet velocity is varied from 1m/s to 2m/s step wise. The analysis has done using ANSYS 13 CFD methodology. Different parameters are calculated from the results obtained and graphs are plotted between various parameters such as Nusselt number, friction factor, pressure drop and pumping power versus Reynolds number. These graphs have been analyzed and discussed to find out the optimal result for which the heat exchanger would give the best performance.

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CHAPTER 5
CONCLUSION & FUTURE SCOPES

CONCLUSION

This work investigates the heat transfer and flow characteristics of a tube-in-tube helical heat exchanger for counter flow using CFD methodology. The effect of mass flow rate in the inner tube and curvature ratio are studied and the various conclusions drawn are:

- Nusselt depends on the curvature ratio, i.e. the ratio of coil diameter to inner tube diameter. Nu increases with increasing curvature ratio. Also it was found that Nu increases with increasing mass flow rate or Reynolds number.
- For turbulent flow in the pipe, friction factor decreases with increasing Reynolds number(Re) whereas heat transfer rate increases with Re. So, there exists an optimal value of mass flow rate and curvature ratio for which the heat exchanger would give the best performance.
- For more heat transfer rate, higher curvature ratio should be preferred irrespective of the power low.
- From the velocity and temperature contours it can be observed that the velocity is higher towards the outer side of the coil whereas temperature is higher towards inner side of coil.
- The heat transfer performance of a helical tube heat exchanger is more than that of a straight tube heat exchanger.

DESIGN AND THERMAL ANALYZING OF MISSILE NOSE CONE

PHASE II REPORT

Submitted by

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EXTERNAL EXAMINER

ABSTRACT

A new nose cones concept that guarantees an addition in act over existing ordinary nose cones is talked about in this paper the term nose cone is utilized to allude to the forward most area of a rocket, guided rocket or air ship. The cone is shaped to offer least aerodynamic resistance. The aerodynamic structure of the nose cone area of any vehicle or body intended to go through a compressible fluid medium, (for example, a rocket or airplane rocket or projectile), a vital issue is the assurance of the nose cone geometrical shape for ideal execution.

This undertaking assesses the rocket nose cone analysis by utilizing the accompanying materials, for example, AL alloy, Ti-6Al-4V and steel. A cone display is taken from the concepts of obtuse nose cone and structured in the CAD programming creo. Further this nose cone configuration is imported to the Analysis programming named as Ansys and plays out the thermal analysis. At long last the outcomes are thought about and classified.

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CHAPTER 6

CONCLUSION

This study explains the various characteristics and properties of the materials of rocket nose casing. The results obtained from Finite Element Analysis (FEA) are compared with original material values. And the three materials are used as the nose. The nose is sketched, modeled and assembled in AUTO CAD, Creo 3.0 and Ansys workbench. This project describes the latest and strongest material for nose. Thermal analysis of nose is completed. Stainless steel and aluminum alloy has the best temperature results. Ti-6Ai-6V has the best heat flux value.

TEMPERATURE ANALYSIS OF ROCKET NOZZLE CONES

PHASE II REPORT

Submitted by

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In partial fulfilment for the award of the degree

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INTERNAL EXAMINER

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ABSTRACT

A solid rocket motor nozzle is an essential component housed in the rear end of the rocket. The basic purpose of having this component is the conversion of the thermal energy into kinetic energy thereby imparting thrust to the rocket. Nozzle Geometry is of paramount importance to understand the performance of a rocket. The performance can be modified by changing the geometrical design, so as to achieve maximum effective velocity of the rocket.

The iterative process is continued until a thermally and structurally adequate nozzle is obtained within the required rocket constraints. Two basic exit configurations are considered in the design process, contoured and conical. The contoured nozzle turns the flow so that the exhaust products exit in a more or less axial direction thereby reducing divergences losses.

The conical nozzle on the other hand is considered due to its ease of fabrication. In this report the design and analysis of a rocket nozzle for optimizing thrust as per the requirements and constraints is carried out. The design process is carried out as per the GVR Rao method which has now become an aerospace industry standard due to its ease of use and accuracy.

CHAPTER 5

CONCLUSION

The rocket nozzle has been analyzed under thermal and modal condition for different materials. columbium and Cast Iron are the two different materials which are compared with the existing material which is Niobium.In thermal analysis among the three materials, columbium was good compared to other material. In modal analysis, columbium has obtained good results compared to Niobium material.

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1. Burden, R.L., and Faires, J.D., "Numerical Analysis – Theory and Applications", 9th Edition, Cengage Learning, New Delhi, 2016.
2. Gupta S.K., "Numerical Methods for Engineers", New Age Publishers, 1995.
3. Jain M. K., Iyengar S. R., Kanchi M. B., Jain, "Computational Methods for Partial Differential Equations", New Age Publishers ,1993.
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6. Smith, G. D., "Numerical Solutions of Partial Differential Equations: Finite Difference Methods", Clarendon Press, 1985.

TE5151 **ADVANCED HEAT TRANSFER** **L T P C**
4 0 0 4

OBJECTIVES

- To develop the ability to use the heat transfer concepts for various applications like finned systems, turbulence flows, high speed flows.
- To analyse the thermal analysis and sizing of heat exchangers and to learn the heat transfer coefficient for compact heat exchanges.
- To achieve an understanding of the basic concepts of phase change processes and mass transfer.

UNIT I CONDUCTION AND RADIATION HEAT TRANSFER **12**

One dimensional energy equations and boundary condition - three-dimensional heat conduction equations - extended surface heat transfer - conduction with moving boundaries - radiation in gases and vapour.Gas radiation and radiation heat transfer in enclosures containing absorbing and emitting media – interaction of radiation with conduction and convection.

UNIT II TURBULENT FORCED CONVECTIVE HEAT TRANSFER **12**

Momentum and energy equations - turbulent boundary layer heat transfer - mixing length concept - turbulence model – k Є model - analogy between heat and momentum transfer – Reynolds, Colburn, Prandtl turbulent flow in a tube - high speed flows.

UNIT III PHASE CHANGE HEAT TRANSFER AND HEAT EXCHANGER **12**

Condensation with shears edge on bank of tubes - boiling – pool and flow boiling - heat exchanger -Є – NTU approach and design procedure - compact heat exchangers.

UNIT IV NUMERICAL METHODS IN HEAT TRANSFER **12**

Finite difference formulation of steady and transient heat conduction problems – discretization schemes – explicit - Crank Nicolson and fully implicit schemes - control volume formulation - steady one-dimensional convection and diffusion problems - calculation of the flow field – SIMPLER Algorithm

UNIT V MASS TRANSFER AND ENGINE HEAT TRANSFER CORRELATION **12**

Mass transfer - vaporization of droplets - combined heat and mass transfers - heat transfer correlations in various applications like I.C. engines, compressors and turbines.

TOTAL : 60 PERIODS

7. Properties of fuel oils, biomass, biogas.
8. Direct and diffused solar radiation measurements.
9. Performance study on Boiler.
10. Performance study on parallel and counter flow Heat Exchangers.
11 Performance and characteristics studies on fan.
12 Study on Fuel Cell Systems.
13 Study on Thermal Storage Systems

TOTAL: 60 PERIODS

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

- Know the various alternate fuels are available for IC engines
- Understand the thermodynamic relations for thermal engineering devices.
- Understand the working principle of different renewable energy sources.
- Measure the properties of different fuels

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

1. Single cylinder / multi cylinder Automotive Engine with data acquisition system - 1 No
2. Flue gas analyzer - 1 No
3. Smoke meter - 1 No
4. Single cylinder variable Compression ratio petrol engine - 1 No
5. Single cylinder variable Compression ratio Diesel engine - 1 No
6. Cooling tower test rig - 1 No
7. Refrigeration cum Heat Pump test rig - 1 No
8. 100 LPD Solar flat plate water heater test rig - 1 No
9. Pyranometer - 1 No
10. Redwood / Saybolt viscometer - 1 No
11. Bomb calorimeter apparatus - 1 No
12. Gas colorimeter - 1 No
13. Cloud & Pour point apparatus - 1 No
14. Non-IBR Boiler test rig - 1 No
15. Parallel flow / Counter flow Heat exchanger test rig - 1 No
16. Fan test rig - 1 No

TE5201 INSTRUMENTATION FOR THERMAL ENGINEERING **L T P C 3 0 0 3**

OBJECTIVES

- To provide knowledge on various measuring instruments for thermal engineering.
- To understand the various steps involved in error analysis and uncertainty analysis.
- To provide knowledge on advance measurement techniques.

UNIT I MEASUREMENT CHARACTERISTICS **12**

Instrument Classification, Characteristics of Instruments – Static and dynamic, experimental error analysis, Systematic and random errors, Statistical analysis, Uncertainty, Experimental planning and selection of measuring instruments, Reliability of instruments

UNIT II MICROPROCESSORS AND COMPUTERS IN MEASUREMENT **5**

Data logging and acquisition – use of sensors for error reduction, elements of micro computer interfacing, intelligent instruments in use.

UNIT III MEASUREMENT OF PHYSICAL QUANTITIES **10**

Measurement of thermo-physical properties, Instruments for measuring temperature, pressure and flow, use of sensors for physical variables.

UNIT IV ADVANCE MEASUREMENT TECHNIQUES **8**

Shadowgraph, Schlieren, Interferometer, Laser Doppler Anemometer, Hot wire Anemometer, heat flux sensors, Telemetry in measurement.

UNIT V MEASUREMENT ANALYSIS **10**

Chemical thermal, magnetic and optical gas analyzers, measurement of smoke, Dust and moisture, gas chromatography, spectrometry, measurement of pH, Review of basic measurement techniques.

TOTAL: 45 PERIODS

OUTCOME

- On the completion of the syllabus students get knowledge about the thermal engineering measuring devices, utilization of computers in measurement applications and advanced measuring systems.

REFERENCES

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8. T.G.Beekwith R.D., Marangoni and J.H. Lienhard, Mechanical Measurements, Pearson Education, 2001.

TE5291 ENVIRONMENTAL ENGINEERING AND POLLUTION CONTROL **L T P C**

3 0 0 3

OBJECTIVES

- To impart knowledge on the atmosphere and its present condition, global warming and eco-legislations.
- To detail on the sources of air, water and noise pollution and possible solutions for mitigating their degradation.
- To elaborate on the technologies available for generating energy from waste.

UNIT I INTRODUCTION **9**

Global atmospheric change – green house effect – Ozone depletion - natural cycles - mass and energy transfer – material balance – environmental chemistry and biology – impacts – environmental Legislations.