ACADEMIC YEAR (2021-2022)						
	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	internship	Number of students
(2021-2022) Regulation-2017						
1	Project Work	ME8811	MECHANICAL ENGINEEREING	✓		1
2	Engineering Thermodynamics	ME8391	MECHANICAL ENGINEEREING	✓		1
3	Fluid Mechanics and Machinery	CE8394	MECHANICAL ENGINEEREING	✓	✓	3
4	Manufacturing Technology - I	ME8351	MECHANICAL ENGINEEREING	✓	✓	1
5	Kinematics of Machinery	ME8492	MECHANICAL ENGINEEREING	✓		1
6	Manufacturing Technology – II	ME8451	MECHANICAL ENGINEEREING	✓		1
7	Engineering Metallurgy	ME8491	MECHANICAL ENGINEEREING	✓	✓	1
8	Strength of Materials for Mechanical Engineers	CE8395	MECHANICAL ENGINEEREING	✓		2
9	Thermal Engineering- I	ME8493	MECHANICAL ENGINEEREING		✓	1
10	Design of Machine Elements	ME8593	MECHANICAL ENGINEEREING	✓	✓	8
11	Metrology and Measurements	ME8501	MECHANICAL ENGINEEREING		✓	4
12	Dynamics of Machines	ME8594	MECHANICAL ENGINEEREING	✓		3
13	Thermal Engineering- II	ME8595	MECHANICAL ENGINEEREING			2
14	Design of Transmission Systems	ME8651	MECHANICAL ENGINEEREING	✓		8
15	Computer Aided Design and Manufacturing	ME8691	MECHANICAL ENGINEEREING		✓	4

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MECHANICAL ENGINEERING

2021-2022

S.NO	REG.NO	STUDENT NAME	PROJECT	INTERNSHIP
1	731218114001	AATHI DHINAKARAN N	✓	✓
2	731218114002	ANILPRADEEPKUMAR R	✓	✓
3	731218114003	ASHOKKUMAR M	✓	✓
4	731218114004	ATHILAKSHMANAN K	✓	✓
5	731218114005	CHANDRU S	✓	✓
6	731218114007	DHANAPAL P	✓	✓
7	731218114009	GOKUL U	✓	✓
8	731218114010	GOKULAPRASANTH S	✓	✓
9	731218114011	GOWTHAM S	✓	✓
10	731218114012	KARAN A	✓	✓
11	731218114013	KATHIRVEL M	✓	✓
12	731218114015	MATHAVAN J	✓	✓
13	731218114018	PARTHIPAN V	✓	✓
14	731218114019	PRASATH B	✓	✓
15	731218114020	PRAVEEN T	✓	✓
16	731218114022	RAJA V	✓	✓
17	731218114023	SARATH M	✓	✓
18	731218114025	SIVASANKAR M	✓	✓

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19	731218114026	SOUNDHAR G	✓	✓
20	731218114027	SURESH K	✓	✓
21	731218114029	THAMARAI SELVAN S	✓	✓
22	731218114030	VIJAY RP	✓	✓
23	731218114031	VIJAYAKUMAR I	✓	✓
24	731218114301	RAMESH KANNAN M	✓	✓

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MECHANICAL ENGINEERING

2021-2022

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	Metrology and Measurements
12	Dynamics of Machines
13	Thermal Engineering- II
14	Design of Transmission Systems
15	Computer Aided Design and Manufacturing

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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.

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CE8394	FLUID MECHANICS AND MACHINERY	L	T	P	C
		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 dimensional analysis
- To understand the importance of various types of flow in pumps.
- To understand the importance of various types of flow in turbines.

UNIT I FLUID PROPERTIES AND FLOW CHARACTERISTICS 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 momentum equation.

UNIT II FLOW THROUGH CIRCULAR 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 and parallel.

UNIT III DIMENSIONAL ANALYSIS 12

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

UNIT IV PUMPS 12

Impact of jets - Euler's equation - Theory of roto-dynamic machines – various efficiencies– velocity components at entry and exit of the rotor- velocity triangles - Centrifugal pumps– working principle - work done by the impeller - performance curves - Reciprocating pump- working principle – Rotary pumps – classification.

UNIT V 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 water on the runner – draft tube. Specific speed - unit quantities – performance curves for turbines – governing of turbines.

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 a fluid.
- Can analyse and calculate major and minor losses associated with pipe flow in piping networks.
- Can mathematically predict the nature of physical quantities
- Can critically analyse the performance of pumps
- Can critically analyse the performance of turbines.

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

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 performance.
  (Use of Standard and approved Steam Table, Mollier Chart, Compressibility Chart and Psychrometric Chart permitted)

UNIT I BASIC CONCEPTS AND FIRST LAW 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.

UNIT II SECOND LAW AND AVAILABILITY ANALYSIS 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.

UNIT III PROPERTIES OF PURE SUBSTANCE AND STEAM POWER CYCLE 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.

UNIT IV IDEAL AND REAL GASES, THERMODYNAMIC RELATIONS 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, Clausius Clapeyron equation, Phase Change Processes. Simple Calculations.

UNIT V GAS MIXTURES AND PSYCHROMETRY 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 systems under steady , Apply second law of thermodynamics to open and closed systems and calculate entropy , Apply Rankine cycle to steam power plant and compare few cycle improvement methods, Derive simple thermodynamic relations of ideal and real gases, Calculate the properties of gas mixtures and mois air and its use in psychometric processes

TEXT BOOKS :

1. R.K.Rajput, "A Text Book Of Engineering Thermodynamics ",Fifth Edition,2017.
2. Yunus a. Cengel & michael a. Boles, "Thermodynamics", 8th edition 2015.

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", 8th Edition.
5. Nag.P.K., "Engineering Thermodynamics", 5th Edition, Tata McGraw-Hill, New Delhi, 2013.

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HAND GUSTURE MOVEMENT BASED WHEEL CHAIR CONTROLLER

A PROJECT REPORT

Submitted by

AATHIDHINAKARAN.N	**731218114001**
ATHILAKSHMANAN.K	**731218114004**
GOKUL. U	**731218114009**
VIJAY.R.P	**731218114030**

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

ANNA UNIVERSITY, CHENNAI 600 025

JUNE 2022

PRINCIPAL
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GOBI (Tk), ERODE (Dt).

ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report **"HAND GUESTUER MOVEMENT BASED WHEEL CHAIR CONTROLLER"** is the bonfire work of **"AATHIDHINAKARAN.N (731218114001), ATHILAKSHMANAN.K (731218114004), GOKUL.U (731218114009), and VIJAY.R.P (731218114030)"** who carried out the project work under my supervision.

21/6/2022

Signature

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

Head of the Department

Department of Mechanical Engineering

J.K.K. Munirajah College of Technology

T.N. Palayam

Erode District

21/6/22

Signature

Mr.M.SIVAKUMAR, M.E.,

Supervisor

Department of Mechanical Engineering

J.K.K. Munirajah College of Technology

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Erode District

Submitted for the Anna University Viva – Voce held on 22.06.22

22/6/2022

Internal Examiner

22/6/22

External Examiner

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ABSTRACT

Robots are the future should communicate with humans in a natural way. Hence, we are pecifically interested in hand making a operated gesture based interfaces. The purpose of this project was to present a reliable means for human-computer interface based on hand gestures that could be interpreted and used in controlling a wheel chair's movement automatically. In this project we will develop architecture for an intelligent wheelchair working on wireless and gesture control and not by the usual method of head movement for the physically andicapped people. It is wheelchair which can be controlled by simple hand gestures. It employs a sensor& actuator which controls the wheelchair hand gestures made by the user nterprets the motion intended by user and moves accordingly. When we change the direction, the sensor registers values are changed and that values are given to microcontroller. Depending on the direction of the hand movement/gesture microcontroller controls the wheel hair directions like LEFT, RIGHT, FRONT, and BACK. The aim of this project is to mplement a wheel chair direction control with hand gesture recognitions.

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CHAPER.8

SCOPE FOR FUTURE WORK

The hand gesture wheelchair has the ability to bridge the gap between man and machine. ırther this hand gesture can be changed to speech and brain signal recognition which will be ı battle winning factor for all those people whose whole body is paralyzed. We can further nprove wheelchairs by making it with low cost and high accuracy which are operating by a reless remote with various different sensors. An array of sensors can be used and integrating e inputs of multiple sensors and then processing them. Further safety features can be added into the wheelchair like implementation of ultrasonic sensor for the object detection. GPS ıtem can also be implemented to know the exact location of the person who is in wheelchair ıd by using GSM module an SMS can be sent to pre defined number in case of emergency.

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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 plastic components.

UNIT I METAL CASTING PROCESSES 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 Sand casting

UNIT II JOINING PROCESSES 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 and cure.

UNIT III METAL FORMING PROCESSES 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.

UNIT IV SHEET METAL PROCESSES 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 – Micro forming

UNIT V 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 joining processes.
CO3 Summarize various hot working and cold working methods of metals. CO4
Explain various sheet metal making processes.
CO5 Distinguish various methods of manufacturing plastic components.

TEXT BOOKS:

1. Hajra Chouldhary S.K and Hajra Choudhury. 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.Suresh Babu, "Manufacturing Technology I", Pearson Education, 2008
2. Paul Degarma E, Black J.T and Ronald A. Kosher, "Materials and Processes, 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.

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 a mechanism.
- To understand the motion resulting from a specified set of linkages, design few linkage mechanisms and cam mechanisms for specified output motions.
- To understand the basic concepts of toothed gearing and kinematics of gear trains and the effects of friction in motion transmission and in machine components.

UNIT I BASICS OF MECHANISMS 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 – rocker mechanisms.

UNIT II 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.

UNIT III KINEMATICS OF CAM MECHANISMS 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 of cams.

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",

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.

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REVERSE GEAR MECHANISM OF TWO WHEELER FOR PHSICALLY CHALLENGED PEOPLE

PROJECT REPORT

Submitted by

CHANDRU S	**(731218114005)**
GOWTHAM S	**(731218114011)**
SIVASANKAR M	**(731218114025)**
RAMESHKANNAN M	**(731218114301)**

In partial fulfilment for the award of the degree

Of

BACHELOR OF ENGINEERING

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ANNA UNIVERSITY, CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report **"REVERSE GEAR MECHANISM IN TWO WHEELER FOR PHYSICALLY CHALLENGED PEOPLE"** is the bonafide work of **"CHANDRU (731218114005), GOWTHAM (731218114011), SIVASANKAR (731218114025), and RAMESHKANNAN (731218114301)"** who carried out the project work under my supervision.

21/6/2022	21/6/2022
SIGNATURE	**SIGNATURE**
Mr.SRIRAM, ME., (Ph.D)	**Mr.E.DEEPARAJ ME.,**
Head of the Department	Supervisor
Department of mechanical engineering	Department of mechanical engineering
J.K.K. Munirajah Collegeof Technology	J.K.K. Munirajah Collegeof Technology
T.N. Palayam	T.N. Palayam

Submitted for the Anna university viva - voce held on. 22.06.2022

22/6/2022	22/6/22
Internal Examiner	External Examiner

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ABSTRACT

In our country, there are many thousands of physically challenged persons 'ho use the same old vehicles meant for handicapped persons. Normally, a andicapped vehicle does not have reverse gear. We want to overcome these ifficulties of handicapped people by implementing our project, presented in this aper, whose main aim is to help physically challenged persons to move their vehicle ı reverse without the help of others. It consists of three shafts with a keyway cutting nd four spur gears. Driver shaft consists of compound gear arrangement. Gear 1 nd Gear 2 are main gears, Gear 3 is idler gear which is to transmit power from gear to gear 4 for forward motion and gear 4 is a driven gear that is mounted with driven ıaft. The driven shaft consists of a sprocket that is connected with a chain rrangement that allows rear wheel to rotate. Lever is used in gear setup to change ıe gear in forward and reverse motion while supporting plate is used for mounting ıree shafts. Shifting of gears arrangement is provided to change the gear in forward ıd reverse motion. When the gear is shifted from right to left, it makes the vehicle ıove forward. When the gear is shifted from left to right, it moves the vehicle in a verse direction. It is normally based on messing of gears. It quantifies energy usage :cording to its discrete functions.

In fast growing modern world many types of vehicles are being innovated. ut until now it is a major problem for the physically challenged peoples to move ıck the vehicles and to "U" turn the vehicles. Even to a small distance they cannot ove the vehicles backside. So To eliminate this problem we invent the reverse gear echanism in two wheeler. The challenged peoples can easily reverse the vehicles ithout getting down from the vehicle by easily operating hand lever.

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CHAPTER NO.7

CONCLUSION

Our project **"REVERSE GEAR ARRANGEMENT IN MOPPED FOR HANDICAPPED PERSON"** gave us a good opportunity for multiple learning that involved problem solving and decision making at every stage, testing different abilities and skills as part of engineering create a process. This project helps a handicapped person to drive backward without the help of others. It is very often affirmed by different academic and industrial experts that there should be no gap between method of learning in an institution and industrial processes, and we are trying to bridge the gap in our own small way through this paper. We feel that the project work is a good solution to bridge the gap between the institution and the industries to serve the society better.

The design and fabrication of this mechanism was a successful one. We used an outboard engine, and alterations were made which could be manufactured in industrial level in future. It didn't face any kind of difficulties in producing the required reverse motion. Implementing this mechanism to handicapped vehicle would be a greater help to them. This work has provided us an excellent opportunity and experience, to use our limited knowledge. We gained a lot of practical knowledge regarding, planning, purchasing, assembling and machining while doing this work. We are proud that we have completed the work with the limited time successfully. The reverse mechanism is working well with satisfactory conditions.

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GOBI (Tk), ERODE (Dt).

INTERNSHIP

Gmail

Internship
1message

WED 30 MAR 2022 at 12.35 PM

From: SRIRAMKS<hodmech@jkkmct.edu.in>
Date: WED 30 MAR 2022 at 12.35 PM
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 :**(AATHIDINAKARAN.N, ATHILAKSHMANAN.K, GOKUL.U, VIJAY.R.P, CHANDRU S, GOWTHAM S, SIVASANKAR M, RAMESHKANNAN M)**

Sincerely,

Final Year Mech Students,
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

FRI 1 APR 2022 at 3.50 PM

From: SAKTHI GEAR PRODUCT<hr@sakthigear.com >
Date: FRI 1 APR 2022 at 3.50 PM
Subject: Internship-reg

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

Dear Sir,

I am writing to confirm my acceptance of your internship offer of 08.04.2022 to 23.05.2022 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: **(AATHIDINAKARAN.N, ATHILAKSHMANAN.K, GOKUL.U, VIJAY.R.P, CHANDRU S, GOWTHAM S, SIVASANKAR M, RAMESHKANNAN M).**

Sincerely,

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

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SAKTHI GEAR PRODUCTS

INTERNSHIP CERTIFICATE

TO WHOM-SO-EVER IT MAY CONCERN

This is to certify that Mr .AATHIDINAKARAN.N, IV Year student B.E.Mechanical Engineering,J.K.K.Munirajah College of Technology, T.N.Palayam has successfully completed 45 days (08.04.2022 to 23.05.2022) internship in " SAKTHI GEAR PRODUCTS PRIVATE LIMITED COIMBATORE. "

He has worked on project titled " HAND GUESTUER MOVEMENT BASED WHEELCHAIR CONTROLLER " This project aimed to hinder the theft of bikes with the help of a wheel locking system.

During this tenure Mr.AADHIDINAKARN.N 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.

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Coimbatore
23.05.2022

SAKTHI GEAR PRODUCTS Coimbatore

General Manager

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

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INTERNSHIP CERTIFICATE

TO WHOM-SO-EVER IT MAY CONCERN

This is to certify that Mr.ATHILAKSHMANAN.K, IV Year student B.E.Mechanical Engineering,J.K.K.Munirajah College of Technology, T.N.Palayam has successfully completed 45 days (08.04.2022 to 23.05.2022) internship in " SAKTHI GEAR PRODUCTS PRIVATE LIMITED COIMBATORE. "

He has worked on project titled " HAND GUESTUER MOVEMENT BASED WHEELCHAIR CONTROLLER " This project aimed to hinder the theft of bikes with the help of a wheel locking system.

During this tenure Mr.ATHILAKSHMANAN.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.

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Coimbatore
23.05.2022

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TO WHOM-SO-EVER IT MAY CONCERN

This is to certify that Mr.GUKUL.U, IV Year student B.E. Mechanical Engineering, J.K.K. Munirajah College of Technology, T.N.Palayam has successfully completed 45 days (08.04.2022 to 23.05.2022) internship in " SAKTHI GEAR PRODUCTS PRIVATE LIMITED COIMBATORE."

He has worked on project titled "HAND GUESTUER MOVEMENT BASED WHEELCHAIR CONTROLLER" This project aimed to hinder the theft of bikes with the help of a wheel locking system.

During this tenure Mr.GUKUL.U has involvedin 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 conductand character was good during the internship period.

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Coimbatore
23.05.2022

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TO WHOM-SO-EVER IT MAY CONCERN

This is to certify that Mr.VIJAY.R.P, IV Year student B.E. Mechanical Engineering, J.K.K. Munirajah College of Technology, T.N.Palayam has successfully completed 45 days (08.04.2022 to 23.05.2022) internship in "SAKTHI GEAR PRODUCTS PRIVATE LIMITED COIMBATORE."

He has worked on project titled "HAND GUESTUER MOVEMENT BASED WHEELCHAIR CONTROLLER" This project aimed to hinder the theft of bikes with the help of a wheel locking system.

During this tenure Mr.VIJAY.R.P has involvedin 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 conductand character was good during the internship period.

Coimbatore
23.05.2022

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SAKTHI GEAR PRODUCTS

INTERNSHIP CERTIFICATE

TO WHOM-SO-EVER IT MAY CONCERN

This is to certify that Mr.CHANDRU.S, IV Year student B.E. Mechanical Engineering, J.K.K. Munirajah College of Technology, T.N.Palayam has successfully completed 45 days (08.04.2022 to 23.05.2022) internship in "SAKTHI GEAR PRODUCTS PRIVATE LIMITED COIMBATORE."

He has worked on project titled "REVERSE GEAR MECHANISM OF TWO WHEELERN FOR PHYSICALLY CHALLENGED PEOPLE" This project aimed to hinder the theft of bikes with the help of a wheel locking system.

During this tenure Mr.CHANDRU.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.

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TO WHOM-SO-EVER IT MAY CONCERN

This is to certify that Mr.GOWTHAM.S, IV Year student B.E. Mechanical Engineering, J.K.K. Munirajah College of Technology, T.N.Palayam has successfully completed 45 days (08.04.2022 to 23.05.2022) internship in "SAKTHI GEAR PRODUCTS PRIVATE LIMITED COIMBATORE."

He has worked on project titled "REVERSE GEAR MECHANISM OF TWO WHEELERN FOR PHYSICALLY CHALLENGED PEOPLE" This project aimed to hinder the theft of bikes with the help of a wheel locking system.

During this tenure Mr.GOWTHAM.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 conductand character was good during the internship period.

Coimbatore
23.05.2022

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SAKTHI GEAR PRODUCTS

INTERNSHIP CERTIFICATE

TO WHOM-SO-EVER IT MAY CONCERN

This is to certify that Mr.SIVASANKAR.M, IV Year student B.E. Mechanical Engineering, J.K.K. Munirajah College of Technology, T.N.Palayam has successfully completed 45 days (08.04.2022 to 23.05.2022) internship in "SAKTHI GEAR PRODUCTS PRIVATE LIMITED COIMBATORE."

He has worked on project titled "REVERSE GEAR MECHANISM OF TWO WHEELERN FOR PHYSICALLY CHALLENGED PEOPLE" This project aimed to hinder the theft of bikes with the help of a wheel locking system.

During this tenure Mr.SIVASANKAR.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 conductand character was good during the internship period.

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Coimbatore
23.05.2022

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.RAMESHKANNAN.M, IV Year student B.E. Mechanical Engineering, J.K.K. Munirajah College of Technology, T.N.Palayam has successfully completed 45 days (08.04.2022 to 23.05.2022) internship in "SAKTHI GEAR PRODUCTS PRIVATE LIMITED COIMBATORE."

He has worked on project titled "REVERSE GEAR MECHANISM OF TWO WHEELERN FOR PHYSICALLY CHALLENGED PEOPLE" This project aimed to hinder the theft of bikes with the help of a wheel locking system.

During this tenure Mr.RAMESHKANNAN.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 conductand character was good during the internship period.

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Coimbatore
23.05.2022

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PROJECT

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.

UNIT II TURNING MACHINES 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 – multi spindle:

UNIT III SHAPER, MILLING AND GEAR CUTTING MACHINES 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 of gears.

UNIT IV ABRASIVE PROCESS AND 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 broaching machines

UNIT V CNC MACHINING 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 removal processes.

CO2 Describe the constructional and operational features of centre lathe and other special purpose lathes.

CO3 Describe the constructional and operational features of shaper, planner, milling, drilling, sawing and broaching machines.

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 part program.

TEXT BOOKS:

1. Hajra Choudhury, "Elements of Workshop Technology", Vol.II., Media Promoters 2014
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. Geofrey Boothroyd, "Fundamentals of Metal Machining and Machine Tools", Mc Graw Hill, 1984
3. HMT, "Production Technology", Tata McGraw Hill, 1998.
4. Roy. A.Lindberg, "Process and Materials of Manufacture," Fourth Edition, PHI/Pearson Education 2006.

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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 engineering applications.

UNIT I ALLOYS AND PHASE DIAGRAMS 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 and application.

UNIT II HEAT TREATMENT 9

Definition – Full annealing, stress relief, recrystallisation and spheroidising – normalising, hardening and Tempering of 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. .

UNIT III FERROUS AND NON-FERROUS METALS 9

Effect of alloying additions on steel- α and β stabilisers– stainless and tool steels – HSLA, Maraging steels – Cast Iron - Grey, white, malleable, spheroidal – alloy cast irons, Copper and copper alloys – Brass, Bronze and Cupronickel – Aluminium and Al-Cu – precipitation strengthening treatment – Bearing alloys, Mg-alloys, Ni-based super alloys and Titanium alloys.

UNIT IV NON-METALLIC MATERIALS 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 of Composites.

UNIT V MECHANICAL PROPERTIES AND DEFORMATION MECHANISMS 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 failure mechanisms.

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 steel classification.

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 metallic materials.

CO5 Explain the testing of mechanical properties. .

TEXT BOOKS:

1. Avner, S.H., "Introduction to Physical Metallurgy", McGraw Hill Book Company,1997.
2. Williams D Callister, "Material Science and Engineering" Wiley India Pvt Ltd, Revised Indian Edition 2014

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 Anish Upadhyay, "Materials Science and Engineering", Viva Books Pvt. Ltd., New Delhi, 2006.

CE8395	STRENGTH OF MATERIALS FOR MECHANICAL ENGINEERS	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To understand the concepts of stress, strain, principal stresses and principal planes.
- To study the concept of shearing force and bending moment due to external loads in determinate beams and their effect on stresses.
- To determine stresses and deformation in circular shafts and helical spring due to torsion.
- To compute slopes and deflections in determinate beams by various methods.
- To study the stresses and deformations induced in thin and thick shells.

UNIT I STRESS, STRAIN AND DEFORMATION OF 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.

UNIT II TRANSVERSE LOADING ON BEAMS AND STRESSES IN 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 stress distribution.

UNIT III 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, carriage springs.

UNIT IV DEFLECTION OF BEAMS

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.

UNIT V THIN CYLINDERS, SPHERES AND THICK CYLINDERS

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 principal planes.
- Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment.
- Apply basic equation of simple torsion in designing of shafts and helical spring
- Calculate the slope and deflection in beams using different methods.
- Analyze and design thin and thick shells for the applied internal and external pressures.

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.

POWER GENERATION BY VERTICAL AXIS WIND TURBINE IN HIGHWAY USING VEHICLE SPEEDS

PROJECT REPORT

Submitted by

PRASATH.B	(731218114019)
SARATH.M	(731218114023)
SOUNDHAR.G	(731218114026)
SURESH.K	(731218114027)

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

JUNE 2022

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 **"POWER GENERATION BY VERTICAL AXIS WIND TURBINE IN HIGHWAY USING VEHICLE SPEEDS"** is the bonafide work of **"PRASATH.B, SARATH.M, SOUNDHAR.G, SURESH.K"** who carried out the project work under my supervision.

21/6/2022

SIGNATURE

HEAD OF THE DEPARTMENT

Assistant Professor

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

Department of Mechanical Engineering

J.K.K.Munirajah College of Technology

T.N.Palayam-638506.

21/6/2022

SIGNATURE

SUPERVISOR

Assistant Professor

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

Department of Mechanical Engineering

J.K.K.Munirajah College of Technology

T.N.Palayam-638506.

Submitted for the Project Viva-Voce Examination held on 22.06.2022

22/6/22

INTERNAL EXAMINER

22/6/22

EXTERNAL EXAMINER

PRINCIPAL
JKK MUNIRAJAH COLLEGE
OF TECHNOLOGY
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GOBI (Tk), ERODE (Dt).

ABSTRACT

Wind energy is one of the non-conventional forms of energy and it is available in affluence. Electricity can be generated with the help of vertical axis wind turbine. This projects aims of utilizing this wind energy in most effective manner to get the maximum electric output, and therefore we selected highway as our installation site where we can take the advantage of the moving vehicles on both the sides of the road. In the present work, turbine is design and fabricated as per the specifications, the blades used are semi-circular shape and are connected to the disc which is connected to shaft.

Shaft is then coupled with pulley with the help of bearing, and then pulley is connected to the alternator, which generates the power. The power developed is stored in battery and then can be used for street light, signal or toll. In this project a small model has been created for testing purpose. This project also aims for maximum output with minimum cost indulges, so that the government can think over this project and can implement this type of vertical axis wind turbine on highways at low cost.

This project is about designing and manufacturing of a Wind Turbine that can convert wind by using Vertical Axis Wind Turbines to a useful energy.

The current power demand in Kenya is very high compared to power consumption average. This high demanding should take the focus of attention in thinking in different sources of energy. One of the best sources of energy that can apply the concept of sustainability is renewable energy such as sun, wind, and rivers.

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CHAPTER NO.7

CONCLUSION

By using this technology all the highways can be lightened without use of non- renewable energy resources. Also, if this method is implemented in all national highways it can able to produce large amount of power. And it can also provide job for many educated fellowship. By increasing numbers it can develop more energy & light up the highways so that the percentage of accidents gets minimized. The project "Highway Wind Mill" was designed such that to deliver power to switch on the emergency head lamp. The dynamo uses electromagnetic principles to convert mechanical rotation into direct current (DC) using wind energy. The system generates electrical power as nonconventional method by wind energy power using wind turbine set up. A careful selection has to be made for the blade profile so that the losses will be minimum and the power generation can be enhanced. Since the wind energy is not constant at all the time so the operation of the wind machine will be intermittent and the power production rate will also vary; the component should be design in such a manner so that the losses should be at minimum.

Thus at minimum wind speed of 12.77 m/s i.e., 46 km/hr. the turbine is rotating at 342rpm which accounts for 102.4 watts according to the equation. Hence one can obtain an output of 500watts to 1kilowatts of power with an average wind speed of 20 to 30m/s. Our work and the results obtained so far are very encouraging and reinforce the conviction that wind energy conversion systems are practical and potentially very contributive to the production of clean renewable electricity from the wind even under less than ideal sitting conditions. The is designed and fabricated in such a way that it can able to capture wind from all the direction.

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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 Transmission components.
- 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)

UNIT I DESIGN OF FLEXIBLE ELEMENTS 9

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

UNIT II SPUR GEARS AND PARALLEL AXIS HELICAL GEARS 9

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

UNIT III BEVEL, WORM AND CROSS HELICAL GEARS 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.

UNIT IV 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.

UNIT V CAMS, CLUTCHES AND 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, helical gears.
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. Orthwein W, "Machine Component Design", Jaico Publishing Co, 2003.
3. Prabhu. T.J., "Design of Transmission Elements", Mani Offset, Chennai, 2000.
4. Robert C. Juvinall and Kurt M. Marshek, "Fundamentals of Machine Design", 4th Edition, Wiley, 2005
5. Sundararajamoorthy T. V, Shanmugam .N, "Machine Design", Anuradha Publications, Chennai, 2003.

PRINCIPAL
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T.N. PALAYAM (Po)-638 506.
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 component design
- To understand the application of computers in various aspects of Manufacturing viz., Design, Proper planning, Manufacturing cost, Layout & Material Handling system.

UNIT I 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

UNIT II 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

UNIT III 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.

UNIT IV FUNDAMENTAL OF CNC AND PART 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 CAM package.

UNIT V CELLULAR MANUFACTURING AND FLEXIBLE MANUFACTURING SYSTEM (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 in CAD
CO4	Apply NC & CNC programming concepts to develop part programme for Lathe & Milling Machines
CO5	Summarize the different types of techniques used in Cellular Manufacturing and FMS

TEXT BOOKS:

1. Ibrahim Zeid "Mastering CAD CAM" Tata McGraw-Hill PublishingCo.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, New Delhi,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.

DESIGN AND FABRICATION OF ROTATING FORKLIFT

A PROJECT REPORT

Submitted by

ASHOK KUMAR.M	**(731218114003)**
DHANAPAL.P	**(731218114007)**
RAJA.V	**(731218114022)**
VIJAYA KUMAR .I	**(731218114031)**

In partial fulfilment for the award of the degree

of

BACHELOR OF ENGINEERING

in

MECHANICAL ENGINEERING

J.K.K.MUNIRAJAH COLLEGE OF TECHNOLOGY

T.N.PALAYAM-638 506

ANNA UNIVERSITY: CHENNAI 600 025

JUNE 2022

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

ANNA UNIVERSITY:CHENNAI 600 025

BONAFIDE CIRTIFICATE

Certified that this project report **"DESIGN AND FABRICATION OF ROTATING FORKLIFT"** is the bonafide work of **"ASHOK KUMAR.M, DHANAPAL.P, RAJA.V, VIJAYA KUMAR.I"** who carried out the project work under my supervision.

21/6/2022

SIGNATURE

Mr.K.SRIRAM M.E.,(PhD).,

HEAD OF THE DEPARTMENT

Assistant Professor

Department of Mechanical Engineering

J.K.K.Munirajah college of Technology

T.N.Palayam-638 506

21/6/2022

SIGNATURE

Mr.K.SRIRAM M.E.,(PhD).,

SUPERVISOR

Assistant Professor

Department of Mechanical Engineering

J.K.K.Munirajah college of Technology

T.N.Palayam-638 506

Submitted for the Viva-Voice Examination held on 22.06.2022.

22/6/2022

INTERNAL EXAMINER

22/6/22

EXTERNAL EXAMINER

PRINCIPAL
JKK MUNIRAJAH COLLEGE
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ABSTRACT

Material handling process is the process of movement of raw material, semi-finished goods, finished goods through various stages of production and warehousing. It has been seen that forklift equipment is widely used in many industries for different applications such as lifting, safe delivery of material such as huge boxes, Raw materials, Cylindrical sections etc. are widely used Forklift equipment.

It consist of Lead screw & Nut arrangement. The forklift equipment is compact in size can be alternative for the manual lifting. Small scale industries can't afford the huge & costly material handling equipment so we are designing and manufacturing Forklift equipment for small scale industries.

The Battery Operated fork lift is an improved version of lifting and carrying the load which needs to be transferred from one place to another. This advanced technology has brought a new revolution in the mechanical industries and most commonly used in heavy Engineering companies. These forklift vehicles had revolutionized ware-housing practices used in the middle of the 20th century. For a long time, semi- automatic type of material handing systems being used. In semi automatic material handling, the system was manually controlled.

The design of forklift has revolutionized warehouse work and it is practicable for one person to move hundreds of kilograms at once. These well maintained and safely operated forklift has made lifting and transporting cargo items very easily.

CHAPTER NO : 7
CONCULATION

The deveploment of Mechanical forklift assures the ergonomically comfort to the operator or worker and to reduces time required for manual lifting and handling. This increases the productivity & it provide safety of operator while handling of the material. 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.

In this research work, design and fabrication of forklift have been studied. From this research paper the following conclusions have been drawn. The designed forklift has the ability to carry a maximum load of 100 Kg. The forklift designed works on a rechargeable battery and it works continuously for 8 to 10 hours when once it is charged. From the analysis it can be concluded that the designed forklift is able to with stand the load and is economical, reliable and environmentally friendly. The specifications of the motor driving the forklift is calculated based on desired load and acceleration to be achieved. The scope for the further research increas research on forklift's weight change and stability during the turning and speeding process.

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

INTERNSHIP

Gmail

Internship
1message

MON 28 MAR 2022 at 1.00 PM

From: SRIRAMKS<hodmech@jkkmct.edu.in>
Date: MON 28 MAR 2022 at 1.00 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 student:**(PRASATH.B, SARATH.M, SOUNDHAR.G, SURESH.K, ASHOK KUMAR.M, DHANAPAL.P, RAJA.V, VIJAYA KUMAR.I)**

Sincerely,

Final Year Mech Students,

J K K Munirajah College of Technology,

T.N.Palayam, Erode-638506,Tamilnadu.

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

Gmail

Internship
1message

THU 31 MAR 2022 at 1.50 PM

From: SHENDHUR ALLOYS FOUNDRY <hr@ shendhuralloysfoundry.com >

Date: THU 31 MAR 2022 at 1.50 PM

Subject: Internship -reg

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

Dear Sir,

I am writing to confirm my acceptance of your internship offer of 05.04.2022 to 20.05.2022 and to tell you how to be joining my **SHENDHUR ALLOYS FOUNDRY.** 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 :**(PRASATH.B, SARATH.M, SOUNDHAR.G, SURESH.K, ASHOK KUMAR.M, DHANAPAL.P, RAJA.V, VIJAYA KUMAR.I)**

Sincerely,

HR Manager,
Shendhur Alloys Foundry,
Coimbatore.

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

SHENDHUR ALLOYS FOUNDRY

INTERNSHIP CERTIFICATE

TO WHOM-SO-EVER IT MAY CONCERN

This is to certify that Mr .DHANAPAL.P, IV Year student B.E. Mechanical Engineering, J.K.K. Munirajah College of Technology, T.N.Palayam has successfully completed 45 days (05.04.2022 to 20.05.2022) internship in " SHENDHUR ALLOYS FOUNDRY COIMBATORE. "

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
20.05.2022

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

Shendhur Alloys Foundry
Coimbatore

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

SHENDHUR ALLOYS FOUNDRY

INTERNSHIP CERTIFICATE

TO WHOM-SO-EVER IT MAY CONCERN

This is to certify that Mr .PRASATH.B, IV Year student B.E. Mechanical Engineering, J.K.K. Munirajah College of Technology, T.N.Palayam has successfully completed 45 days (05.04.2022 to 20.05.2022) internship in " SHENDHUR ALLOYS FOUNDRY COIMBATORE. "

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
20.05.2022

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Shendhur Alloys Foundry Coimbatore

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SHENDHUR ALLOYS FOUNDRY

INTERNSHIP CERTIFICATE

TO WHOM-SO-EVER IT MAY CONCERN

This is to certify that Mr .RAJA.V, IV Year student B.E. Mechanical Engineering, J.K.K. Munirajah College of Technology, T.N.Palayam has successfully completed 45 days (05.04.2022 to 20.05.2022) internship in " SHENDHUR ALLOYS FOUNDRY COIMBATORE. "

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
20.05.2022

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GOBI (Tk), ERODE (Dt).

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...Mail ID:sendhuralloys@gmail.com, Land Line :-0422-547862, 0422-547741..

SHENDHUR ALLOYS FOUNDRY

INTERNSHIP CERTIFICATE

TO WHOM-SO-EVER IT MAY CONCERN

This is to certify that Mr .SARATH.M, IV Year student B.E. Mechanical Engineering, J.K.K. Munirajah College of Technology, T.N.Palayam has successfully completed 45 days (05.04.2022 to 20.05.2022) internship in " SHENDHUR ALLOYS FOUNDRY COIMBATORE. "

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
20.05.2022

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Authorized signatory

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...Mail ID:sendhuralloys@gmail.com, Land Line :-0422-547862,.0422-547741...

SHENDHUR ALLOYS FOUNDRY

INTERNSHIP CERTIFICATE

TO WHOM-SO-EVER IT MAY CONCERN

This is to certify that Mr .SOUNDHAR.G, IV Year student B.E. Mechanical Engineering, J.K.K. Munirajah College of Technology, T.N.Palayam has successfully completed 45 days (05.04.2022 to 20.05.2022) internship in " SHENDHUR ALLOYS FOUNDRY COIMBATORE. "

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
20.05.2022

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...Mail ID:sendhuralloys@gmail.com, Land Line :.0422-547862,.0422-547741..

SHENDHUR ALLOYS FOUNDRY

TEEV
MARS ENERGY

INTERNSHIP CERTIFICATE

TO WHOM-SO-EVER IT MAY CONCERN

This is to certify that Mr .SURESH.K, IV Year student B.E. Mechanical Engineering, J.K.K. Munirajah College of Technology, T.N.Palayam has successfully completed 45 days (05.04.2022 to 20.05.2022) internship in " SHENDHUR ALLOYS FOUNDRY COIMBATORE. "

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We would like to wish him all the best.

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Coimbatore
20.05.2022

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Mail ID:sendhuralloys@gmail.com, Land Line :-0422-547862,0422-547741

SHENDHUR ALLOYS FOUNDRY

INTERNSHIP CERTIFICATE

TO WHOM-SO-EVER IT MAY CONCERN

This is to certify that Mr .VIJAYA KUMAR.I, IV Year student B.E.Mechanical Engineering, J.K.K.Munirajah College of Technology, T.N.Palayam has successfully completed 45 days (05.04.2022 to 20.05.2022) internship in " SHENDHUR ALLOYS FOUNDRY COIMBATORE. "

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
20.05.2022

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SHENDHUR ALLOYS FOUNDRY

TEEV
MARS ENERGY

INTERNSHIP CERTIFICATE

TO WHOM-SO-EVER IT MAY CONCERN

This is to certify that Mr .ASHOK KUMAR.S, IV Year student B.E.Mechanical Engineering, J.K.K.Munirajah College of Technology, T.N.Palayam has successfully completed 45 days (05.04.2022 to 20.05.2022) internship in " SHENDHUR ALLOYS FOUNDRY COIMBATORE. "

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Coimbatore
20.05.2022

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Mail ID:sendhuralloys@gmail.com, Land Line - 0422-547862, 0422-547741

PROJECT

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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GOBI (Tk), ERODE (Dt).

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

TEXT BOOKS:

1. Kothandaraman, C.P., Domkundwar .S and Domkundwar A.V.,"A course in Thermal Engineering", Dhanpat Rai & Sons, 2016.
2. Mahesh. M. Rathore, "Thermal Engineering", 1st Edition, Tata Mc Graw Hill Publications, 2010.

REFERENCES:

1. Arora .C.P., "Refrigeration and Air Conditioning", Tata Mc Graw Hill, 2008
2. Ballaney. P.L ." Thermal Engineering", Khanna publishers, 24th Edition 2012
3. Charles H Butler : Cogeneration" McGraw Hill, 1984.
4. Donald Q. Kern, " Process Heat Transfer", Tata Mc Graw Hill, 2001.
5. Sydney Reiter "Industrial and Commercial Heat Recovery Systems" Van Nostrand Reinhols, 1985.

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

DESIGN AND FABRICATION OF AQUA SILENCER FOR REDUCING AIR POLLUTION

A PROJECT REPORT

Submitted by

GOKULA PRASANTH.S	**(731218114010)**
KATHIRVEL.M	**(731218114013)**
PRAVEEN.T	**(731218114020)**
THAMARAI SELVAN.S	**(731218114029)**

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

JUNE 2022

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GOBI (Tk), ERODE (Dt).

ANNA UNIVERSITY : CHENNAI-600 025

BONAFIDE CERTIFICATE

Certified that this project report "**DESIGN AND FABRICATION OF AQUA SILENCER AND AIR POLLUTION**" is the bonafied work of **Gokula prasanth .S , kathirvel .M , Praveen .T , Thamarai selvan .S** Who carried out the project work under my supervision

21/6.

SIGNATURE

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

HAED OF THE DEPARTMENT

Department of Mechanical Engineering

JKK Munirajah College of Technology

T.N.Palayam.

22/6/22

SIGNATURE

Mr.S. KARTHIKEYAN., M.E.,

SUPERVISOR,AP/MECH

Department of Mechanical Engineering

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T.N.Palayam.

Submitted for the project Viva-Voce examination held on 22-06-2022

INTERNAL EXAMINER

EXTERNAL EXAMINER

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ABSTRACT

This project is an attempt to reduce the toxic content of diesel exhaust, before it is emitted to the atmosphere. This system can be safely used for diesel power packs which could be used in inflammable atmospheres, such as refineries, chemicals processing industries, open cost mines and other confined areas, which demands the need for diesel power packs.

The aqua silencer is more effective in the reduction of emission gases from the engine exhaust gas using perforated tube. By using perforated tube the back Pressure. Will remain constant and the sound level is reduced.

Using the perforated tube the fuel consumption remains same as conventional system. By using water as a medium the sound can be lowered and also by using activated charcoal in water. We can control the exhaust emission to a greater level.

The water contamination is found to be negligible in aqua silencer, because the amount of acidity level in aqua silencer is expected to be below the dangerous acidity. It is smokeless and pollution free emission and also very cheap. The aqua silencer's performance is almost equivalent to the conventional silencer.

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CHAPTER 7

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.

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

OBJECTIVES

- To familiarize the various steps involved in the Design Process
- To understand the principles involved in evaluating the shape and dimensions of a component to satisfy functional and strength requirements.
- To learn to use standard practices and standard data
- To learn to use catalogues and standard machine components
- (Use of P S G Design Data Book is permitted)

UNIT I STEADY STRESSES AND VARIABLE STRESSES IN MACHINE MEMBERS 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 variable loading.

UNIT II SHAFTS AND COUPLINGS 9

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

UNIT III TEMPORARY AND PERMANENT JOINTS 9

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

UNIT IV ENERGY STORING ELEMENTS AND ENGINE COMPONENTS 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.

UNIT V BEARINGS 9

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

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 and couplings.

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 to bearings.

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 Ansel
2. Ugural, "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.,

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ME8501 **METROLOGY AND MEASUREMENTS**

L	T	P	C
3	0	0	3

OBJECTIVES:

- To provide knowledge on various Metrological equipments available to measure the dimension of the components.
- To provide knowledge on the correct procedure to be adopted to measure the dimension of the components.

UNIT I BASICS OF METROLOGY **9**

Introduction to Metrology – Need – Elements – Work piece, Instruments – Persons – Environment – their effect on Precision and Accuracy – Errors – Errors in Measurements – Types – Control – Types of standards.

UNIT II LINEAR AND ANGULAR MEASUREMENTS **9**

Linear Measuring Instruments – Evolution – Types – Classification – Limit gauges – gauge design – terminology – procedure – concepts of interchange ability and selective assembly – Angular measuring instruments – Types – Bevel protractor clinometers angle gauges, spirit levels sine bar – Angle alignment telescope – Autocollimator – Applications.

UNIT III ADVANCES IN METROLOGY **9**

Basic concept of lasers Advantages of lasers – laser Interferometers – types – DC and AC Lasers interferometer – Applications – Straightness – Alignment. Basic concept of CMM – Types of CMM – Constructional features – Probes – Accessories – Software – Applications – Basic concepts of Machine Vision System – Element – Applications.

UNIT IV FORM MEASUREMENT **9**

Principles and Methods of straightness – Flatness measurement – Thread measurement, gear measurement, surface finish measurement, Roundness measurement – Applications.

UNIT V MEASUREMENT OF POWER, FLOW AND TEMPERATURE **9**

Force, torque, power - mechanical , Pneumatic, Hydraulic and Electrical type. Flow measurement: Venturimeter, Orifice meter, rotameter, pitot tube – Temperature: bimetallic strip, thermocouples, electrical resistance thermometer – Reliability and Calibration – Readability and Reliability.

TOTAL : 45 PERIODS

OUTCOMES:

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

CO1 Describe the concepts of measurements to apply in various metrological instruments
CO2 Outline the principles of linear and angular measurement tools used for industrial applications
CO3 Explain the procedure for conducting computer aided inspection
CO4 Demonstrate the techniques of form measurement used for industrial components
CO5 Discuss various measuring techniques of mechanical properties in industrial applications

TEXT BOOKS:

1. Gupta. I.C., "Engineering Metrology", Dhanpatrai Publications, 2005.
2. Jain R.K. "Engineering Metrology", Khanna Publishers, 2009.

REFERENCES:

1. Alan S. Morris, "The essence of Measurement", Prentice Hall of India 1996.
2. Beckwith, Marangoni, Lienhard, "Mechanical Measurements", Pearson Education , 2014.
3. Charles Reginald Shotbolt, "Metrology for Engineers", 5th edition, Cengage Learning EMEA,1990.
4. Donald Peckman, "Industrial Instrumentation", Wiley Eastern, 2004.
5. Raghavendra ,Krishnamurthy "Engineering Metrology & Measurements", Oxford Univ. Press, 2013.

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ME8594 **DYNAMICS OF MACHINES**

L	T	P	C
4	0	0	4

OBJECTIVES:

- To understand the force-motion relationship in components subjected to external forces and analysis of standard mechanisms.
- To understand the undesirable effects of unbalances resulting from prescribed motions in mechanism.
- To understand the effect of Dynamics of undesirable vibrations.
- To understand the principles in mechanisms used for speed control and stability control.

UNIT I FORCE ANALYSIS **12**

Dynamic force analysis – Inertia force and Inertia torque– D Alembert's principle –Dynamic Analysis in reciprocating engines – Gas forces – Inertia effect of connecting rod– Bearing loads – Crank shaft torque – Turning moment diagrams –Fly Wheels – Flywheels of punching presses- Dynamics of Cam- follower mechanism.

UNIT II BALANCING **12**

Static and dynamic balancing – Balancing of rotating masses – Balancing a single cylinder engine – Balancing of Multi-cylinder inline, V-engines – Partial balancing in engines – Balancing of linkages – Balancing machines-Field balancing of discs and rotors.

UNIT III FREE VIBRATION **12**

Basic features of vibratory systems – Degrees of freedom – single degree of freedom – Free vibration– Equations of motion – Natural frequency – Types of Damping – Damped vibration– Torsional vibration of shaft – Critical speeds of shafts – Torsional vibration – Two and three rotor torsional systems.

UNIT IV FORCED VIBRATION **12**

Response of one degree freedom systems to periodic forcing – Harmonic disturbances – Disturbance caused by unbalance – Support motion –transmissibility – Vibration isolation vibration measurement.

UNIT V MECHANISM FOR CONTROL **12**

Governors – Types – Centrifugal governors – Gravity controlled and spring controlled centrifugal governors – Characteristics – Effect of friction – Controlling force curves. Gyroscopes –Gyroscopic forces and torques – Gyroscopic stabilization – Gyroscopic effects in Automobiles, ships and airplanes.

TOTAL : 60 PERIODS

OUTCOMES:

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

CO1 Calculate static and dynamic forces of mechanisms.

CO2 Calculate the balancing masses and their locations of reciprocating and rotating masses. CO3 Compute the frequency of free vibration.

CO4 Compute the frequency of forced vibration and damping coefficient.

CO5 Calculate the speed and lift of the governor and estimate the gyroscopic effect on automobiles, ships and airplanes.

TEXT BOOKS:

1. F. B. Sayyad, "Dynamics of Machinery", McMillan Publishers India 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", 4th Edition, Oxford University Press, 2014.

REFERENCES:

1. Cleghorn. W. L, "Mechanisms of Machines", Oxford University Press, 2014
2. Ghosh. A and Mallick, A.K., "Theory of Mechanisms and Machines", 3rd Edition Affiliated East-West Pvt. Ltd., New Delhi, 2006.
3. Khurmi, R.S.,"Theory of Machines", 1st Edition, S Chand Publications, 2005.
4. Rao.J.S. and Dukkipati.R.V. "Mechanisms and Machine Theory", Wiley-Eastern Ltd., New Delhi, 1992.
5. Robert L. Norton, "Kinematics and Dynamics of Machinery", Tata McGraw-Hill, 2009.

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DESIGN AND FABRICATION OF A QUADCOPTER FOR WEATHER MONITORING

A PROJECT REPORT

Submitted by

ANILPRADEEPKUMAR R	(731213114002)
KARAN A	(731213114012)
MATHAVAN J	(731218114015)
PARTHIPAN V	(731218114018)

In partial fulfillment for the award of the degree

Of

BACHELOR OF ENGINEERING

IN

MECHANICAL ENGINEERING

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JUNE 2022

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ANNA UNIVERSITY: CHENNAI 600025

BONAFIDE CERTIFICATE

Certified that this project report "DESIGN AND FABRICATION OF A QUADCOPTER FOR WEATHER MONITORING" Is the bonafide work of "ANILPRADEEPKUMAR R, KARAN A, MATHAVAN J, PARTHIPAN V" who carried out the project work under my supervision.

21/6/2022
SIGNATURE

Mr. K. SRIRAM M.E.,(PhD)

HEAD OF THE DEPARMENT

Assistant professor

Department of Mechanical Engineering

J.K.K. Munirajah College of Technology

T.N. Palayam – 638506

21/6/2022
SIGNATURE

Mr. E. DEEPARAJ M.E.,

SUPERVISOR

Assistant professor

Department of Mechanical Engineering

J.K.K. Munirajah collegeof Technology

T.N. Palayam – 638506

Submitted for the project Viva – Voice Examination held on 22.06.22

22/6/2022
INTERNAL EXAMINER

22/6/22
EXTERNAL EXAMINER

PRINCIPAL
JKK MUNIRAJAH COLLEGE
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ABSTRACT

Mostly, the conditions within an ecosystem as well as weather of a field affect crop productivity greatly. Different weather conditions produce different effects and different impact on the quality of the crop field or the ecosystem. Weather elements form a chain reaction, as the atmosphere is not the only one being affected. Atmospheric air temperature, vapor pressure and relative humidity or moisture content can act together and form diverse effects on crops. These diverse effects turn to reduce radiation which is necessary for plants, or increase rainfall patterns. Monitoring the climate and the weather conditions are important not only as an environmental baseline, but to maintain quality working conditions, marine studies and recreational safety. The parameters of climate are measurable, Means and extreme datasets, maximum and minimum weather trends with deviations of lengthy time series would be calculated for each of these climate parameters which were considered in this study. These results are a simple form of climate indices, as they already describe changes in climate. All the readings and datasets are recorded on a cloud platform, as well as, in an installed microchip on the drone. Data synchronization is done with MAT-LAB and Arduino Programming Rule.

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CHAPTER 7

RESULT AND DISCUSSION

In weather monitoring, we using a sensor to detect weather temperature and humidity by a drone. We were able to construct a system that collects data range ability 0°C to 50°C and humidity range 20% to 50% deal with DHT11 sensor. By Realizing this system,

"Weather monitoring using a quadcopter" which attempt to monitor the weather at the city and also important for farmer. This project achieved the objectives where to build weather monitoring system that can check the weather conditions using application, Blynk. Next, the project also able to display the current weather conditions on weather monitoring system. The implementation of a system to monitor the weather using Internet of Things (IoT) is accomplished.

The system provides a low power solution for monitoring weather and environment. The monitoring system has been tested in outdoor environment and successfully updated data from sensor. The data will be used for various type of analysis and it can be shared to other people or users.

The weather monitoring has the potential to be implemented for monitoring the developing cities and industrial zones especially for pollution monitoring. In order to protect the public health from pollution, the system also able to provide an efficient and low cost solution for the authority. It also suitable for continuous monitoring of environment in the future.

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INTERNSHIP

Gmail

Internship
1message

TUE 29 MAR 2022 at 10.00 AM

From: SRIRAMKS<hodmech@jkkmct.edu.in>
Date: TUE 29 MAR 2022 at 10.00 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 :**(GOKUL PRASANTH.S, KATHIRVEL.M, PRAVEEN.T, HAMARAI SELVAN.S, ANILPRADEEPKUMAR.R, KARAN.A, MATHAVAN.J, PARTHIPAN.V)**

Sincerely,

Final Year Mech Students,
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

SAT 02 APR 2022 at 12.15 PM

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

Date: SAT 02 APR 2022 at 12.15 PM

Subject: Internship -reg

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

Dear Sir,

I am writing to confirm my acceptance of your internship offer of 06.04.2022 to 23.05.2022 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 :**(GOKUL PRASANTH.S, KATHIRVEL.M, PRAVEEN.T, HAMARAI SELVAN.S, ANILPRADEEPKUMAR.R, KARAN.A, MATHAVAN.J, PARTHIPAN.V)**

Sincerely,

HR Manager,
Periyasamy Hydraulic Equipment's,
Tirupur.

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

PHE

PERIYASAMY HYDRAULIC EQUIPMENTS

Makers of Green India

INTERNSHIP CERTIFICATE

This is to certify that Mr.ANILPRADEEPKUMAR.R, Final year student B.E.Mechanical Engineering at J.K.K.Munirajah College of Technology, T.N.palayam, Gobi (TK), Erode District -638 506 had a undergone the internship program at "Periyasamy Hydraulic Equipments" during 06.04.2022 to 23.05.2022.

We wish him all the best in his future endeavor.

Tirupur
23.05.2022

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Periyasamy Hydraulic Equipments (PHE)
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Tiruppur-638 103.
AUTHORIZED SIGN

PHE
PERIYASAMY HYDRAULIC EQUIPMENTS

Makers of Green India

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This is to certify that Mr.GOKUL PRASANTH.S, Final year student B.E. Mechanical Engineering at J.K.K. Munirajah College of Technology, T.N.palayam, Gobi (TK), Erode District -638 506 had a undergone the internship program at "Periyasamy Hydraulic Equipments" during 06.04.2022 to 23.05.2022 .

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Tirupur
23.05.2022

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This is to certify that Mr.KARAN.A, Final year student B.E. Mechanical Engineering at J.K.K. Munirajah College of Technology, T.N.palayam, Gobi(TK), Erode District-638 506 had a undergone the internship program at "Periyasamy Hydraulic Equipments during 06.04.2022 to 23.05.2022

We wish him all the best in his future endeavor.

Tirupur
23.05.2022

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INTERNSHIP CERTIFICATE

This is to certify that Mr.KATHIRVEL.M, Final year student B.E. Mechanical Engineering at J.K.K. Munirajah College of Technology, T.N.palayam, Gobi(TK), Erode District-638 506 had a undergone the internship program at "Periyasamy Hydraulic Equipments during 06.04.2022 to 23.05.2022.

We wish him all the best in his future endeavor.

Tirupur

23.05.2022

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INTERNSHIP CERTIFICATE

This is to certify that Mr.MATHAVAN.J, Final year student B.E. Mechanical Engineering at J.K.K. Munirajah College of Technology, T.N.palayam, Gobi(TK), Erode District-638 506 had a undergone the internship program at "Periyasamy Hydraulic Equipments during 06.04.2022 to 23.05.2022.

We wish him all the best in his future endeavor.

Tirupur

23.05.2022

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INTERNSHIP CERTIFICATE

This is to certify that Mr.PARTHIPAN.V, Final year student B.E. Mechanical Engineering at J.K.K. Munirajah College of Technology, T.N.palayam, Gobi(TK), Erode District-638 506 had a undergone the internship program at "Periyasamy Hydraulic Equipments during 06.04.2022 to 23.05.2022

We wish him all the best in his future endeavor.

Tirupur
23.05.2022

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This is to certify that Mr.PRAVEEN.T, Final year student B.E. Mechanical Engineering at J.K.K. Munirajah College of Technology, T.N.palayam, Gobi(TK), Erode District-638 506 had a undergone the internship program at "Periyasamy Hydraulic Equipments during 06.04.2022 to 23.05.2022

We wish him all the best in his future endeavor.

Tirupur
23.05.2022

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This is to certify that Mr.THAMARAISELVAN.S, Final year student B.E. Mechanical Engineering at J.K.K. Munirajah College of Technology, T.N.palayam, Gobi (TK), Erode District -638 506 had a undergone the internship program at "Periyasamy Hydraulic Equipments" during 06.04.2022 to 23.05.2022 .

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