ACADEMIC YEAR (2022-2023)							
	J.K.K.MUNIRAJAH COLLEGE OF TECHNOLOGY T.N.Palayam(po),Gobi(tk)-638506, Erode(dt).						Metric No 1.3.2
S.No	Name of the course	Course code	programme offering	project work	field work	internship	Number of students
(2022-2023) Regulation-2017							
1	Project Work	ME8811	MECHANICAL ENGINEEREING	✓			5
2	Engineering Thermodynamics	ME8391	MECHANICAL ENGINEEREING	✓			7
3	Fluid Mechanics and Machinery	CE8394	MECHANICAL ENGINEEREING	✓		✓	6
4	Manufacturing Technology - I	ME8351	MECHANICAL ENGINEEREING	✓		✓	8
5	Kinematics of Machinery	ME8492	MECHANICAL ENGINEEREING	✓			5
6	Manufacturing Technology – II	ME8451	MECHANICAL ENGINEEREING	✓			8
7	Engineering Metallurgy	ME8491	MECHANICAL ENGINEEREING	✓		✓	4
8	Strength of Materials for Mechanical Engineers	CE8395	MECHANICAL ENGINEEREING	✓			7
9	Thermal Engineering- I	ME8493	MECHANICAL ENGINEEREING			✓	7
10	Design of Machine Elements	ME8593	MECHANICAL ENGINEEREING	✓		✓	5
11	Design of Transmission Systems	ME8651	MECHANICAL ENGINEEREING	✓			8
12	Computer Aided Design and Manufacturing	ME8691	MECHANICAL ENGINEEREING	✓		✓	4

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DEPARTMENT OF MECHANICAL ENGINEERING

2022-2023

S.NO	REG.NO	STUDENT NAME	PROJECT	INTERNSHIP
1	731219114001	ANISHKUMAR L	✓	✓
2	731219114002	ARUNKUMAR S	✓	✓
3	731219114003	BALAMURUGAN V	✓	✓
4	731219114005	DHARMARAJ M	✓	✓
5	731219114006	DINESH S	✓	✓
6	731219114007	DINESH KUMAR R	✓	✓
7	731219114009	KARTHI M	✓	✓
8	731219114011	KAVINKUMAR M	✓	✓
9	731219114013	MANOJ J	✓	✓
10	731219114014	MANO RANJITH K	✓	✓
11	731219114015	MURUGESH M	✓	✓
12	731219114019	SHANKER GANESH K	✓	✓
13	731219114021	SATHISH KUMAR S	✓	✓
14	731219114022	SIVANANTH K	✓	✓
15	731219114023	THAMARAI SELVAN	✓	✓
16	731219114024	VIGNESH P	✓	✓
17	731219114027	YOKESH E	✓	✓
18	731219114501	DINESH KUMAR B	✓	✓

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DEPARTMENT OF MECHANICAL ENGINEERING

2022-2023

Regulation - 2017

S. No	Name of the Course that include experiential learning through Project Work/Internship/Field Visit
1.	Project Work
2.	Engineering Thermodynamics
3.	Fluid Mechanics and Machinery
4.	Manufacturing Technology - I
5.	Kinematics of Machinery
6.	Manufacturing Technology – II
7.	Engineering Metallurgy
8.	Strength of Materials for Mechanical Engineers
9.	Thermal Engineering- I
10.	Design of Machine Elements
11.	Design of Transmission Systems
12.	Computer Aided Design and Manufacturing

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PROJECT WORK

ME8351 **MANUFACTURING TECHNOLOGY–I** **L T P C**
3 0 0 3

OBJECTIVE:

- To introduce the concepts of basic manufacturing processes and fabrication techniques, such as metal casting, metal joining, metal forming and manufacture of plasticcomponents.

UNITI METALCASTINGPROCESSES **9**

Sand Casting : Sand Mould – Type of patterns - Pattern Materials – Pattern allowances –Moulding sand Properties and testing – Cores –Types and applications – Moulding machines– Types and applications; Melting furnaces : Blast and Cupola Furnaces; Principle of special casting processes : Shell - investment – Ceramic mould – Pressure die casting - Centrifugal Casting - CO_2 process – Stir casting; Defects in Sandcasting

UNITII JOININGPROCESSES **9**

Operating principle, basic equipment, merits and applications of: Fusion welding processes: Gas welding - Types – Flame characteristics; Manual metal arc welding – Gas Tungsten arc welding - Gas metal arc welding – Submerged arc welding – Electro slag welding; Operating principle and applications of: Resistance welding - Plasma arc welding – Thermit welding – Electron beam welding – Friction welding and Friction Stir Welding; Brazing and soldering; Weld defects: types, causes andcure.

UNITIII METALFORMINGPROCESSES **9**

Hot working and cold working of metals – Forging processes – Open, impression and closed die forging – forging operations. Rolling of metals– Types of Rolling – Flat strip rolling – shape rolling operations – Defects in rolled parts. Principle of rod and wire drawing – Tube drawing – Principles of Extrusion – Types – Hot and Cold extrusion.

UNITIV SHEETMETALPROCESSES **9**

Sheet metal characteristics – shearing, bending and drawing operations – Stretch forming operations – Formability of sheet metal – Test methods –special forming processes-Working principle and applications – Hydro forming – Rubber pad forming – Metal spinning– Introduction of Explosive forming, magnetic pulse forming, peen forming, Super plastic forming – Microforming

UNITV MANUFACTURE OF PLASTIC COMPONENTS **9**

Types and characteristics of plastics – Moulding of thermoplastics – working principles and typical applications – injection moulding – Plunger and screw machines – Compression moulding, Transfer Moulding – Typical industrial applications – introduction to blow moulding –Rotational moulding – Film blowing – Extrusion – Thermoforming – Bonding of Thermoplastics.

TOTAL: 45 PERIODS

OUTCOMES:

CO1 Explain different metal casting processes, associated defects, merits and demerits CO2
Compare different metal joiningprocesses.
CO3 Summarize various hot working and cold working methods of metals. CO4
Explain various sheet metal making processes.
CO5 Distinguish various methods of manufacturing plasticcomponents.

TEXT BOOKS:

1. HajraChouldhary S.K and HajraChoudhury. AK., "Elements of workshop Technology", volume I and II, Media promoters and Publishers Private Limited, Mumbai,2008
2. Kalpakjian. S, "Manufacturing Engineering and Technology", Pearson Education India Edition, 2013

REFERENCES:

1. Gowri P. Hariharan, A.SureshBabu, "Manufacturing Technology I", Pearson Education,2008
2. PaulDegarma E, Black J.T and Ronald A. Kosher, "Materials andProcesses, in Manufacturing" Eight Edition, Prentice – Hall of India,1997.
3. Rao, P.N. "Manufacturing Technology Foundry, Forming and Welding", 4th Edition, TMH-2013
4. Roy. A. Lindberg, "Processes and Materials of Manufacture", PHI / Pearson education,2006
5. Sharma, P.C., "A Text book of production Technology", S.Chand and Co. Ltd.,2014.

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CE8394 **FLUID MECHANICS AND MACHINERY** **L T PC**
4 0 0 4

OBJECTIVES

- The properties of fluids and concept of control volume are studied
- The applications of the conservation laws to flow through pipes are studied.
- To understand the importance of dimensionalanalysis
- To understand the importance of various types of flow inpumps.
- To understand the importance of various types of flow inturbines.

UNITI FLUID PROPERTIES ANDFLOWCHARACTERISTICS **12**

Units and dimensions- Properties of fluids- mass density, specific weight, specific volume, specific gravity, viscosity, compressibility, vapor pressure, surface tension and capillarity. Flow characteristics – concept of control volume - application of continuity equation, energy equation and momentumequation.

UNITII FLOW THROUGHCIRCULAR CONDUITS **12**

Hydraulic and energy gradient - Laminar flow through circular conduits and circular annuli- Boundary layer concepts – types of boundary layer thickness – Darcy Weisbach equation –friction factor- Moody diagram- commercial pipes- minor losses – Flow through pipes in series andparallel.

UNITIII DIMENSIONALANALYSIS **12**

Need for dimensional analysis – methods of dimensional analysis – Similitude –types of similitude - Dimensionless parameters- application of dimensionless parameters – Model analysis.

UNITIV PUMPS **12**

Impact of jets - Euler's equation - Theory of roto-dynamic machines – various efficiencies– velocity componentsatentryandexitoftherotor-velocitytriangles-Centrifugalpumps–workingprinciple - work done by the impeller - performance curves - Reciprocating pump- working principle – Rotary pumps – classification.

UNITV TURBINES **12**

Classification of turbines – heads and efficiencies – velocity triangles.Axial, radial and mixed flow turbines.Pelton wheel, Francis turbine and Kaplan turbines- working principles - work done by waterontherunner– drafttube.Specificspeed-unitquantities–performancecurvesforturbines – governingofturbines.

TOTAL: 60 PERIODS

OUTCOMES:

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

- Apply mathematical knowledge to predict the properties and characteristics of afluid.
- Can analyse and calculate major and minor losses associated with pipe flow in piping networks.
- Can mathematically predict the nature of physicalquantities
- Can critically analyse the performance ofpumps
- Can critically analyse the performance ofturbines.

TEXT BOOK:

1. Modi P.N. and Seth, S.M. "Hydraulics and Fluid Mechanics", Standard Book House, New Delhi 2013.

REFERENCES:

1. Graebel. W.P, "Engineering Fluid Mechanics", Taylor & Francis, Indian Reprint,2011
2. Kumar K. L., "Engineering Fluid Mechanics", Eurasia Publishing House(p) Ltd., New Delhi 2016
3. Robert W.Fox, Alan T. McDonald, Philip J.Pritchard, "Fluid Mechanics and Machinery",2011.
4. Streeter, V. L. and Wylie E. B., "Fluid Mechanics", McGraw Hill Publishing Co.2010

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GOBI (Tk), ERODE (Dt).

DESIGN AND FABRICATION OF SOLAR AGRICULTURAL WATER PUMPING SYSTEM

PROJECT REPORT

Submitted by

ANISH KUMAR L	**(731219114001)**
MANORANJITH K	**(731219114014)**
YOKESH E	**(731219114027)**

In partial fulfillment for the award of the degree

Of

BACHELOR OF ENGINEERING

IN

MECHANICAL ENGINEERING

J.K.K. MUNIRAJAH COLLEGE OF TECHNOLOGY

T.N. PALAYAM-638506

ANNA UNIVERSITY: CHENNAI 600 025

MAY 2023

PRINCIPAL
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T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report " **DESIGN AND FABRICATION SOLAR WATER PUMPING SYSTEM** " is the benefic work of "**ANISH KUMAR .L, MANORANJITH.K, YOKESH.E**" who carried out the project work under my supervision.

18/5/23

SIGNATURE

Mr.K. SRIRAM. M.E .,(Ph.D).,

HEAD OF THE DEPARTMENT

Assistant Professor

Dept of Mechanical Engineering

JKK Munirajah College of Technology

T.N.Palayam.

18/5/23

SIGNATURE

Mr.K. SRIRAM. M.E .,(Ph.D).,

SUPERVISOR

Assistant Professor

Dept of Mechanical Engineering

JKK Munirajah College of Technology

T.N.Palayam

Submitted for the Project **Viva-Voce** Examination held on 18/5/2023

INTERNAL EXAMINER

18/5/23

EXTERNAL EXAMINER

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.

ACKNOWLEDGEMENT

First of all we would like to thank the almighty for giving as sound health throughout our project work. We would like to express our thanks to our beloved parents for successful completion of our project.

We extend sincere thanks to our beloved **Chairman Mrs.VASANTHA KUMARI MUNIRAJAH.**, and all the members of J.K.K Muniraja College of Technology for providing wonderful facilities for summing up our studies.

I express my sincere thanks and grateful acknowledgement to our **Secretary Mrs. KASTHURIPRIYA KRUPAKAR MURALI., M.B.A.,** and a dynamic personality of our college for his kind consent to take up this project work and make it a great success.

We would like to express our sincere thanks to our principal **Dr.K.SRIDHARAN. M.E., MBA. , Ph.D., MISTE.,** for forwarding us to do our project and offering adequate duration in completing our project.

We are also grateful to express to our sincere thanks to our Head of Department **Mr.K.SRIRAM. M.E.,(Ph.D)** for his constructive suggestions and encouragement during our project.

We would like to express our grateful thanks to our project coordinator **Mr.K.S.RAMESH.M.E,** Assistant professor for his valuable ideas, encouragement and continuous help during the preparation of this project.

We own in great measure to our guide **Mr.K.SRIRAM. M.E.,(Ph.D)** Assistant professor for his guidance inspiring suggestions, encouragement and continuous help during the preparation of this project. We express our sincere thanks to all teaching and non-teaching faculties in department of Mechanical Engineering in giving us the project complete shape and also our thanks to all our staff members and friends for valuable suggestion to carry out our project work successfully.

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ABSTRACT

Energy plays an important role in the material, social and cultural life of mankind. The energy needs are increasing day by day. This is the result of population growth and increase in the standard of living which is directly proportional to energy consumption.

The lifting of water for drinking or irrigation purposes is of great importance in widely distributed villages with little or no rural electrification and where underground water is available. Solar energy is converted to mechanical energy to drive small water pumps it would be of great help to the rural inhibitions.

In our project we use solar photo voltaic cells for pumping water. The photo voltaic modules convert sunlight direct to electricity which is used to run a dc motor pump for bailing of water. It consists of solar photo voltaic modules, power conditioner to protect storage batteries from over charging during non-sun shine and a dc water pump.

CHAPTER 1

INTRODUCTION

we know that man kind will be never lacking in energy. Today, it is liquid fluid, tomorrow it may be uranium with an element of risk. Risk exists where ever there is human activity and production of energy. Just as the supply of fossil fuel is finite thus there will be the supply of uranium. Perhaps, uranium would be exhausted quickly if it is used on a large scale. It is therefore, harnessing the gigantic inexhaustible solar energy source reduces the dependence on fossil fuels. For the environmental concerned, the solar energy harnessing system offers advantages in that, it emits no pollutants in to the atmosphere as they are with the combustion of fossil fuels. Thus, as a long term option solar energy system can be considered as an alternate to all the finite fuel system. Therefore, there is no energy shortage today nor will there be in the near future. The lifting of water for drinking or irrigation purposes is of great importance in widely distributed villages with little or no rural electrification and where under ground water is available. Solar energy is converted to mechanical energy to drive small water pumps it would be of great help to the rural inhibitions. In our project we use solar photo

CHAPTER 8

CONCLUSION

The **SOLAR AGRICULTURAL WATER PUMPING SYSTEM** is working with satisfactory conditions. We are able to understand the difficulties in maintaining the tolerances and also quality. The solar tracking system is uses the sunrays for pumping the water to agricultural lands and fields, when pumping action not taking place the energy can be stored in battery for other application.

INTERNSHIP

ME8593 **DESIGN OF MACHINE ELEMENTS** **L T P C**
3 0 0 3

OBJECTIVES

- To familiarize the various steps involved in the DesignProcess
- To understand the principles involved in evaluating the shape and dimensions of a component to satisfy functional and strengthrequirements.
- To learn to use standard practices and standarddata
- To learn to use catalogues and standard machinecomponents
- (Use of P S G Design Data Book ispermitted)

UNITI STEADY STRESSES AND VARIABLE STRESSES INMACHINEMEMBERS 9

Introduction to the design process - factors influencing machine design, selection of materials based on mechanical properties - Preferred numbers, fits and tolerances – Direct, Bending and torsional stress equations – Impact and shock loading – calculation of principle stresses for various load combinations, eccentric loading – curved beams – crane hook and 'C' frame- Factor of safety - theories of failure – Design based on strength and stiffness – stress concentration – Design for variableloading.

UNITII SHAFTSAND COUPLINGS 9

Design of solid and hollow shafts based on strength, rigidity and critical speed – Keys, keyways and splines - Rigid and flexible couplings.

UNITIII TEMPORARY ANDPERMANENTJOINTS 9

Threaded fastners - Bolted joints including eccentric loading, Knuckle joints, Cotter joints – Welded joints, riveted joints for structures - theory of bondedjoints.

UNITIV ENERGY STORING ELEMENTS ANDENGINECOMPONENTS 9

Various types of springs, optimization of helical springs - rubber springs - Flywheels considering stresses in rims and arms for engines and punching machines- Connecting Rods and crank shafts.

UNITV BEARINGS 9

Sliding contact and rolling contact bearings - Hydrodynamic journal bearings, Sommerfeld Number, Raimondi and Boyd graphs, -- Selection of Rolling Contactbearings.

TOTAL: 45 PERIODS

OUTCOMES:

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

CO1 Explain the influence of steady and variable stresses in machine component design. CO2 Apply the concepts of design to shafts, keys andcouplings.

CO3 Apply the concepts of design to temporary and permanent joints.

CO4 Apply the concepts of design to energy absorbing members, connecting rod and crank shaft.

CO5 Apply the concepts of design tobearings.

TEXT BOOKS:

1. Bhandari V, "Design of Machine Elements", 4th Edition, Tata McGraw-Hill Book Co,2016.
2. Joseph Shigley, Charles Mischke, Richard Budynas and Keith Nisbett "Mechanical Engineering Design", 9th Edition, Tata McGraw-Hill,2011.

REFERENCES:

1. Alfred Hall, Halowenko, A and Laughlin, H., "Machine Design", Tata McGraw-Hill BookCo.(Schaum's Outline), 2010
2. AnselUgural, "Mechanical Design Co, 2003. An Integral Approach",1st Edition, Tata McGraw-Hill Book
3. P.C. Gope, "Machine Design – Fundamental and Application", PHI learning private ltd, New Delhi, 2012.
4. R.B. Patel, "Design of Machine Elements", MacMillan Publishers India P Ltd.,

Gmail

Internship
1message

MON 06 MAR 2023 at 10.35 AM

From: SRIRAMKS<hodmech@jkkmct.edu.in>
Date: MON 06 MAR 2023 at 10.35 AM
Subject: Internship-reg

To: SAKTHI GEAR PRODUCT<hr@sakthigear.com >

Dear Sir,

I am requesting to be joining your **SAKTHI GEAR PRODUCT.** The requirements are exactly what, I have prepared for and hoped to do. I feel confident that I can make a significant contribution to your organization while at the same time learning from your staff.

Additionally, I shall complete all insurance forms for the new intern orientation. I look forward to working with you and your fine team. I appreciate your confidence in me and providing the chance to work with and observe your outstanding staff.

Refer the following students : **(ANISHKUMAR L, MANO RANJITH K, YOKESH E, ARUNKUMAR S,KAVINKUMAR M and SIVANANTH K)**

Sincerely,

Mr.K.Sriram,
HOD/MECH
J K K.Munirajah College of Technology,
T.N.Palayam, Erode-638506,
Tamilnadu.

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OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

Gmail

Internship

1message

WED 15 MAR 2023 at 3.30 PM

From: SAKTHI GEAR PRODUCT<hr@sakthigear.com >
Date: WED 15 MAR 2023 at 3.30 PM

Subject: Internship-reg

To:SRIRAMKS<hodmech@jkkmct.edu.in>

Dear Sir,

I am writing to confirm my acceptance of your internship offer of 20.03.2023 to 06.05.2023 and to tell you how to be joining my **SAKTHI GEAR PRODUCT**. The requirements are exactly what I have prepared for and hoped to do. I feel confident that I can make a significant contribution to your organization while at the same time learning from my staff.

Additionally, I shall complete all insurance forms for the new intern orientation. I look forward to working with you and your fine team. I appreciate your confidence in me and providing the chance to work with and observe my outstanding staff.

Refer the following students: **(ANISHKUMAR L, MANO RANJITH K, YOKESH E, ARUNKUMAR S,KAVINKUMAR M and SIVANANTH K).**

Sincerely,
HR Manager,
Sakthi Gear Product,
Coimbatore – 641006
Tamil Nadu, India

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GOBI (Tk). ERODE (Dt).

SAKTHI GEAR PRODUCTS

INTERNSHIP CERTIFICATE

TO WHOM-SO-EVER IT MAY CONCERN

This is to certify that Mr .ANISHKUMAR L , IV Year student B.E.Mechanical Engineering,J.K.K.Munirajah College of Technology, T.N.Palayam has successfully completed 45 days (20.03.2023 to 06.05.2023) internship in " SAKTHI GEAR PRODUCTS PRIVATE LIMITED COIMBATORE. "

He has worked on project titled " DESIGN AND FABRICATION SOLAR WATER PUMPING SYSTEM" This project aimed to hinder the theft of bikes with the help of a wheel locking system.

During this tenure ANISHKUMAR L has involved in his work with dedication. We found him pretty and active in whatever the task we have given him. He is a confident person, punctual, hardworking and inqulsitive.His conduct and character was good during the internship period.

Coimbatore
27.05.2023

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GOBI (Tk), ERODE (Dt).

General Manager

SAKTHI GEAR PRODUCTS Coimbatore

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SAKTHI GEAR PRODUCTS

INTERNSHIP CERTIFICATE

TO WHOM-SO-EVER IT MAY CONCERN

This is to certify that Mr .MANO RANJITH K , IV Year student B.E.Mechanical Engineering,J.K.K.Munirajah College of Technology, T.N.Palayam has successfully completed 45 days (20.03.2023 to 06.05.2023) internship in " SAKTHI GEAR PRODUCTS PRIVATE LIMITED COIMBATORE. "

He has worked on project titled " DESIGN AND FABRICATION SOLAR WATER PUMPING SYSTEM " This project aimed to hinder the theft of bikes with the help of a wheel locking system.

During this tenure MANO RANJITH K has involved in his work with dedication. We found him pretty and active in whatever the task we have given him. He is a confident person, punctual, hardworking and inqulsitive.His conduct and character was good during the internship period.

Coimbatore
27.05.2023

PRINCIPAL
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General Manager

SAKTHI GEAR PRODUCTS Coimbatore

Internel Guide

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SAKTHI GEAR PRODUCTS

INTERNSHIP CERTIFICATE

TO WHOM-SO-EVER IT MAY CONCERN

This is to certify that Mr .YOKESH E , IV Year student B.E.Mechanical Engineering, J.K.K. Munirajah College of Technology, T.N.Palayam has successfully completed 45 days (20.03.2023 to 06.05.2023) internship in " SAKTHI GEAR PRODUCTS PRIVATE LIMITED COIMBATORE. "

He has worked on project titled " DESIGN AND FABRICATION SOLAR WATER PUMPING SYSTEM " This project aimed to hinder the theft of bikes with the help of a wheel locking system.

During this tenure YOKESH E has involved in hiswork with dedication. We found him pretty and active in whatever the task we have given him. He is a confident person, punctual, hardworking and inqulsitive.His conduct and character was good during the internship period.

Coimbatore
27.05.2023

PRINCIPAL
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GOBI (Tk), ERODE (Dt).

General Manager

SAKTHI GEAR PRODUCTS Coimbatore

Internel Guide

7/4, School Street, Chinnavedampatti Post, Ganapathy,Coimbatore 641006, Tamil Nadu, India.Website: www.sakthigear.com, Mail ID: sales@sakthigear.com, Land line :0422-2364100

PROJECT WORK

ME8391 **ENGINEERING THERMODYNAMICS** L T P C
3 2 0 4

OBJECTIVE:

- To familiarize the students to understand the fundamentals of thermodynamics and to perform thermal analysis on their behavior and per formance.
  (Use of Standard and approved Steam Table, Mollier Chart, Compressibility Chart and Psychrometric Chart permitted)

UNITI BASIC CONCEPTS ANDFIRSTLAW 9+6

Basic concepts - concept of continuum, comparison of microscopic and macroscopic approach.Path and point functions.Intensive and extensive, total and specific quantities. System and their types.Thermodynamic Equilibrium State, path and process. Quasi-static, reversible and irreversible processes. Heat and work transfer, definition and comparison, sign convention. Displacement work and other modes of work .P-V diagram. Zeroth law of thermodynamics – concept of temperature and thermal equilibrium– relationship between temperature scales –new temperature scales. First law of thermodynamics –application to closed and open systems – steady and unsteady flow processes.

UNITII SECOND LAW ANDAVAILABILITYANALYSIS 9+6

Heat Reservoir, source and sink. Heat Engine, Refrigerator, Heat pump. Statements of second law and its corollaries. Carnot cycle Reversed Carnot cycle, Performance. Clausius inequality. Concept of entropy, T-s diagram, Tds Equations, entropy change for - pure substance, ideal gases - different processes, principle of increase in entropy. Applications of II Law. High and low grade energy. Available and non-available energy of a source and finite body.Energy and irreversibility. Expressions for the energy of a closed system and open systems. Energy balance and entropy generation. Irreversibility. I and II law Efficiency.

UNITIII PROPERTIES OF PURE SUBSTANCE AND STEAMPOWERCYCLE 9+6

Formation of steam and its thermodynamic properties, p-v, p-T, T-v, T-s, h-s diagrams. p-v-T surface. Use of Steam Table and Mollier Chart. Determination of dryness fraction. Application of I and II law for pure substances. Ideal and actual Rankine cycles, Cycle Improvement Methods - Reheat and Regenerative cycles, Economiser, preheater, Binary and Combined cycles.

UNITIV IDEAL AND REAL GASES,THERMODYNAMICRELATIONS 9+6

Properties of Ideal gas- Ideal and real gas comparison- Equations of state for ideal and real gases- Reduced properties.Compressibility factor-.Principle of Corresponding states. -Generalised Compressibility Chart and its use-. Maxwell relations, Tds Equations, Difference and ratio of heat capacities, Energy equation, Joule-Thomson Coefficient, ClausiusClapeyron equation, Phase Change Processes. SimpleCalculations.

UNITV GAS MIXTURES ANDPSYCHROMETRY 9+6

Mole and Mass fraction, Dalton's and Amagat's Law. Properties of gas mixture – Molar mass, gas constant, density, change in internal energy, enthalpy, entropy and Gibbs function. Psychrometric properties, Psychrometric charts. Property calculations of air vapour mixtures by using chart and expressions. Psychrometric process – adiabatic saturation, sensible heating and cooling, humidification, dehumidification, evaporative cooling and adiabatic mixing. Simple Applications

TOTAL : 75 PERIODS

OUTCOMES:

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

- Apply the first law of thermodynamics for simple open and closed systemsunder steady , Apply second law of thermodynamics to open and closed systems and calculate entropy , Apply Rankinecycle to steam power plant and compare few cycle improvement methods, Derive simple thermodynamic relations of ideal and realgases, Calculate the properties of gas mixtures and moisair and its use in psychometric processes

TEXT BOOKS :

1. R.K.Rajput, "A Text Book Of Engineering Thermodynamics ",FifthEdition,2017.
2. Yunus a. Cengel & michael a. Boles, "Thermodynamics", 8th edition2015.

REFERENCES:

1. Arora C.P, "Thermodynamics", Tata McGraw-Hill, New Delhi,2003.
2. Borgnakke & Sonnatag, "Fundamental of Thermodynamics", 8th Edition ,2016.
3. Chattopadhyay, P, "Engineering Thermodynamics", Oxford University Press, 2016.
4. Michael J. Moran, Howard N. Shapiro, "Fundamentals of Engineering Thermodynamics", 8thEdition.
5. Nag.P.K.,"EngineeringThermodynamics",5th Edition,TataMcGraw-Hill,NewDelhi,2013.

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.

DESIGN AND FABRICATION OF COMPACT INDUSTRIAL FORK LIFT

PROJECT REPORT

Submitted by

ARUNKUMAR.S	**(731219114002)**
KAVINKUMAR.M	**(731219114011)**
SIVANANTH.K	**(731219114022)**

In partial fulfillment for the award of the degree

Of

BACHELOR OF ENGINEERING

IN

MECHANICAL ENGINEERING

J.K.K. MUNIRAJAH COLLEGE OF TECHNOLOGY

T.N. PALAYAM-638506

ANNA UNIVERSITY: CHENNAI 600 025

MAY 2023

PRINCIPAL
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GOBI (Tk), ERODE (Dt).

ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report **"DESIGN AND FABRICATION OF COMPACT INDUSTRIAL FORK LIFT"** is the benefic work of **"ARUNKUMAR.S, KAVINKUMAR.M, SIVANANTH.K"** who carried out The project work under my supervision.

17/5/23

SIGNATURE

Mr.K. SRIRAM. M.E.,(Ph.D).,

HEAD OF THE DEPARTMENT

Assistant Professor

Dept of Mechanical Engineering

JKK Munirajah College of Technology

T.N.Palayam.

17/5/23

SIGNATURE

Mr.K.S.RAMESH. M.E.,

SUPERVISOR

Assistant Professor

Dept of Mechanical Engineering

JKK Munirajah College of Technology

T.N.Palayam

Submitted for the Project **Viva-Voce** Examination held on 18/05/2023

INTERNAL EXAMINER

18/5/23

EXTERNAL EXAMINER

PRINCIPAL
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ERODE (D.T.)

ABSTRACT

Mechanical fork lift is an improved and advance technology that helps brought about revolution in the mechanical industries today all heavy engineering company uses it. Widespread use of the forklift truck had revolutionized warehousing practices before the middle of the 20th century. A mixture of material handling systems is in the use, exact from that entirely physical to the ones that are semi-automatic but manually controlled. Forklifts have revolutionized warehouse work. They made it possible for one person to move thousands of pounds at once. Well-maintained and safely operated forklifts make lifting and transporting cargo infinitely easier. This is the general description of a normal forklift truck. To enhances the technology further, this prototype module is constructed with electric drive there by the handling is made simple, also load carrying capacity get increases and the container can be placed accurately (precision position). This increases the safety of the operator.

CHAPTER 1

INTRODUCTION

In general the forklift can be defined as a tool capable of lifting hundreds of kilograms of weight. A forklift is a vehicle similar to a small truck that has two metal forks on the front used to lift cargo. The forklift operator drives the forklift forward until the forks push under the cargo, and can then lift the cargo several feet in the air by operating the forks. The forks, also known as blades or tines, are usually made out of steel and can lift up to a few tons. Forklifts are machines that use levers and/or pulleys to lift significant weights. A fork lift one passes on the road may look like a fairly modern invention, but these machines have actually been used for at least the past 2000 years, if not longer. The Romans used forklifts to build huge monuments. Medieval churches were constructed with them. Also, the Egyptians may have used them to create pyramids. The modern version can be either simple or complex, and forklifts vary based on their application. To make the project work more realistic, much importance is given for practical orientation, therefore a prototype module is constructed for the demonstration purpose. This module simulates the real working system & based on this technology with slight changes in the structure & motor ratings, the system can be converted for real applications. The method of converting rotary to linear motion is implemented in the mechanism. The forklift is designed to move in all directions including reverse direction also.

CHAPTER 12

CONCLUSION

The development of Mechanical forklift assures the ergonomically comfort to the operator or worker and to reduces time required for manual lifting and handling. It lifts the maximum load of 200 Kg at maximum height 1250mm. This increases efficiency of productivity & it provide safety of operator while handling of the material.

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INTERNSHIP

ME8493	THERMAL ENGINEERING - I	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To integrate the concepts, laws and methodologies from the first course in thermodynamics into analysis of cyclic processes
- To apply the thermodynamic concepts into various thermal application like IC engines, Steam.
- Turbines, Compressors and Refrigeration and Air conditioning systems

(Use of standard refrigerant property data book, Steam Tables, Mollier diagram and Psychrometric chart permitted)

UNIT I GAS AND STEAM POWER CYCLES 9

Air Standard Cycles - Otto, Diesel, Dual, Brayton – Cycle Analysis, Performance and Comparison – Rankine, reheat and regenerative cycle.

UNIT II RECIPROCATING AIR COMPRESSOR 9

Classification and comparison, working principle, work of compression - with and without clearance, Volumetric efficiency, Isothermal efficiency and Isentropic efficiency. Multistage air compressor with Intercooling. Working principle and comparison of Rotary compressors with reciprocating air compressors.

UNIT III INTERNAL COMBUSTION ENGINES AND COMBUSTION 9

IC engine – Classification, working, components and their functions. Ideal and actual : Valve and port timing diagrams, p-v diagrams- two stroke & four stroke, and SI & CI engines – comparison. Geometric, operating, and performance comparison of SI and CI engines. Desirable properties and qualities of fuels. Air-fuel ratio calculation – lean and rich mixtures. Combustion in SI & CI Engines – Knocking – phenomena and control.

UNIT IV INTERNAL COMBUSTION ENGINE PERFORMANCE AND SYSTEMS 9

Performance parameters and calculations. Morse and Heat Balance tests. Multipoint Fuel Injection system and Common Rail Direct Injection systems. Ignition systems – Magneto, Battery and Electronic. Lubrication and Cooling systems. Concepts of Supercharging and Turbocharging – Emission Norms.

UNIT V GAS TURBINES 9

Gas turbine cycle analysis – open and closed cycle. Performance and its improvement - Regenerative, Intercooled, Reheated cycles and their combinations. Materials for Turbines.

TOTAL:45 PERIODS

OUTCOMES:

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

CO1 Apply thermodynamic concepts to different air standard cycles and solve problems. CO2 Solve problems in single stage and multistage air compressors

CO3 Explain the functioning and features of IC engines, components and auxiliaries. CO4 Calculate performance parameters of IC Engines.

CO5 Explain the flow in Gas turbines and solve problems.

TEXT BOOKS:

1. Kothandaraman.C.P., Domkundwar. S,Domkundwar. A.V., "A course in thermal Engineering", Fifth Edition, "Dhanpat Rai & sons , 2016
2. Rajput. R. K., "Thermal Engineering" S.Chand Publishers, 2017

REFERENCES:

1. Arora.C.P, "Refrigeration and Air Conditioning ," Tata McGraw-Hill Publishers 2008
2. Ganesan V.." Internal Combustion Engines" , Third Edition, Tata Mcgraw-Hill 2012
3. Ramalingam. K.K., "Thermal Engineering", SCITECH Publications (India) Pvt. Ltd., 2009.
4. Rudramoorthy, R, "Thermal Engineering ",Tata McGraw-Hill, New Delhi,2003
5. Sarkar, B.K,"Thermal Engineering" Tata McGraw-Hill Publishers, 2007

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Gmail

Internship
1message

MON 06 MAR 2023 at 10.35 AM

From: SRIRAMKS<hodmech@jkkmct.edu.in>
Date: MON 06 MAR 2023 at 10.35 AM
Subject: Internship-reg

To: SAKTHI GEAR PRODUCT<hr@sakthigear.com >

Dear Sir,

I am requesting to be joining your **SAKTHI GEAR PRODUCT.** The requirements are exactly what, I have prepared for and hoped to do. I feel confident that I can make a significant contribution to your organization while at the same time learning from your staff.

Additionally, I shall complete all insurance forms for the new intern orientation. I look forward to working with you and your fine team. I appreciate your confidence in me and providing the chance to work with and observe your outstanding staff.

Refer the following students : **(ANISHKUMAR L, MANO RANJITH K, YOKESH E, ARUNKUMAR S,KAVINKUMAR M and SIVANANTH K)**

Sincerely,

Mr.K.Sriram,
HOD/MECH
J K K.Munirajah College of Technology,
T.N.Palayam, Erode-638506,
Tamilnadu.

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

Gmail

Internship

1message

WED 15 MAR 2023 at 3.30 PM

From: SAKTHI GEAR PRODUCT<hr@sakthigear.com >
Date: WED 15 MAR 2023 at 3.30 PM

Subject: Internship-reg

To:SRIRAMKS<hodmech@jkkmct.edu.in>

Dear Sir,

I am writing to confirm my acceptance of your internship offer of 20.03.2023 to 06.05.2023 and to tell you how to be joining my **SAKTHI GEAR PRODUCT**. The requirements are exactly what I have prepared for and hoped to do. I feel confident that I can make a significant contribution to your organization while at the same time learning from my staff.

Additionally, I shall complete all insurance forms for the new intern orientation. I look forward to working with you and your fine team. I appreciate your confidence in me and providing the chance to work with and observe my outstanding staff.

Refer the following students: **(ANISHKUMAR L, MANO RANJITH K, YOKESH E, ARUNKUMAR S,KAVINKUMAR M and SIVANANTH K).**

Sincerely,
HR Manager,
Sakthi Gear Product,
Coimbatore – 641006
Tamil Nadu, India

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GOBI (Tk), ERODE (Dt).

SAKTHI GEAR PRODUCTS

INTERNSHIP CERTIFICATE

TO WHOM-SO-EVER IT MAY CONCERN

This is to certify that Mr .ARUNKUMAR S , IV Year student B.E.Mechanical Engineering, J.K.K. Munirajah College of Technology, T.N.Palayam has successfully completed 45 days (20.03.2023 to 06.05.2023) internship in " SAKTHI GEAR PRODUCTS PRIVATE LIMITED COIMBATORE. "

He has worked on project titled " DESIGN AND FABRICATION OF COMPACT INDUSTRIAL FORK LIFT " This project aimed to hinder the theft of bikes with the help of a wheel locking system.

During this tenure ARUNKUMAR S has involved in his work with dedication. We found him pretty and active in whatever the task we have given him. He is a confident person, punctual, hardworking and inqulsitive.His conduct and character was good during the internship period.

Coimbatore
20.05.2023

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GOBI (Tk), ERODE (Dt).

SAKTHI GEAR PRODUCTS Coimbatore

General Manager

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7/4, School Street, Chinnavedampatti Post, Ganapathy,Coimbatore 641006, Tamil Nadu, India.Website: www.sakthigear.com, Mail ID: sales@sakthigear.com, Land line :0422-2364100

SAKTHI GEAR PRODUCTS

INTERNSHIP CERTIFICATE

TO WHOM-SO-EVER IT MAY CONCERN

This is to certify that Mr .KAVINKUMAR M ,IV Year student B.E.Mechanical Engineering, J.K.K. Munirajah College of Technology, T.N.Palayam has successfully completed 45 days (20.03.2023 to 06.05.2023) internship in " SAKTHI GEAR PRODUCTS PRIVATE LIMITED COIMBATORE. "

He has worked on project titled " DESIGN AND FABRICATION OF COMPACT INDUSTRIAL FORK LIFT " This project aimed to hinder the theft of bikes with the help of a wheel locking system.

During this tenure KAVINKUMAR M has involved in his work with dedication. We found him pretty and active in whatever the task we have given him. He is a confident person, punctual, hardworking and inqulsitive.His conduct and character was good during the internship period.

Coimbatore
20.05.2023

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SAKTHI GEAR PRODUCTS

INTERNSHIP CERTIFICATE

TO WHOM-SO-EVER IT MAY CONCERN

This is to certify that Mr .SIVANANTH K ,IV Year student B.E.Mechanical Engineering, J.K.K. Munirajah College of Technology, T.N.Palayam has successfully completed 45 days (20.03.2023 to 06.05.2023) internship in " SAKTHI GEAR PRODUCTS PRIVATE LIMITED COIMBATORE. "

He has worked on project titled " DESIGN AND FABRICATION OF COMPACT INDUSTRIAL FORK LIFT " This project aimed to hinder the theft of bikes with the help of a wheel locking system.

During this tenure SIVANANTH K has involved in his work with dedication. We found him pretty and active in whatever the task we have given him. He is a confident person, punctual, hardworking and inqulsitive.His conduct and character was good during the internship period.

Coimbatore
20.05.2023

PRINCIPAL
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General Manager

SAKTHI GEAR PRODUCTS Coimbatore

Internel Guide

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PROJECT WORK

CE8395	STRENGTH OF MATERIALS FORMECHANICAL ENGINEERS	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To understand the concepts of stress, strain, principal stresses and principalplanes.
- To study the concept of shearing force and bending moment due to external loads in determinate beams and their effect onstresses.
- To determine stresses and deformation in circular shafts and helical spring due totorsion.
- To compute slopes and deflections in determinate beams by variousmethods.
- To study the stresses and deformations induced in thin and thickshells.

UNITI STRESS, STRAIN AND DEFORMATIONOF SOLIDS

Rigid bodies and deformable solids – Tension, Compression and Shear Stresses – Deformation of simple and compound bars – Thermal stresses – Elastic constants – Volumetric strains –Stresses on inclined planes – principal stresses and principal planes – Mohr's circle of stress.

UNITII TRANSVERSE LOADING ON BEAMS AND STRESSESIN BEAM

Beams – types transverse loading on beams – Shear force and bending moment in beams – Cantilevers – Simply supported beams and over – hanging beams. Theory of simple bending– bending stress distribution – Load carrying capacity – Proportioning of sections – Flitched beams – Shear stressdistribution.

UNITIII TORSION

Torsion formulation stresses and deformation in circular and hollows shafts – Stepped shafts– Deflection in shafts fixed at the both ends – Stresses in helical springs – Deflection of helical springs, carriagesprings.

UNITIV DEFLECTIONOFBEAMS

Double Integration method – Macaulay's method – Area moment method for computation of slopes and deflections in beams - Conjugate beam and strain energy – Maxwell's reciprocal theorems.

UNITV THIN CYLINDERS, SPHERES ANDTHICKCYLINDERS

Stresses in thin cylindrical shell due to internal pressure circumferential and longitudinal stresses and deformation in thin and thick cylinders – spherical shells subjected to internal pressure – Deformation in spherical shells – Lame's theorem.

TOTAL: 45 PERIODS

OUTCOMES

Students will be able to

- Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principalplanes.
- Understand the load transferring mechanism in beams and stress distribution due to shearing force and bendingmoment.
- Apply basic equation of simple torsion in designing of shafts and helicalspring
- Calculate the slope and deflection in beams using differentmethods.
- Analyze and design thin and thick shells for the applied internal and externalpressures.

TEXT BOOKS:

1. Bansal, R.K., "Strength of Materials", Laxmi Publications (P) Ltd.,2016
2. Jindal U.C., "Strength of Materials", Asian Books Pvt. Ltd., New Delhi,2009

REFERENCES:

1. Egor. P.Popov "Engineering Mechanics of Solids" Prentice Hall of India, New Delhi,2002
2. Ferdinand P. Been, Russell Johnson, J.r. and John J. Dewole "Mechanics of Materials", Tata McGraw Hill Publishing 'co. Ltd., New Delhi,2005.
3. Hibbeler, R.C., "Mechanics of Materials", Pearson Education, Low Price Edition,2013
4. Subramanian R., "Strength of Materials", Oxford University Press, Oxford Higher Education Series,2010.

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ME8492	KINEMATICS OF MACHINERY	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To understand the basic components and layout of linkages in the assembly of a system machine.
- To understand the principles in analyzing the assembly with respect to the displacement, velocity, and acceleration at any point in a link of amechanism.
- To understand the motion resulting from a specified set of linkages, design few linkage mechanisms and cam mechanisms for specified outputmotions.
- To understand the basic concepts of toothed gearing and kinematics of gear trains and the effects of friction in motion transmission and in machinecomponents.

UNITI BASICSOFMECHANISMS 9

Classification of mechanisms – Basic kinematic concepts and definitions – Degree of freedom, Mobility – Kutzbach criterion, Gruebler's criterion – Grashof's Law – Kinematic inversions of four-bar chain and slider crank chains – Limit positions – Mechanical advantage – Transmission Angle – Description of some common mechanisms – Quick return mechanisms, Straight line generators, Universal Joint – rockermechanisms.

UNITII KINEMATICS OF LINKAGE MECHANISMS 9

Displacement, velocity and acceleration analysis of simple mechanisms – Graphical method– Velocity and acceleration polygons – Velocity analysis using instantaneous centres – kinematic analysis of simple mechanisms – Coincident points – Coriolis component of Acceleration – Introduction to linkage synthesis problem.

UNITIII KINEMATICS OFCAMMECHANISMS 9

Classification of cams and followers – Terminology and definitions – Displacement diagrams – Uniform velocity, parabolic, simple harmonic and cycloidal motions – Derivatives of follower motions – Layout of plate cam profiles – Specified contour cams – Circular arc and tangent cams – Pressure angle and undercutting – sizing ofcams.

UNITIV GEARS ANDGEARTRAINS 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.

UNITV FRICTION INMACHINEELEMENTS 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 Blockbrakes.

TOTAL: 45 PERIODS

OUTCOMES:

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

CO1 Discuss the basics ofmechanism
CO2 Calculate velocity and acceleration in simple mechanisms CO3 Develop CAMprofiles
CO4 Solve problems on gears and gear trains CO5 Examine friction in machineelements

TEXTBOOKS:

1. F.B. Sayyad, "Kinematics of Machinery", MacMillan Publishers Pvt Ltd., Tech-maxEducational resources,2011.
2. Rattan, S.S, "Theory ofMachines",4th Edition, Tata McGraw-Hill,2014.
3. Pennock G.R and Shigley, J.E., "Theory of Machines andMechanisms",

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.

DESIGN AND FABRICATION OF SEMI AUTOMATIC EXOTIC PLANTS CLEANING MACHINE

PROJECT REPORT

Submitted by

BALAMURUGAN.V	**(731219114003)**
SHANKARGANESH.K	**(731219114021)**
THAMARAISELVAN.V	**(731219114023)**
VIGNESH.P	**(731219114024)**

In partial fulfillment for the award of the degree
Of
BACHELOR OF ENGINEERING
IN
MECHANICAL ENGINEERING

J. K. K. MUNIRAJAH COLLEGE OF TECHNOLOGY

T.N.PALAYAM-638506

ANNAUNIVERSITY: CHENNAI 600025

MAY 2023

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T.N. PALAYAM (Po)-638 506.

ANNA UNIVERSITY:CHENNAI600025

BONAFIDE CERTIFICATE

Certified that this project report **"DESIGN AND FABRICATION OF SEMI AUTOMATIC EXOTIC PLANTS CLEANING MACHINE"** is the benefic work of **"BALA MURUGAN.V, SHANKAR GANESH.K, THAMARAI SALAVAN.V, VIGNESH.P,,**who carried out the project work under my supervision.

17/5/23

SIGNATURE

Mr.K. SRIRAM.,M.E .,(Ph.D).,

HEAD OF THE DEPARTMENT

Assistant Professor

Dept of Mechanical Engineering

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T.N.Palayam.

N.Sankar 16/5/23

SIGNATURE

Dr.N. SANKAR.,M.E.,Ph.D.,

SUPERVISOR

Assistant Professor

Dept of Mechanical Engineering

JKK Munirajah College of Technology

T.N.Palayam

Submitted for the Project **Viva-Voce** Examination held on 18-5-2023 / FN

INTERNALEXAMINER

18/5/23

EXTERNALEXAMINER

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.

ABSTRACT

Nowadays, water pollution is the most important problem in the world because water is the main source of human life. The water is polluted in many ways, such as by sewage leakage, chemicals, and exotic plants. The exotic plants are harmful and affect the ecosystem's water. The exotic plants, such as water man file and bracelet, these plants are polluting the lake, and they are also not useful to the acoustic system. These plants block sunlight from reaching other plants. Also, these plants provide habitat for mosquitoes and reduce the oxygen level in the water. These factors pollute the lake and water ecosystems. So cleaning exotic plants is very important; hence, in this work, we design and fabricate a semi-automatic exotic plant cleaning machine. This machine is environmentally friendly and can run in any conditions afforded by the lake and pond. This machine works on an electric motor, and the electric motor is powered by battery power systems.

Keywords: Water pollution, Exotic plants, Ecosystem, Cleaning machine

CHAPTER I

INTRODUCTION

In recent years, the increasing and spread of exotic plant species has become a growing concern due to their negative impacts on natural ecosystems. Exotic plants, also known as non-native or alien species, are plants that have been introduced to an area outside of their native range. These plants can outcompete native species, disrupt ecological processes, and pose a threat to biodiversity. One of the challenges associated with managing exotic plants is their ability to rapidly establish and spread in new environments. Once established, these plants often exhibit aggressive growth patterns and have the potential to dominate native vegetation. The removal and control of exotic plants are crucial for maintaining the health and integrity of ecosystems. Traditional methods of exotic plant control often involve manual labour, which can be time-consuming, labour-intensive, and costly. As the need for efficient and effective management strategies increases, there is a growing interest in developing innovative technologies to address this issue. One such technology is the design and fabrication of semi-automatic exotic plant cleaning machines.

Design and fabrication of machinery and equipment to address specific industrial needs has been a driving force behind technological advancements. In recent years, there has been an increasing concern over the invasion and spread

CHAPTER-VII

7.1 CONCLUSION

In conclusion, water pollution has become a critical issue in today's world, considering its vital role as a source of sustenance for human life. Various factors contribute to water pollution, including sewage leakage, chemical contamination, and the presence of exotic plants. Exotic plants, such as water hyacinth and water lettuce, pose a significant threat to water ecosystems by obstructing sunlight from reaching other plants, providing breeding grounds for mosquitoes, and depleting oxygen levels in the water. To address this problem, the development of a semi-automatic machine for cleaning exotic plants has been proposed. This machine is designed to be environmentally friendly and adaptable to various conditions encountered in lakes and ponds. It operates on an electric motor powered by batteries, offering a sustainable solution for tackling the issue of water pollution caused by exotic plants. By implementing such a machine, we can take a significant step towards preserving and restoring the health of our water bodies and ecosystems.

INTERNSHIP

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 andbroaching.
- To understand the basic concepts of Computer Numerical Control (CNC) of machine tools and CNCProgramming

UNITI THEORY OFMETALCUTTING 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 andMachinability.

UNITII TURNINGMACHINES 9

Centre lathe, constructional features, specification, operations – taper turning methods, thread cutting methods, special attachments, machining time and power estimation. Capstan and turret lathes- tool layout – automatic lathes: semi automatic – single spindle : Swiss type, automatic screw type – multispindle:

UNITIII SHAPER, MILLING AND GEARCUTTINGMACHINES 9

Shaper - Types of operations. Drilling ,reaming, boring, Tapping. Milling operations-types of milling cutter. Gear cutting – forming and generation principle and construction of gear milling ,hobbing and gear shaping processes – finishing ofgears.

UNITIV ABRASIVE PROCESSAND BROACHING 9

Abrasive processes: grinding wheel – specifications and selection, types of grinding process– cylindrical grinding, surface grinding, centreless grinding and internal grinding- Typical applications

– concepts of surface integrity, broaching machines: broach construction – push, pull, surface and continuous broachingmachines

UNITV CNCMACHINING 9

Numerical Control (NC) machine tools – CNC types, constructional details, special features, machining centre, part programming fundamentals CNC – manual part programming – micromachining – wafer machining.

TOTAL : 45 PERIODS

OUTCOMES:

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

CO1 Explain the mechanism of material removalprocesses.
CO2 Describe the constructional and operational features of centre lathe and other special purposelathes.
CO3 Describe the constructional and operational features of shaper, planner, milling, drilling, sawing and broachingmachines.
CO4 Explain the types of grinding and other super finishing processes apart from gear manufacturing processes.
CO5 Summarize numerical control of machine tools and write a partprogram.

TEXT BOOKS:

1. HajraChoudhury, "Elements of Workshop Technology", Vol.II., Media Promoters2014
2. Rao. P.N "Manufacturing Technology - Metal Cutting and Machine Tools", 3rd Edition, Tata McGraw-Hill, New Delhi,2013.

REFERENCES:

1. Richerd R Kibbe, John E. Neely, Roland O. Merges and Warren J.White "Machine Tool Practices", Prentice Hall of India,1998
2. GeofreyBoothroyd, "Fundamentals of Metal Machining and Machine Tools", McGraw Hill, 1984
3. HMT, "Production Technology", Tata McGraw Hill,1998.
4. Roy. A.Lindberg, "Process and Materials of Manufacture," Fourth Edition, PHI/Pearson Education2006.

Gmail

Internship
1message

MON 20 FEB 2023 at 1.40 PM

From: SRIRAMKS<hodmech@jkkmct.edu.in>
Date: MON 20 FEB 2023 at 1.40 PM
Subject: Internship -reg
To: SHENDHUR ALLOYS FOUNDRY <hr@ shendhuralloysfoundry.com >

Dear Sir,

I am requesting to be joining your **SHENDHUR ALLOYS FOUNDRY**. The requirements are exactly what I have prepared for and hoped to do. I feel confident that I can make a significant contribution to your organization while at the same time learning from your staff.

Additionally, I shall complete all insurance forms for the new intern orientation. I look forward to working with you and your fine team. I appreciate your confidence in me and providing the chance to work with and observe your outstanding staff.

Refer the following students : **(BALAMURUGAN V, SHANKER GANESH K' THAMARAI SELVAN VIGNESH P, DHARMARAJ M, DINESH KUMAR R, SATHISH KUMAR S, DINESH KUMAR B)**

Sincerely,

Mr.K.Sriram,
HOD/MECH
J K K.Munirajah College of Technology,
T.N.Palayam, Erode-638506,
Tamilnadu.

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
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Date: THU 02 MAR 2023 at 10.20 AM

Subject: Internship -reg

To:SRIRAMKS<hodmech@jkkmct.edu.in>

Dear Sir,

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HR Manager,
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Coimbatore.

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GOBI (Tk), ERODE (Dt).

SHENDHUR ALLOYS FOUNDRY

INTERNSHIP CERTIFICATE

TO WHOM-SO-EVER IT MAY CONCERN

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During his stay in the company as an intern, he display enthusiasm, leartership, self-discipline, and self-motivation.

We would like to wish him all the best.

His conduct and character was good during the internship period.

Coimbatore
28.04.2024

Shendhur Alloys Foundry Coimbatore

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JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (TK) ERODE (Dt).

Authorized signatory

1-G, Avinashi Rd,Thottipalaym, MGR Nagar, Civil Aerodrome Post,Chinniyampalayam, Coimbatore, Tamil Nadu, Pin-641062 Website: www.shendhuralloysfoundry.com
Mail ID:sendhuralloys@gmail.com, Land Line - 0422-547862, 0422-547741

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PROJECT WORK

ME8491 **ENGINEERING METALLURGY** L T P C
3 0 0 3

OBJECTIVE:

- To impart knowledge on the structure, properties, treatment, testing and applications of metals and non-metallic materials so as to identify and select suitable materials for various engineeringapplications.

UNITI ALLOYS ANDPHASEDIAGRAMS 9

Constitution of alloys – Solid solutions, substitutional and interstitial – phase diagrams, Isomorphous, eutectic, eutectoid, peritectic, and peritectoid reactions, Iron – carbon equilibrium diagram. Classification of steel and cast Iron microstructure, properties andapplication.

UNITII HEATTREATMENT 9

Definition – Full annealing, stress relief, recrystallisation and spheroidising – normalising, hardening and Temperingof steel. Isothermal transformation diagrams – cooling curves superimposed on
I.T. diagram CCR – Hardenability, Jominy end quench test - Austempering, martempering – case hardening, carburizing, Nitriding, cyaniding, carbonitriding – Flame and Induction hardening – Vacuum and Plasma hardening. .

UNITIII FERROUS ANDNON-FERROUSMETALS 9

Effect of alloying additions on steel- α and β stabilisers– stainless and tool steels – HSLA, Maraging steels–CastIron-Grey,white,malleable,spheroidal–alloycastirons,Copperandcopperalloys
– Brass, Bronze and Cupronickel – Aluminium and Al-Cu – precipitation strengthening treatment – Bearing alloys, Mg-alloys, Ni-based super alloys and Titaniumalloys.

UNITIV NON-METALLICMATERIALS 9

Polymers – types of polymer, commodity and engineering polymers – Properties and applications of various thermosetting and thermoplastic polymers (PP, PS, PVC, PMMA, PET,PC, PA, ABS, PI, PAI, PPO, PPS, PEEK, PTFE, Polymers – Urea and Phenol formaldehydes)- Engineering Ceramics – Properties and applications of Al_2O_3, SiC, Si_3N_4, PSZ and SIALON –Composites- Classifications- Metal Matrix and FRP - Applications ofComposites.

UNITV MECHANICAL PROPERTIES ANDDEFORMATIONMECHANISMS 9

Mechanisms of plastic deformation, slip and twinning – Types of fracture – Testing of materials under tension, compression and shear loads – Hardness tests (Brinell, Vickers and Rockwell), hardness tests, Impact test Izod and charpy, fatigue and creep failuremechanisms.

TOTAL: 45 PERIODS

OUTCOMES

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

CO1 Explain alloys and phase diagram, Iron-Iron carbon diagram and steelclassification.
CO2 Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes.
CO3 Clarify the effect of alloying elements on ferrous and non-ferrous metals CO4 Summarize the properties and applications of non metallicmaterials.
CO5 Explain the testing of mechanical properties..

TEXT BOOKS:

1. Avner, S.H., "Introduction to Physical Metallurgy", McGraw Hill BookCompany,1997.
2. Williams D Callister, "Material Science and Engineering" Wiley India Pvt Ltd, Revised Indian Edition2014

REFERENCES:

1. Kenneth G.Budinski and Michael K. Budinski, "Engineering Materials", Prentice Hall of India Private Limited,2010.
2. Raghavan.V, "Materials Science and Engineering", Prentice Hall of India Pvt. Ltd.,2015.
3. U.C.Jindal : Material Science and Metallurgy, "Engineering Materials and Metallurgy", First Edition, Dorling Kindersley,2012
4. Upadhyay. G.S. and AnishUpadhyay, "Materials Science and Engineering", Viva Books Pvt. Ltd., New Delhi, 2006.

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ME8493	THERMAL ENGINEERING - I	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To integrate the concepts, laws and methodologies from the first course in thermodynamics into analysis of cyclic processes
- To apply the thermodynamic concepts into various thermal application like IC engines, Steam.
- Turbines, Compressors and Refrigeration and Air conditioning systems

(Use of standard refrigerant property data book, Steam Tables, Mollier diagram and Psychrometric chart permitted)

UNIT I GAS AND STEAM POWER CYCLES 9

Air Standard Cycles - Otto, Diesel, Dual, Brayton – Cycle Analysis, Performance and Comparison – Rankine, reheat and regenerative cycle.

UNIT II RECIPROCATING AIR COMPRESSOR 9

Classification and comparison, working principle, work of compression - with and without clearance, Volumetric efficiency, Isothermal efficiency and Isentropic efficiency. Multistage air compressor with Intercooling. Working principle and comparison of Rotary compressors with reciprocating air compressors.

UNIT III INTERNAL COMBUSTION ENGINES AND COMBUSTION 9

IC engine – Classification, working, components and their functions. Ideal and actual : Valve and port timing diagrams, p-v diagrams- two stroke & four stroke, and SI & CI engines – comparison. Geometric, operating, and performance comparison of SI and CI engines. Desirable properties and qualities of fuels. Air-fuel ratio calculation – lean and rich mixtures. Combustion in SI & CI Engines – Knocking – phenomena and control.

UNIT IV INTERNAL COMBUSTION ENGINE PERFORMANCE AND SYSTEMS 9

Performance parameters and calculations. Morse and Heat Balance tests. Multipoint Fuel Injection system and Common Rail Direct Injection systems. Ignition systems – Magneto, Battery and Electronic. Lubrication and Cooling systems. Concepts of Supercharging and Turbocharging – Emission Norms.

UNIT V GAS TURBINES 9

Gas turbine cycle analysis – open and closed cycle. Performance and its improvement - Regenerative, Intercooled, Reheated cycles and their combinations. Materials for Turbines.

TOTAL:45 PERIODS

OUTCOMES:

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

CO1 Apply thermodynamic concepts to different air standard cycles and solve problems. CO2 Solve problems in single stage and multistage air compressors

CO3 Explain the functioning and features of IC engines, components and auxiliaries. CO4 Calculate performance parameters of IC Engines.

CO5 Explain the flow in Gas turbines and solve problems.

TEXT BOOKS:

1. Kothandaraman.C.P., Domkundwar. S,Domkundwar. A.V., "A course in thermal Engineering", Fifth Edition, "Dhanpat Rai & sons , 2016
2. Rajput. R. K., "Thermal Engineering" S.Chand Publishers, 2017

REFERENCES:

1. Arora.C.P, "Refrigeration and Air Conditioning ," Tata McGraw-Hill Publishers 2008
2. Ganesan V.." Internal Combustion Engines" , Third Edition, Tata Mcgraw-Hill 2012
3. Ramalingam. K.K., "Thermal Engineering", SCITECH Publications (India) Pvt. Ltd., 2009.
4. Rudramoorthy, R, "Thermal Engineering ",Tata McGraw-Hill, New Delhi,2003
5. Sarkar, B.K,"Thermal Engineering" Tata McGraw-Hill Publishers, 2007

DESIGN AND FABRICATION OF AQUA SILENCER FOR REDUCING AIR POLLUTION

PROJECT REPORT

Submitted by

DHARMARAJA.M	**(731219114005)**
DINESH KUMAR.R	**(731219114007)**
SATHIS KUMAR.S	**(731219114020)**
DHINESH KUMAR.B	**(731219114501)**

In partial fulfillment for the award of the degree
Of
BACHELOR OF ENGINEERING
IN
MECHANICAL ENGINEERING

J.K.K. MUNIRAJAH COLLEGE OF TECHNOLOGY

T.N. PALAYAM-638506

ANNA UNIVERSITY: CHENNAI 600 025

MAY 2023

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk), ERODE (Dt).

ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report "**DESIGN AND FABRICATION OF AQUA SILENCER FOR REDUCING AIR POLLUTION**" is the benefic work of "**DHARMARAJA.M, DINESH KUMAR.R, SATHIS KUMAR.S, DHINESH KUMAR.B**" who carried out the project work under my supervision.

18/5/23

SIGNATURE

Mr.K. SRIRAM. M.E .,(Ph.D).,

HEAD OF THE DEPARTMENT

Assistant Professor

Dept of Mechanical Engineering

JKK Munirajah College of Technology

T.N.Palayam.

SIGNATURE

Mr.P.ESWARAN .M.E.,

SUPERVISOR

Assistant Professor

Dept of Mechanical Engineering

JKK Munirajah College of Technology

T.N.Palayam

Submitted for the Project **Viva-Voce** Examination held on 18/05/2023 FN

INTERNAL EXAMINER

18/5/23

EXTERNAL EXAMINER

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
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ABSTRACT

Air pollution is most important from the public health point of view, because every individual person breathes approximately 22000 times a day, inhaling about 15 to 22 Kg of air daily. Polluted air causes physical ill effect decides undesirable aesthetic and physiological effects. Air pollution can be defined as addition to our atmosphere of any material, which will have a deterious effect on life upon our planet. The main pollutants contribute by automobiles are carbon monoxide (CO), unburned hydrocarbon (UBHC), oxides of nitrogen (Nox) and Lead. Automobiles are not the only source of air pollution, other sources such as electric power generating stations, industrial and domestic fuel consumption, refuse burning, industrial processing etc. also contribute heavily to contamination of our environment so it is imperative that serious attempts should be made to conserve earth,,¢s environment from degradation. An aqua silencer is an attempt in this direction, it is mainly dealing with control of emission and noise.

CHAPTER 1

INTRODUCTION

Air pollution is the introduction of chemicals, particulate matter, or biological material sthat cause harm or discomfort to humans or other living organisms or damages the natural environment. These substances called pollutants can occur naturally or they can be produced by human activities.

Natural pollutants include dust, pollen, salt particles, smoke from forest fires, and gases from organic waste. Most pollution caused by human activeities is directly or indirectly the result of burning of fuels in furnaces or engines.

The atmosphere is a complex, dynamic natural gaseous system that is essential to support life on planet Earth. Stratospheric ozone depletion due to air pollution has long been recognized as a threat to human health as well as to the Earth's ecosystems.

Air pollution in the world has emerged as the focus of environmental remediation efforts because of their toxicity and threat to human beings. Hence the removal of toxic air pollutant contaminants from atmosphere is one of the most important environmental and economic issues today pollutants .

Many expensive methods of removal for air pollutants are available in developed countries but in developing countries like India these methods are hard to apply because of it.

CHAPTER 8

CONCLUSION

It has been experimentally observed that the aqua silencer is successfully effective in reducing emission of gases from the engine exhaust. By using water as a medium, the sound levels have been reduced and by using activated charcoal in water, it produces almost pollution-free and smokeless emission and is also cheap considering long term use. The aqua silencer"s performance is almost equivalent to the conventional silencer. It can be widely used in industrial engines and with a little improvisation, in heavy weight vehicles. This project analyzed the smoke content of the exhaust gas before and after treatment and it was found that there is a considerable reduction in the emission as pointed out by the test results.

INTERNSHIP

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SHENDHUR ALLOYS FOUNDRY

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His conduct and character was good during the internship period.

Coimbatore
28.04.2024

Shendhur Alloys Foundry Coimbatore

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PROJECT WORK

ME8651	DESIGN OF TRANSMISSION SYSTEMS	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To gain knowledge on the principles and procedure for the design of Mechanical power Transmissioncomponents.
- To understand the standard procedure available for Design of Transmission of Mechanical elements
- To learn to use standard data and catalogues (Use of P S G Design Data Book permitted)

UNITI DESIGN OFFLEXIBLEELEMENTS 9

Design of Flat belts and pulleys - Selection of V belts and pulleys – Selection of hoisting wire ropes and pulleys – Design of Transmission chains andSprockets.

UNITII SPUR GEARS AND PARALLEL AXISHELICALGEARS 9

Speed ratios and number of teeth-Force analysis -Tooth stresses - Dynamic effects – Fatigue strength - Factor of safety - Gear materials – Design ofstraight tooth spur & helical gears based on strength and wear considerations – Pressure angle in the normal and transverse plane- Equivalent number of teeth-forces for helicalgears.

UNITIII BEVEL, WORM AND CROSSHELICALGEARS 9

Straight bevel gear: Tooth terminology, tooth forces and stresses, equivalent number of teeth. Estimating the dimensions of pair of straight bevel gears. Worm Gear: Merits and demerits- terminology. Thermal capacity, materials-forces and stresses, efficiency, estimating the size of the worm gear pair. Cross helical: Terminology-helix angles-Estimating the size of the pair of cross helical gears.

UNITIV GEAR BOXES 9

Geometric progression - Standard step ratio - Ray diagram, kinematics layout -Design of sliding mesh gear box - Design of multi speed gear box for machine tool applications - Constant mesh gear box - Speed reducer unit. – Variable speed gear box, Fluid Couplings, Torque Converters for automotive applications.

UNITV CAMS, CLUTCHESAND BRAKES 9

Cam Design: Types-pressure angle and under cutting base circle determination-forces and surface stresses. Design of plate clutches –axial clutches-cone clutches-internal expanding rim clutches- Electromagnetic clutches. Band and Block brakes - external shoe brakes – Internal expanding shoe brake.

TOTAL : 45 PERIODS

OUTCOMES:

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

CO1 apply the concepts of design to belts, chains and rope drives.
CO2 apply the concepts of design to spur, helicalgears.
CO3 apply the concepts of design to worm and bevel gears. apply the
CO4 concepts of design to gear boxes .

TEXT BOOKS:

1. Bhandari V, "Design of Machine Elements", 4th Edition, Tata McGraw-Hill Book Co,2016.
2. Joseph Shigley, Charles Mischke, Richard Budynas and Keith Nisbett "Mechanical Engineering Design", 8th Edition, Tata McGraw-Hill,2008.

REFERENCES:

1. Merhyle F. Spotts, Terry E. Shoup and Lee E. Hornberger, "Design of Machine Elements" 8th Edition, Printice Hall,2003.
2. OrthweinW, "Machine Component Design", Jaico Publishing Co,2003.
3. Prabhu. T.J., "Design of Transmission Elements", Mani Offset, Chennai, 2000.th
4. Robert C. Juvinall and Kurt M. Marshek, "Fundamentals of MachineDesign",4 Edition,Wiley, 2005
5. Sundararajamoorthy T. V, Shanmugam .N, "Machine Design", Anuradha Publications, Chennai,2003.

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GOBI (Tk), ERODE (Dt).

ME8691 **COMPUTER AIDED DESIGN AND MANUFACTURING** **L T P C**
3 0 0 3

OBJECTIVES:

- To provide an overview of how computers are being used in mechanical componentdesign
- To understand the application of computers in various aspects of Manufacturing viz., Design, Proper planning, Manufacturing cost, Layout & Material Handlingsystem.

UNITI INTRODUCTION **9**

Product cycle- Design process- sequential and concurrent engineering- Computer aided design – CAD system architecture- Computer graphics – co-ordinate systems- 2D and 3D transformations- homogeneous coordinates - Line drawing -Clipping- viewing transformation-Brief introduction to CAD and CAM – Manufacturing Planning, Manufacturing control- Introduction to CAD/CAM –CAD/CAM concepts —Types of production - Manufacturing models and Metrics – Mathematical models of Production Performance

UNITII GEOMETRIC MODELING **9**

Representation of curves- Hermite curve- Bezier curve- B-spline curves-rational curves-Techniques for surface modeling – surface patch- Coons and bicubic patches- Bezier and B-spline surfaces. Solid modeling techniques- CSG andB-rep

UNITIII CAD STANDARDS **9**

Standards for computer graphics- Graphical Kernel System (GKS) - standards for exchange images- Open Graphics Library (OpenGL) - Data exchange standards - IGES, STEP, CALS etc. - communication standards.

UNITIV FUNDAMENTAL OF CNC ANDPART PROGRAMING **9**

Introduction to NC systems and CNC - Machine axis and Co-ordinate system- CNC machine tools- Principle of operation CNC- Construction features including structure- Drives and CNC controllers- 2D and 3D machining on CNC- Introduction of Part Programming, types - Detailed Manual part programming on Lathe & Milling machines using G codes and M codes- Cutting Cycles, Loops, Sub program and Macros- Introduction of CAMpackage.

UNITV CELLULAR MANUFACTURING ANDFLEXIBLE MANUFACTURINGSYSTEM(FMS) **9**

Group Technology(GT),Part Families–Parts Classification and coding–Simple Problems in Opitz Part Coding system– Production flow Analysis–Cellular Manufacturing–Composite part concept–Types of Flexibility - FMS – FMS Components – FMS Application & Benefits – FMS Planning and Control– Quantitative analysis in FMS

TOTAL : 45 PERIODS

OUTCOMES:

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

CO1	Explain the 2D and 3D transformations, clipping algorithm, Manufacturing models and Metrics
CO2	Explain the fundamentals of parametric curves, surfaces and Solids CO3 Summarize the different types of Standard systems used inCAD
CO4	Apply NC & CNC programming concepts to develop part programme for Lathe & MillingMachines
CO5	Summarize the different types of techniques used in Cellular Manufacturing andFMS

TEXT BOOKS:

1. Ibrahim Zeid "Mastering CAD CAM" Tata McGraw-HillPublishingCo.2007
2. Mikell.P.Groover "Automation, Production Systems and Computer Integrated Manufacturing", Prentice Hall of India,2008.
3. Radhakrishnan P, SubramanyanS.andRaju V., "CAD/CAM/CIM", 2nd Edition, New Age International (P) Ltd, NewDelhi,2000.

REFERENCES:

1. Chris McMahon and Jimmie Browne "CAD/CAM Principles", "Practice and Manufacturing management " Second Edition, Pearson Education,1999.
2. Donald Hearn and M. Pauline Baker "Computer Graphics"'. Prentice Hall,Inc,1992.
3. Foley, Wan Dam, Feiner and Hughes - "Computer graphics principles & practice" Pearson Education -2003
4. William M Neumann and Robert F.Sproul "Principles of Computer Graphics", McGraw Hill Book Co. Singapore, 1989.

ME8811	PROJECT WORK	L	T	P	C
		2	0	1	0

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 voceexamination.

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 thesemester. The project work is evaluated based on oral presentation and the project report jointly by external and internal examiners constituted by the Head of theDepartment.

TOTAL: 30 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 propermethodology.

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SMART BRAKING SYSTEM IN TWO WHEELER

A PROJECT REPORT

Submitted by

DINESH.S	**(731219114006)**
KARTHI.M	**(731219114009)**
MANOJ.J	**(731219114013)**
MURUGESH.M	**(731219114015)**

in partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

in

MECHANICAL ENGINEERING

J.K.K.MUNIRAJAH COLLEGE OF TECHNOLOGY

T.N.PALAYAM -638506

ANNA UNIVERSITY:CHENNAI-600025

MAY 2023

PRINCIPAL
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OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506.
GOBI (Tk). ERODE (Dt).

ANNA UNIVERSITY:CHENNAI-600 025

BONAFIDE CERTIFICATE

Certified that this Report titled **"SMART BRAKING SYSTEM IN TWO WHEELER"** is the bonafide work of **DINESH.S** (Reg .No.731219114006), **KARTHI.M** (Reg . No.731219114009), **MANOJ.J** (Reg .No. 7312194013), **MURUGESH .M** (Reg .No.731219114015) who carried out the project work under my supervision. Certified further that to the best of my knowledge and 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.

18/5/23
SIGNATURE

Mr. K. SRIRAM M.E., Ph.D.,
HEAD OF THE DEPARTMENT
Assistant Professor
Dept of Mechanical Engineering
JKK Munirajah College of Technology
T.N.Palayam.

17/5/23
SIGNATURE

Mr.S. KARTHIKEYAN M.E.,
SUPERVISOR
Assistant Professor
Dept of Mechanical Engineering
JKK Munirajah College of Technology
T.N. Palayam.

Submitted for the Viva-Voce examination held on 18/05/23

Internal Examiner

18/5/23
External Examiner

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ABSTRACT

Here we fabricate the braking system using with ultra sonic sensor. A brake is a device for applying a force against the friction of the road, slowing or stopping the motion of a vehicle, or alternatively a device to restrain it from starting to move again. We are using the pneumatic cylinder for applying the breaking system and it works because of compressor with the help of the control unit, it was very safe to the driver while running of vehicle.

Our model consists of ultrasonic sensor, dc motor, pneumatic cylinder and solenoid valve. Nissan's Intelligent Brake Assist uses laser radar sensors to detect the distance to An EC supported 6th Framework project entitled Powered two-wheeler.

An automatic Braking system is an intelligent mechatronic system includes an Ultrasonic wave emitter provided on the front portion of a bike producing and emitting Ultrasonic waves. An Ultrasonic receiver is also placed on the front portion of the car operatively receiving a reflective Ultrasonic wave signal. The reflected wave (detected pulse) gives the distance between the obstacle and the vehicle.

CHAPTER - I
INTRODUCTION

A brake is a device for slowing or stopping the motion of a machine or vehicle, or alternatively a device to restrain it from starting to move again. The kinetic energy lost by the moving part is usually translated to heat by friction. Alternatively, in regenerative braking, much of the energy is recovered and stored for later use.

As the standard of living people increased together with the human population it resulted in a drastic increase in the number of moving vehicles on the road. This means that the probability of the number of accidents also increase which resulted in heightened need of safety systems in automobiles. Keeping this fact in mind we have developed a unique way of preventing accidents, by sensing the vehicle which is moving in front measure the distance between the two and if the distance is close enough for a contact, the sensor will immediately send signal to the ECU which actuates the pneumatic cylinder to apply brakes. Thereby preventing a possible accident!

An automatic braking system is an important part of safety technology for automobiles. It is an advanced system, specifically designed to either prevent possible collision, or reduce speed of the moving vehicle, prior to a collision with another vehicle, pedestrian or an obstacle of some sort.

Automatic brakes are one of many car safety features, and are often integrated with other technology, such as pre-collision systems and adaptive cruise control.

CHAPTER-VIII
CONCLUSION

Hence with the help of ultrasonic sensor, the braking system is fabricated. Thereby slowing or stopping the motion of the wheel is achieved. We are using the pneumatic cylinder for applying the brake which is efficient it works because of compressor with the help of the control unit, it was very safe to the driver while running of vehicle.

An automatic braking system is an important part of safety technology for automobiles. It is an advanced system, specifically designed to either prevent possible collision, or reduce speed of the moving vehicle, prior to a collision with another vehicle, pedestrian or an obstacle of some sort.

INTERNSHIP

Gmail

Internship
1message

TUE 14 APR 2023 at 10.45 AM

From: SRIRAMKS<hodmech@jkkmct.edu.in>
Date: TUE 14 APR 2023 at 10.45 AM
Subject: Internship -reg
To: PERIYASAMY HYDRAULIC EQUIPMENTS<hr@periyasamyhydraulicequipments.com >

Dear Sir,

I am requesting to be joining your **PERIYASAMY HYDRAULIC EQUIPMENTS**. The requirements are exactly what I have prepared for and hoped to do. I feel confident that I can make a significant contribution to your organization while at the same time learning from your staff.

Additionally, I shall complete all insurance forms for the new intern orientation. I look forward to working with you and your fine team. I appreciate your confidence in me and providing the chance to work with and observe your outstanding staff.

Refer the following student :(**DINESH S, KARTHI M, MANOJ J and MURUGESH M)**

Sincerely,

Mr.K.Sriram,
HOD/MECH
J K K.Munirajah College of Technology,
T.N.Palayam, Erode-638506,
Tamilnadu.

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OF TECHNOLOGY
T.N. PALAYAM (Po)-638 506,
GOBI (Tk), ERODE (Dt).

Gmail

Internship
1message

WED 22 MAR 2023 at 11.15 AM

From: PERIYASAMY HYDRAULIC EQUIPMENTS<hr@periyasamyhydraulicequipments.com >

Date: WED 22 MAR 2023 at 11.15 AM

Subject: Internship -reg

To:SRIRAMKS<hodmech@jkkmct.edu.in>

Dear Sir,

I am writing to confirm my acceptance of your internship offer of 27.03.2023 to 03.05.2023 and to tell you how to be joining my **PERIYASAMY HYDRAULIC EQUIPMENTS.** So kindly make necessary arrangements for the same and also inform to your student must come with neat dress code and must follow company rules and regulations without fail.

Refer the following student : **(DINESH S, KARTHI M, MANOJ J and MURUGESH M).**

Sincerely,

HR Manager,
Periyasamy Hydraulic Equipment's,
Tirupur.

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GOBI (Tk), ERODE (Dt).

PHE
PERIYASAMY HYDRAULIC EQUIPMENTS

Makers of Green India

TO WHOM IT MAY CONCERN

This is so certify that Mr. DINESH S, student of B.E (Mechanical Engineering) J.K.K.Munirajah College of Technology. Has successfully completed a internship in the hydraulics from 27.03.2023 to 03.05.2023

He has worked on project titled "SMART BRAKING SYSTEM IN TWO WHEELER "This project aimed to hinder the theft of bikes with the help of a wheel locking system.

During this tenure, he participated in his work with dedication. We found him beautiful and active in any task. He is a confident person, punctual, hardworking and competent. His behavior and character were good during the training period. We wish him every success in his life and career.

Tirupur
Date: 03.05.2023

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GOBI (Tk), ERODE (Dt).

Periyasamy Hydraulic Equipments (PHE)
24/A1, PN Rd, Kunnathur,
Tirupur-638 103.
AUTHORIZED SIGN

PHE
PERIYASAMY HYDRAULIC EQUIPMENTS

Makers of Green India

TO WHOM IT MAY CONCERN

This is so certify that Mr. KARTHI M, student of B.E (Mechanical Engineering) J.K.K.Munirajah College of Technology. Has successfully completed a internship in the hydraulics from 27.03.2023 to 03.05.2023

He has worked on project titled "SMART BRAKING SYSTEM IN TWO WHEELER "This project aimed to hinder the theft of bikes with the help of a wheel locking system.

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Tirupur
Date: 03.05.2023

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Cell : +91 97865 58888, 97865 00188 Email : pheindia@yahoo.com Website : www.pheindia.com

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TO WHOM IT MAY CONCERN

This is so certify that Mr. MANOJ J, student of B.E (Mechanical Engineering) J.K.K.Munirajah College of Technology. Has successfully completed a internship in the hydraulics from 27.03.2023 to 03.05.2023

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Tirupur
Date: 03.05.2023

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Cell : +91 97865 58888, 97865 00188 Email : pheindia@yahoo.com Website : www.pheindia.com

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TO WHOM IT MAY CONCERN

This is so certify that Mr. MURUGESH M, student of B.E (Mechanical Engineering) J.K.K.Munirajah College of Technology. Has successfully completed a internship in the hydraulics from 27.03.2023 to 03.05.2023

He has worked on project titled "SMART BRAKING SYSTEM IN TWO WHEELER "This project aimed to hinder the theft of bikes with the help of a wheel locking system.

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Tirupur
Date: 03.05.2023

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