

ACADEMIC YEAR (2023-2024)



J.K.K.MUNIRAJAH COLLEGE OF TECHNOLOGY (AUTONOMOUS)
T.N.Palayam (Po), Gobi (Tk)- 638506, Erode (dt).

Metric No 1.3.2

S.No	Name of the course	Course Code	Programme offering			Number of Students
				Project Work	Internship	
(2023-2024) Regulation-2017						
1	Project Work	ME8811	MECHANICAL ENGINEERING	✓		15
2	Engineering Thermodynamics	ME8391	MECHANICAL ENGINEERING	✓		6
3	Fluid Mechanics and Machinery	CE8394	MECHANICAL ENGINEERING	✓		7
4	Manufacturing Technology - I	ME8351	MECHANICAL ENGINEERING	✓		6
5	Kinematics of Machinery	ME8492	MECHANICAL ENGINEERING	✓		5
6	Manufacturing Technology – II	ME8451	MECHANICAL ENGINEERING	✓		8
7	Engineering Metallurgy	ME8491	MECHANICAL ENGINEERING	✓		6
8	Strength of Materials for Mechanical Engineers	CE8395	MECHANICAL ENGINEERING	✓		5
9	Thermal Engineering- I	ME8493	MECHANICAL ENGINEERING	✓		5
10	Design of Machine Elements	ME8593	MECHANICAL ENGINEERING	✓		9
11	Design of Transmission Systems	ME8651	MECHANICAL ENGINEERING	✓		10
12	Computer Aided Design and Manufacturing	ME8691	MECHANICAL ENGINEERING	✓		8
(2023-2024) Regulation-2021						
13	Hydraulics and Pneumatics	ME3492	MECHANICAL ENGINEERING		✓	10
14	Metrology and Measurements	ME3592	MECHANICAL ENGINEERING		✓	10

[Signature]
Principal

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DEPARTMENT OF MECHANICAL ENGINEERING

2023-2024

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


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DEPARTMENT OF MECHANICAL ENGINEERING

2023-2024

S.NO	REG.NO	STUDENT NAME	PROJECT	INTERNSHIP
1	731220114001	JAGANKUMAR S	✓	✓
2	731220114002	KODEESWARAN S	✓	✓
3	731220114003	KUMARAVEL M	✓	✓
4	731220114004	MAHENDRAN D	✓	✓
5	731220114005	MANIKANDAN S	✓	✓
6	731220114006	PARTHIPAN M	✓	✓
7	731220114007	RAMESH B	✓	✓
8	731220114008	RAVINDRAN L	✓	✓
9	731220114010	SENTHILKUMAR G	✓	✓
10	731220114011	THIRUMURUGAN M	✓	✓
11	731220114012	THIRUNAVUKKARASU S	✓	✓
12	731220114013	VELLINGIRI A	✓	✓
13	731220114301	GOWRISANKAR M	✓	✓
14	731220114302	KAVIN A	✓	✓
15	731220114501	PALANIKUMAR M	✓	✓
16	731221114004	MATHANKUMAR M		✓
17	731221114005	PRABAKARAN S		✓
18	731221114008	SATHEESH C		✓
19	731221114009	VAIRAMUTHU S		✓
20	731221114010	VIGNESH S		✓
21	731222114001	ARUN S		✓


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22	731222114002	GOWTHAM V		✓
23	731222114003	JEEVA P		✓
24	731222114005	NAVEENKUMAR N		✓
25	731222114006	PARTHASARATHI R		✓
26	731222114007	RAGUPATHI R		✓
27	731222114008	RAJESHKUMAR K		✓
28	731222114010	SANTHOSH M		✓
29	731222114012	SIVAKUMAR M		✓
30	731222114013	SURIYAKUMAR S		✓
31	731222114014	YOGAPRAKASH M		✓
32	731222114303	DURAI ANBARASU S		✓
33	731222114304	POOVARASU M		✓
34	731222114305	RAGU B		✓

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PROJECT WORK

ME8811

PROJECT WORK

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2	0	1	0

OBJECTIVE:

- To develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same. To train the students in preparing project reports and to face reviews and viva 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: 30 PERIODS

OUTCOME:

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


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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 system under steady, Apply second law of thermodynamics to open and closed systems and calculate entropy, Apply Rankin 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 moist air and its use in psychrometric processes

TEXT BOOKS :

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

REFERENCES:

- Arora C.P, "Thermodynamics", Tata McGraw-Hill, New Delhi, 2003.
- Borgnakke & Sonntag, "Fundamental of Thermodynamics", 8th Edition, 2016.



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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 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


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PERFORMANCE ANALYSIS OF PROTON EXCHANGE MEMBRANE FUEL CELL

PROJECT REPORT

Submitted by

JEGANKUMAR.S

(731220114001)

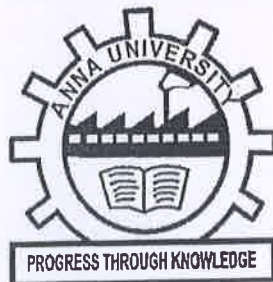
MANIKANDAN.S

(731220114005)

SENTHIL KUMAR.G

(731220114010)

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



J.K.K.MUNIRAJAH COLLEGE OF TECHNOLOGY

T.N.PALAYAM-638506

ANNA UNIVERSITY::CHENNAI 600025

MAY 2024



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Erode (Dt) - 638 506.

BONAFIDE CERTIFICATE

Certified that this project report "**PERFORMANCE ANALYSIS OF PROTON EXCHANGE MEMBRANE FUEL CELL**" is the benefic work of **JAGANKUMAR.G** (Reg.No.731220114001), **MANIKANDAN.S** (Reg.No. 731220114005) and **SENTHIL KUMAR.G** (Reg.No. 731220114010) who carried out the project work under my supervision.



SIGNATURE

Mr.K.SRIRAM, M.E., (Ph.D),
HEAD OF THE DEPARTMENT

Assistant Professor

Dept of Mechanical Engineering

JKK Munirajah College of Technology

T.N.Palayam.



SIGNATURE

Mr.E.DEEPARAJ, M.E., (Ph.D),
SUPERVISOR

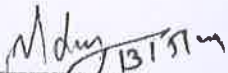
Assistant Professor

Dept of Mechanical Engineering

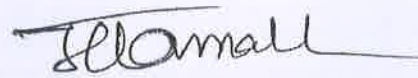
JKK Munirajah College of Technology

T.N.Palayam.

Submitted for the Project Viva-Voce Examination held on 13/05/2024



INTERNAL EXAMINER



EXTERNAL EXAMINER

ABSTRACT

The fuel cell technologies that received high interest for commercialization are polymer electrolyte membrane fuel cells (PEMFCs), and direct methanol fuel cells (DMFCs). The optimum efficiency for the fuel cell is not bound by the principle of Carnot cycle compared to other traditional power machines that are generally based on thermal cycles such as gas turbines, steam turbines and internal combustion engines. Proton-Exchange Membrane Fuel Cell (PEMFC) is an electrochemical device that produces electrical power through a chemical reaction between a fuel and oxygen. PEMFC performance decays dramatically when the electrode structure is damaged owing to carbon corrosion. The Proton Exchange Membrane fuel cell performance is affected with several parameters like design factors, operating factors and materials. In this project work, the PEM fuel cell having new serpentine flow channel design is fabricated and analyzed in different operating temperatures and different operating pressures to study its effects on the power output. From the experimental analysis, the best operating conditions of the PEM fuel cell was found.

Keywords: PEMFC, fuel cell, temperature, power, operating conditions.



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CHAPTER - VIII

CONCLUSION

6.1 Conclusion

The effect of temperature and pressure on the performance of PEM fuel cell with active area of 25 cm^2 and serpentine type flow field was analyzed experimentally. By analysis, the PEM fuel cell by varying operating temperatures 318 K, 323 K & 328 K with a constant pressure of 1 bar have been considered. From analysis result, it is found that 323 K at the 1 bar giving the best performance of cell potential at 0.75V. The effect of pressure on the performance of PEM fuel cell with active area of 25 cm^2 and serpentine type flow field was analyzed experimentally. The PEM fuel cell by varying operating pressure 0.5 bar, 1 bar, 1.5 bar & 2 bar with a constant temperature of 323 K have been considered. From analysis result, it is found that 2 bar at 323 K giving the best performance of cell potential at 0.75V.



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TOTAL: 30 PERIODS**OUTCOME:**

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

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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 - CO2 process – Stir casting; Defects in Sandcasting

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 METALFORMING 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 – Microforming.

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:

- Hajra Chouldhary S.K and Hajra Choudhury. AK., "Elements of workshop Technology", volume I and II, Media promoters and Publishers Private Limited, Mumbai,2008
- Kalpakistan. S, "Manufacturing Engineering and Technology", Pearson Education India Edition, 2013

REFERENCES:

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

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(Autonomous)
T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.

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 – multispindle.

UNIT III SHAPER, MILLING AND GEARCUTTINGMACHINES

9

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

UNIT IV ABRASIVE PROCESSAND BROACHING

9

Abrasive processes: grinding wheel – specifications and selection, types of grinding process– cylindrical grinding, surface grinding, centreless grinding and internal grinding- Typical applications
– concepts of surface integrity, broaching machines: broach construction – push, pull, surface and continuous 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. HajraChoudhury, "Elements of Workshop Technology", Vol.II., Media Promoters2014
2. Rao. P.N "Manufacturing Technology - Metal Cutting and Machine Tools", 3rd Edition, Tata McGraw-Hill, New Delhi,2013.

REFERENCES:

1. Richerd R Kibbe, John E. Neely, Roland O. Merges and Warren J.White "Machine Tool Practices", Prentice Hall of India,1998
2. GeoffreyBoothroyd, "Fundamentals of Metal Machining and Machine Tools", McGraw Hill, 1984
3. HMT, "Production Technology", Tata McGraw Hill,1998.



Principal

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T.N.Palayam, Gobi (Tk),

Erode (Dt) - 638 506

**FABRICATION OF 360 DEGREE FIRE
PROTECTION SYSTEM**

PROJECT REPORT

Submitted by

PARTHIPAN.M

(731220114006)

RAMESH.B

(731220114007)

GOWRISANKAR.M

(731220114301)

In partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

IN

MECHANICAL ENGINEERING



J.K.K.MUNIRAJAH COLLEGE OF TECHNOLOGY

T.N.PALAYAM-638506

ANNA UNIVERSITY::CHENNAI-600025

MAY 2024



Principal

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T.N.Palayam, Gobi (Tk),

Erode (Dt) - 638 506.

ANNA UNIVERSITY: CHENNAI-600025

BONAFIDE CERTIFICATE

Certified that this Report titled **"FABRICATION OF 360 DEGREE FIRE PROTECTION SYSTEM"** is the bonafide work of **PARTHIPAN.M (731220114006), RAMESH.B (731220114007) & GOWRISANKAR.M (731220114301)** who carried out the work under my supervision.


SIGNATURE

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

HEAD OF THE DEPARTMENT

Assistant Professor

Dept of Mechanical Engineering

JKK Munirajah College of Technology

T.N.Palayam.


SIGNATURE

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

SUPERVISOR

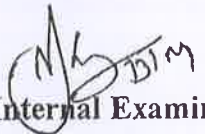
Assistant Professor


Dept of Mechanical Engineering


JKK Munirajah College of Technology

T.N.Palayam.

Submitted for the Viva-Voce examination held on 13/05/2024 (C.F.N.)


Internal Examiner


External Examiner


Principal
J.K.K.Munirajah College of Technology
(Autonomous)
T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.

ABSTRACT

Large factories, warehouses, and industrial production facilities always run the risk of fires breaking out. Lack of appropriate fire fighting measures could result in disastrous consequences and along with financial losses and might even lead to massive loss of human life. Usual fire protection systems installed in buildings have the disadvantages like they spray small amounts of water from each sprinkler which may not be enough to put out the fire. The sprinklers are not targeted and spray an entire floor or building ruining computers, furniture and paperwork. While this sprayer gun can spray water in desired quantity only at fire outbreak point to stop fire without ruining complete office furniture and electronics. This demo version is made to be remote controlled from few meters but future version will operate remotely from fire dept. Fire monitors and sprayers are an aim able and controllable high-capacity water jet used to deal with large fires.

Key Words: Motor, Sprayer, Nozzle, Fire extinguishers, Remote Controller

CHAPTER-VIII

RESULT AND CONCLUSION

8.1 CONCLUSION

Fire has always been a devastating phenomenon but the technology advancements it become easier to tackle it. Firefighters try their best to respond quickly to case of fire and event put their lives at risk of they endeavour to save human life and protect property from the fires. Some attempts have been made to automatic fire fighting for the navy (ship board autonomous firefighting robot). This paper describes one such solution to the problem of fire fighting with help of 360degree fire protection system.

In conclusion there are many possible ways to put out fires but it always safer to use the constantly this idea to reduce the involvement of fire fighters thereby decreasing the risk of physical injuries and life threats. Comparing this prototype with the existing technology we implement the sensor and wireless technology. Nowadays the firefighting technologies are fully manual in scope of future we implement wireless technology to control the fires.

This project will reduce the cost involved in the concern. Project has been designed to perform the entire requirement task at the shortest time available.



Principal

J.K.K.Munirajah College of Technology
(Autonomous)
T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.

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: 30 PERIODS**OUTCOME:**

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

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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 fasteners - 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
2. Ansel 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.


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 Erode (Dt) - 638 506.

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 stabilizer's– stainless and tool steels – HSLA, Maraging steels–Cast-iron-Grey, white, malleable, spheroidal–alloy cast irons, Copper and copper alloys Brass, Bronze and Cupronickel – Aluminum 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 nonmetallic materials.
- CO5 Explain the testing of mechanical properties.

TEXT BOOKS:

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

REFERENCES:

- Kenneth G. Budinski and Michael K. Budinski, "Engineering Materials", Prentice Hall of India Private Limited, 2010.
- Raghavan. V, "Materials Science and Engineering", Prentice Hall of India Pvt. Ltd., 2015.
- U.C. Jindal : Material Science and Metallurgy, "Engineering Materials and Metallurgy", First Edition, Dorling Kindersley, 2012


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J.K.K. Munirajah College of Technology
(Autonomous)
T.N. Palayam, Gobi (Tk),
Erode (Dt) - 638 506.

DESIGN AND DEVELOPMENT OF HYBRID ROBOTIC

SYSTEM FOR COLLECTING OCEAN WASTE

PROJECT REPORT

Submitted by

KUMARAVEL.M (731220114003)

THIRUNAVUKKARASU.S (731220114012)

PALANIKUMAR.M (731220114501)

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



J. K. K. MUNIRAJAH COLLEGE OF TECHNOLOGY

T.N.PALAYAM - 638506

ANNA UNIVERSITY::CHENNAI 600025

MAY 2024


Principal
J.K.K.Munirajah College of Technology
(Autonomous)
T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.

BONAFIDE CERTIFICATE

Certified that this project report “**DESIGN AND DEVELOPMENT OF ROBOTIC SYSTEM FOR COLLECTING OCEAN WASTE**” is the benefic work of **KUMARAVEL M (Reg.no.731220114003), THIRUNAVUKKARASU S (Reg.no.731220114012)** and **PALANIKUMAR M (Reg.no.731220114501)** who carried out the project work under my supervision.

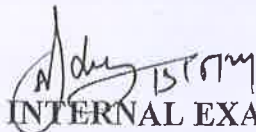

SIGNATURE

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



SIGNATURE

Dr. N. SANKAR M.E., Ph.D.,
SUPERVISOR
Assistant Professor
Dept of Mechanical Engineering
JKK Munirajah College of Technology
T.N.Palayam

Submitted for the Project Viva-Voce Examination held on 13.05.2024


INTERNAL EXAMINER


EXTERNAL EXAMINER


Principal
J.K.K.Munirajah College of Techn
(Autonomous)
T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506

ABSTRACT

The objective of this paper is to study, analyse and investigate the main contributor of plastic and oil waste pollution which has become the world major infamous problem nowadays, and to explain our platform design which aim to help in reducing the issue of floating trash and oil. Annually, more than 2 million tonnes of plastics have been tossed to water body and eventually washed away to the sea. Not just living marine organisms become targets and carrier of harmful viruses but some of marine animals suffer a direct mortality after plastic ingestion. Numerous negative impacts of plastic and oil waste pollution to the environment and the society had been identified. This project work primarily focuses on the design and development of an advanced robot specifically engineered to tackle plastic and oil pollution in oceans. The primary goal is to design a highly functional robotic model proficient in efficiently retrieving plastic and oil waste from marine environments. This innovative work encompasses the development and deployment of a specialized robotic system capable of navigating oceanic conditions adeptly, ensuring effective collection of plastic and oil waste. With a focus on combating the critical issue of marine pollution, the model provides a technological remedy to the menace of plastic waste, a major threat to marine ecosystems. The robot is built with special features to help it move in water, find and recognize plastic and oil waste, and safely gather and store the waste.

Keywords: Water pollution, Ecosystem, Cleaning machine, Oil and Plastic Collecting

CHAPTER- IX

CONCLUSION

The culmination of this research journey marks a pivotal moment in our collective efforts to combat the ever-growing threat of plastic and oil pollution in our oceans. Through the design and development of an affordable waste-collecting robot prototype, this paper has presented a tangible solution to this pressing environmental crisis. The robot's emphasis on functionality and cost-effectiveness offers a promising avenue for mitigating marine debris and safeguarding the health of our planet's delicate ecosystems.

The successful demonstration of the prototype's capabilities underscores the feasibility of employing robots for marine waste collection. Key features such as efficient navigation, remote control functionality, and a conveyor belt system for waste collection showcase a practical approach to addressing surface waste accumulation. Moreover, the robot's affordability, achieved through the utilization of readily available components and low power consumption, positions it as a scalable solution for various applications.

However, it is imperative to acknowledge the limitations of the current prototype, including its modest waste collection capacity and cleaning area. Addressing these constraints requires further development efforts aimed at enhancing the robot's capabilities to handle larger volumes of debris. Additionally, there is a pressing need to expand research into robots capable of operating at different depths to tackle sunken debris effectively. Future advancements in this field should prioritize increasing the robot's capacity and operational range through the integration of stronger motors, larger collection bins, and possibly solar panels for extended operation time. Furthermore, research into sensor technology for waste identification and differentiation between plastic and oil would enable more targeted collection efforts. The development of autonomous navigation capabilities using GPS or LiDAR technology would further enhance the robots' efficiency by enabling them to operate independently and cover larger areas without human intervention. The successful implementation of these advancements holds the potential to usher in a fleet of autonomous robots capable of significantly reducing marine debris. This could entail establishing designated waste collection zones or integrating the robots into existing waste management processes in collaboration with established companies.

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: 30 PERIODS**OUTCOME:**

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

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(Autonomous)
T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.**

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.

nod

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.

iron

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 hollow 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 – Lamé'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. Beer, Russell Johnson, J.R. and John J. Dewole "Mechanics of Materials", Tata McGraw Hill Publishing 'co. Ltd., New Delhi, 2005.

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 PS 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.
 CO4 Apply the concepts of design to gear boxes.
 CO5 Apply the concepts of design to cam clutch.

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.


 Principal
 J.K.K.Munirajah College of Technology
 (Autonomous)
 T.N.Palayam, Gobi (Tk),
 Erode (Dt) - 638 506.

**OPTIMIZATION OF COTTON SEED BIO DIESEL
AND TESTING ITS MECHANICAL PROPERTIES BY
USING VCR ENGINE**

PROJECT REPORT

Submitted by

RAVINDRAN.L

(731220114008)

VELLINGIRI.A

(731220114013)

KAVIN.A

(731220114302)

In partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

IN

MECHANICAL ENGINEERING



J. K. K. MUNIRAJAH COLLEGE OF TECHNOLOGY

T.N.PALAYAM - 638506

ANNA UNIVERSITY :: CHENNAI 600025

MAY 2024



Principal

**J.K.K.Munirajah College of Technology
(Autonomous)
T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.**

ANNA UNIVERSITY: CHENNAI-600 025

BONAFIDE CERTIFICATE

Certified that this Report titled **“OPTIMIZATION OF COTTON SEED BIO DIESEL AND TESTING ITS MECHANICAL PROPERTIES BY USING VCR ENGINE”** is the bonafide work of **RAVINDRAN L (Reg.No.731220114008)**, **VELLINGIRI A (Reg.No.731220114013)**, **KAVIN A (Reg.No.731220114302)**, who carried out the work under my supervision.


13/5/24
SIGNATURE

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

HEAD OF THE DEPARTMENT

Assistant Professor

Dept of Mechanical Engineering

JKK Munirajah College of Technology

T.N.Palayam.


13/5/24
SIGNATURE

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

SUPERVISOR

Assistant Professor

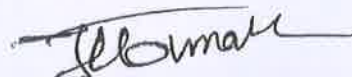
Dept of Mechanical Engineering


JKK Munirajah College of Technology

T.N.Palayam.

Submitted for the Viva-Voce examination held on 13-05-2024


Internal Examiner


External Examiner


Principal
J.K.K.Munirajah College of Technology
(Autonomous)
T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.

ABSTRACT

Biodiesel was produced through transesterification of refined cotton seed oil with methanol and potassium hydroxide (KOH) as a catalyst using batch mode. The physicochemical properties of cotton seed oil and biodiesel as an alternative fuel for diesel engine was characterized through ASTM standards for fuel tests. The functional groups of the biodiesel were investigated using Fourier transform infrared spectroscopy. Influence of key parameters like reaction temperature, reaction time, catalyst concentration and methanol/oil molar ratio were determined using batch mode. These process parameters were optimized using response surface methodology (RSM) and analysis of variance (ANOVA). The significance of the different process parameters and their combined effects on the transesterification efficiency were established through a full factorial central composite design. The results obtained are in good agreement with published data for other vegetable oil biodiesel as well as various international standards for biodiesel fuel. An optimum yield of 96% was achieved with optimal conditions of methanol/oil molar ratio, 6:1; temperature, 55 C; time, 60 min; and catalyst concentration, 0.6%. This investigation has shown that cotton seed oil from Nigeria can be used to produce biodiesel.

Keywords: Biodiesel, Cottonseed oil, Trans-esterification, Factorial design, biodiesel Cotton Seed (*Ceiba pentandra*), diesel engine, engine performance.



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J.K.K.Munirajah College of Technology
(Autonomous)
T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.

CHAPTER VIII

CONCLUSION

8.1. Conclusion

The current experimental research deals with the varying concentrations of antioxidant, pyrogallol and metal contaminant concentration which is aluminium powder and provides the insight to the optimization of the fuel properties (viscosity and flash point) of the biodiesel with the appropriate concentration of the same. Issues aroused due to the addition of antioxidants into the biodiesel were addressed as they increase the viscosity of the fluid resulting in degradation from the level of consumption on the contrary it prevents the fluid from getting oxidized. Cottonseed biodiesel contains very high level of unsaturation and is highly susceptible to oxidization over the given period of time. Most optimum results for the viscosity of cottonseed oil biodiesel were obtained with aluminium concentration as 35 ppm and pyrogallol concentration 90 ppm and 23 days. Viscosity's optimum value was found to be 5.34 centistokes at the end of 23 days with the concentrations of metal contaminants and antioxidant as stated above. Viscosity of biodiesel was highly reduced with the addition of antioxidant. Optimum results were obtained with help of design experiment software and the best result was chosen from the list of 100 solutions. Engine performance was found to be lower in biodiesel. It was due to the governing the poor spray character- Fig. 8 Illustrate the variation of CO₂ values as compared with the load applied Fig. 10 Illustrate the variation of CO values as compared with the load applied teristics and high viscosity of biodiesel. Addition of anti-oxidant certainly made the performance better by reducing the viscosity however addition of metal contaminants acted adversely giving results of lower performance than anti-oxidant mixed samples.

Brake thermal Efficiency was found best for diesel as the fuel consumption rate of the diesel was lowest. Biodiesel samples mixed with anti-oxidant showed brake thermal efficiency less than diesel however still comparable in low percentage blends as the addition of additives worked positively.

It was also found that the NO_x emission is relatively higher for the contaminated biodiesel as compared to biodiesel with only antioxidant. Use of antioxidant inhibited the formation of NO_x to a significant value. NO_x emission was certainly larger than diesel.

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: 30 PERIODS**OUTCOME:**

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



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(Autonomous)
T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.

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 and B-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 PROGRAMMING

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 Optiz 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 Publishing Co. 2007
2. Mikell P. Groover “Automation, Production Systems and Computer Integrated Manufacturing”, Prentice Hall of India, 2008.
3. Radhakrishnan P, Subramanyan S. and Raju 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, Van Dam, Feiner and Hughes - "Computer graphics principles & practice" Pearson Education - 2003


Principal
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T.N. Palayam, Gobi (Tk),
Erode (Dt) - 638 505.

**DRONE FOR WEATHER MONITORING, SURVILANCE
AND ANIMAL REPLENT**

PROJECT REPORT

Submitted by

KODEESWARAN.S

(731220114002)

MAHENDRAN.D

(731220114004)

THIRUMURUGAN.M

(731220114011)

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



J. K. K. MUNIRAJAH COLLEGE OF TECHNOLOGY

T.N.PALAYAM - 638506

ANNA UNIVERSITY:: CHENNAI 600025

MAY 2024



Principal

**J.K.K.Munirajah College of Technology
(Autonomous)
T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.**

ANNA UNIVERSITY: CHENNAI 600025

BONAFIDE CERTIFICATE

Certified that this project report "**DRONE FOR WEATHER MONITORING, SURRVLANCE AND ANIMAL REPLENT**" is the benefic work of **KODEESWARAN.S (Reg.no.731220114002), MAHENDRAN.D (Reg.no.731220114004) and THIRUMURUGAN.M (Reg.no.731220114011)** who carried out the project work under my supervision.


SIGNATURE

Mr. K SRIRAM M.E., (Ph.D.),
HEAD OF THE DEPARTMENT

Assistant Professor

Dept of Mechanical Engineering

JKK Munirajah College of Technology

T.N.Palayam.


SIGNATURE

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


Assistant Professor

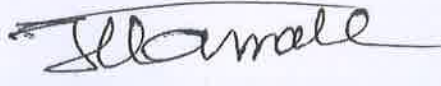
Dept of Mechanical Engineering


JKK Munirajah College of Technology

T.N.Palayam.

Submitted for the Project Viva-Voce Examination held on 13-05-2024 (FM)


INTERNAL EXAMINER



EXTERNAL EXAMINER


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ABSTRACT

This study delves into the conceptualization and realization of an integrated drone system engineered to perform dual functions of surveillance and weather monitoring. It intricately examines the aerodynamic construction of the drone, highlighting the pivotal equilibrium achieved between flight steadiness, payload endurance, and resilience against adverse weather conditions. Elaboration is provided on the meticulous selection of sensors tailored for surveillance, namely the camera, and those dedicated to weather monitoring, encompassing temperature and humidity sensors. Further scrutiny is directed towards elucidating the mechanisms employed for seamless real-time data transmission, imperative for continuous monitoring operations. The culmination of the project encompasses a thorough examination of the intricate challenges associated with amalgamating these multifaceted functionalities into a cohesive unit, culminating in insightful proposals for prospective developmental avenues. Beyond its technical capabilities, the project ventures into the innovative utilization of a smart audio system, leveraging sound to deter wildlife interference, thereby showcase a multifaceted approach to modern drone applications.

Keywords: Drone Platform Integration, Surveillance-Weather Hybrid, Sensor Synergy, Real-Time Monitoring and Smart Audio Defense.


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CHAPTER IX

9. CONCLUSION

In conclusion, this study represents a comprehensive exploration of the design, development, and application of an **integrated drone system** designed to fulfil the dual roles of surveillance and weather monitoring. Through meticulous examination, we have elucidated the intricate aerodynamic considerations essential for achieving optimal performance, balancing stability, endurance, and resilience in challenging environmental conditions. The selection and integration of specialized sensors tailored for surveillance and weather monitoring have been meticulously addressed, underscoring the importance of precise data collection in both domains.

Furthermore, the study has shed light on the critical aspect of real-time data transmission, highlighting its indispensable role in facilitating continuous monitoring operations. The challenges inherent in amalgamating these diverse functionalities into a unified platform have been thoroughly analysed, paving the way for insightful proposals aimed at further development and refinement of **integrated drone systems**.

Beyond its technical achievements, this project has demonstrated **innovative thinking** by incorporating a **smart audio system** to deter wildlife interference, showcasing the versatility and adaptability of drones in addressing multifaceted challenges. As we look to the future, the findings and recommendations put forth in this study serve as a springboard for continued exploration and innovation in the **realm of drone technology**, offering promising avenues for enhancing surveillance, weather monitoring, and beyond.



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INTERNSHIP

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.


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COURSE OBJECTIVES:

1. To provide the knowledge on the working principles of fluid power systems.
2. To study the fluids and components used in modern industrial fluid power system.
3. To develop the design, construction and operation of fluid power circuits.
4. To learn the working principles of pneumatic power system and its components.
5. To provide the knowledge of trouble shooting methods in fluid power systems.

UNIT I FLUID POWER PRINCIPLES AND HYDRAULIC PUMPS 9

Introduction to Fluid power – Advantages and Applications – Fluid power systems – Types of fluids - Properties of fluids and selection – Basics of Hydraulics – Pascal's Law – Principles of flow - Friction loss – Work, Power and Torque- Problems, Sources of Hydraulic power: Pumping Theory— Pump Classification – Construction, Working, Design, Advantages, Disadvantages, Performance, Selection criteria of pumps – Fixed and Variable displacement pumps – Problems

UNIT – II HYDRAULIC ACTUATORS AND CONTROL COMPONENTS 9

Hydraulic Actuators: Cylinders – Types and construction, Application, Hydraulic cushioning – Rotary Actuators-Hydraulic motors - Control Components: Direction Control, Flow control and pressure control valves – Types, Construction and Operation – Accessories: Reservoirs, Pressure Switches – Filters –types and selection- Applications – Fluid Power ANSI Symbols – Problems

UNIT – III HYDRAULIC CIRCUITS AND SYSTEMS 9

Accumulators, Intensifiers, Industrial hydraulic circuits – Regenerative, Pump Unloading, Double-Pump, Pressure Intensifier, Air-over oil, Sequence, Reciprocation, Synchronization, Fail-Safe, Speed Control, Deceleration circuits, Sizing of hydraulic systems, Hydrostatic transmission, Electro hydraulic circuits, –Servo and Proportional valves – Applications- Mechanical, hydraulic servo systems.

UNIT – IV PNEUMATIC AND ELECTRO PNEUMATIC SYSTEMS 9

Properties of air –Air preparation and distribution – Filters, Regulator, Lubricator, Muffler, Air control Valves, Quick Exhaust Valves, Pneumatic actuators, Design of Pneumatic circuit –classification- single cylinder and multi cylinder circuits-Cascade method –Integration of fringe circuits, Electro Pneumatic System – Elements – Ladder diagram – timer circuits-Problems, Introduction to fluidics and pneumatic logic circuits

UNIT – V TROUBLE SHOOTING AND APPLICATIONS 9

Installation, Selection, Maintenance, Trouble Shooting and Remedies in Hydraulic and Pneumatic systems, Conditioning of hydraulic fluids Design of hydraulic circuits for Drilling, Planning, Shaping, Surface grinding, Press and Forklift applications- mobile hydraulics; Design of Pneumatic circuits for metal working, handling, clamping counter and timer circuits. – Low-cost Automation – Hydraulic and Pneumatic power packs, IOT in Hydraulics and pneumatics

Note: (Use of standard Design Data Book is permitted in the University examination)

TOTAL: 45 PERIODS

OUTCOMES: At the end of the course the students would be able to

1. Apply the working principles of fluid power systems and hydraulic pumps.
2. Apply the working principles of hydraulic actuators and control components.
3. Design and develop hydraulic circuits and systems.
4. Apply the working principles of pneumatic circuits and power system and its components.
5. Identify various troubles shooting methods in fluid power systems.

TEXT BOOKS:

1. Anthony Esposito, "Fluid Power with Applications", Prentice Hall, 2009.
2. James A. Sullivan, "Fluid Power Theory and Applications", Fourth Edition, Prentice Hall, 1997

REFERENCES:

1. Jagadeesha. T., "Pneumatics Concepts, Design and Applications ", Universities Press, 2015.
2. Joshi.P., Pneumatic Control", Wiley India, 2008.
3. Majumdar, S.R., "Oil Hydraulics Systems – Principles and Maintenance", Tata McGraw Hill, 2001.

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COURSE OBJECTIVES

- 1 To learn basic concepts of the metrology and importance of measurements.
- 2 To teach measurement of linear and angular dimensions assembly and transmission elements.
- 3 To study the tolerance analysis in manufacturing.
- 4 To develop the fundamentals of GD & T and surface metrology.
- 5 To provide the knowledge of the advanced measurements for quality control in manufacturing industries.

UNIT – I BASICS OF METROLOGY

9

Measurement – Need, Process, Role in quality control; Factors affecting measurement - SWIPE; Errors in Measurements – Types – Control – Measurement uncertainty – Types, Estimation, Problems on Estimation of Uncertainty, Statistical analysis of measurement data, Measurement system analysis, Calibration of measuring instruments, Principle of air gauging- ISO standards.

UNIT – II MEASUREMENT OF LINEAR, ANGULAR DIMENSIONS, ASSEMBLY AND TRANSMISSION ELEMENTS

9

Linear Measuring Instruments – Vernier caliper, Micrometer, Vernier height gauge, Depth Micrometer, Bore gauge, Telescoping gauge; Gauge blocks – Use and precautions, Comparators – Working and advantages; Opto-mechanical measurements using measuring microscope and Profile projector - Angular measuring instruments – Bevel protractor, Clinometer, Angle gauges, Precision level, Sine bar, Autocollimator, Angle dekkor, Alignment telescope. Measurement of Screw threads - Single element measurements – Pitch Diameter, Lead, Pitch. Measurement of Gears – purpose – Analytical measurement – Runout, Pitch variation, Tooth profile, Tooth thickness, Lead – Functional checking – Rolling gear test.

UNIT – III TOLERANCE ANALYSIS

9

Tolerancing– Interchangeability, Selective assembly, Tolerance representation, Terminology, Limits and Fits, Problems (using tables IS919); Design of Limit gauges, Problems. Tolerance analysis in manufacturing, Process capability, tolerance stackup, tolerance charting.

UNIT – IV METROLOGY OF SURFACES

9

Fundamentals of GD & T- Conventional vs Geometric tolerance, Datums, Inspection of geometric deviations like straightness, flatness, roundness deviations; Simple problems – Measurement of Surface finish – Functionality of surfaces, Parameters, Comparative, Stylus based and Optical Measurement techniques, Filters, Introduction to 3D surface metrology- Parameters.

UNIT – V ADVANCES IN METROLOGY

9

Lasers in metrology - Advantages of lasers – Laser scan micrometers; Laser interferometers – Applications – Straightness, Alignment; Ball bar tests, Computer Aided Metrology - Basic concept of CMM – Types of CMM – Constructional features – Probes – Accessories – Software – Applications – Multi-sensor CMMs.

Machine Vision - Basic concepts of Machine Vision System – Elements – Applications - On-line and in-process monitoring in production - Computed tomography – White light Scanners.

TOTAL: 45 PERIODS

OUTCOMES: At the end of the course the students would be able to

1. Discuss the concepts of measurements to apply in various metrological instruments.
2. Apply the principle and applications of linear and angular measuring instruments, assembly and transmission elements.
3. Apply the tolerance symbols and tolerance analysis for industrial applications.
4. Apply the principles and methods of form and surface metrology.
5. Apply the advances in measurements for quality control in manufacturing Industries.

TEXT BOOKS:

1. Dotson Connie, "Dimensional Metrology", Cengage Learning, First edition, 2012.
2. Mark Curtis, Francis T. Farago, "Handbook of Dimensional Measurement", Industrial Press, Fifth edition, 2013.

REFERENCES:

1. AmmarGrous, J "Applied Metrology for Manufacturing Engineering", Wiley-ISTE, 2011.
2. Galyer, J.F.W. Charles Reginald Shotbolt, "Metrology for Engineers", Cengage Learning EMEA; 5th revised edition, 1990.
3. National Physical LaboratoryGuideNo. 40, No. 41, No. 42, No. 43, No. 80, No. 118, No. 130, No. 131. <http://www.npl.co.uk>.



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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 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 BASICSOFMECHANISMS

9

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

9

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

UNIT IV GEARS ANDGEARTRAINS

9

Law of toothed gearing – Involute 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 INMACHINEELEMENTS

9

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

TOTAL: 45 PERIODS**OUTCOMES:**

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

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

TEXTBOOKS:

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

REFERENCES:

1. Allen S. Hall Jr., "Kinematics and Linkage Design", Prentice Hall,1961
2. Cleghorn. W. L, "Mechanisms of Machines", Oxford University Press,2014
3. Ghosh. A and Mallick, A.K., "Theory of Mechanisms and Machines", 3rdEdition Affiliated East-West Pvt. Ltd., New Delhi,2006.


Principal

J.K.K.Munirajah College of Technology
(Autonomous)

T.N.Palayam, Gobi (Tk),

From

Gowrisankar. M

Kumaravel. M

Kavitha. A

Thirumangan. M

Thirunavukkarasu. S

T.N. Palayam

01.07.2023

Final year, B.E. Mechanical Engineering,

J.K.K. Munirajah College of Technology,

T.N. Palayam, Gobi

To
EMD
3/7/23

To

The principal sir,

J.K.K. Munirajah College of Technology,

T.N. Palayam, Gobi.

Respected sir,

Sub: Need Bonafide Certificate for Inplant Training purpose - req.

Sir we are studying final year Mechanical Engineering in our college. In our study purpose we need to go Inplant Training. As we are planning to go Tamilnadu Transport Corporation Coimbatore, Gobi depot for Inplant Training from (5.7.2023 to 15.7.2023). So we request you to give bonafide certificate for Inplant Training. As soon as possible.

Thanking you

Company address

State Transport Corporation,
Kasi Palayam, Chennimata Road,
Erode.

Training date: 5.7.2023 to 15.7.2023

Yours faithfully,

M. Gowrisankar
M. Kumaravel
S. Kavitha
A. Thirumangan
S. Thirunavukkarasu


Principal

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J.K.K.MUNIRAJAH COLLEGE OF TECHNOLOGY

(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)
Accredited by NAAC "A" Grade

ISO 9001:2015 Certified Institution

Smt.M.VASANTHAKUMARI
Chairman & Managng Trustee

Smt.M.KASTHURIPRIYA MBA.,
Secretary

Dr.K.SRIDHARAN Ph.D.,
Principal

JKKMCT/IPT/003/JUL-23

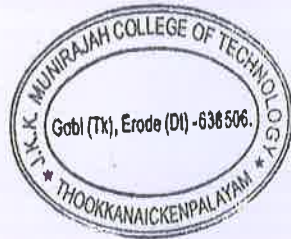
DATE: 03/07/2023

CERTIFICATE

This is to certify that the below mentioned students is studying UG – Final Year B.E Mechanical Engineering during the academic Year of 2023-24. They are willing to undergo the IN-PLANT TRAINING in your concern, 05-07-2023 to 15-07-2023 (ELEVEN DAYS) in STATE TRANSPORT CORPORATION, KASIPALAYAM, CHENNIMALAI ROAD, ERODE.

S.No	Student Name	Anna University Register No.	Year & Department
1	M.KUMARAVEL	731220114003	IV MECH
2	M.THIRUMURUGAN	731220114011	IV MECH
3	S.THIRUNAVUKKARASU	731220114012	IV MECH
4	M.GOWRISANKAR	731220114301	IV MECH
5	A.KAVIN	731220114302	IV MECH

This certificate has been issued for the purpose of In-plant Training Only.



PRINCIPAL
3/7/23

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

Tamil Nadu - 638506 Gobi(Tk) Erode(Dt)

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(Autonomous)
T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.

TAMILNADU STATE TRANSPORT CORPORATION (CBE.) LTD: COIMBATORE
ERODE REGION, CHENNIMALAI ROAD, ERODE-1

3921/P1/PD-II/TSTC/CBE/ER/2023

Date:25-08-2023

CERTIFICATE

This is to certify student of J.K.K.MUNIRAJAH COLLEGE OF TECHNOLOGY, Gobi has completed Inplant Training in R/C Unit, Chittode for the period noted against the individual.

Sl. No	Student Name	Reg.No./ Course	Date of Training
1.	M.KUMARAVEL	IV th B.E (Mechanical)	13.07.23 to 15.07.23, 17.07.23 to 22.07.23 & 24.07.23 to 27.07.23

TNSTC (COIMBATORE) LTD., ERODE REGION,



For GENERAL MANAGER



Principal

J.K.K.Munirajah College of Technology
(Autonomous)
T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.

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ERODE REGION, CHENNIMALAI ROAD, ERODE-1

3921/P1/PD-II/TSTC/CBE/ER/2023

Date:25-08-2023

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Sl. No	Student Name	Reg.No./ Course	Date of Training
1.	THIRUMURUGAN,M	IV th B.E (Mechanical)	13.07.23 to 15.07.23, 17.07.23 to 22.07.23 & 24.07.23 to 27.07.23

TNSTC (COIMBATORE) LTD., ERODE REGION,



(Signature)
For GENERAL MANAGER

(Signature)
Principal

J.K.K.Munirajah College of Technology
(Autonomous)
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Erode (Dt) - 638 506.

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Date:25-08-2023

CERTIFICATE


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Sl. No	Student Name	Reg.No./ Course	Date of Training
1.	THIRUNAVUKKARASU, S	IV th B.E (Mechanical)	13.07.23 to 15.07.23, 17.07.23 to 22.07.23 & 24.07.23 to 27.07.23

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T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.

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3921/P1/PD-II/TSTC/CBE/ER/2023

Date:25-08-2023

CERTIFICATE


This is to certify student of J.K.K.MUNIRAJAH COLLEGE OF TECHNOLOGY, Gobi has completed Inplant Training in R/C Unit, Chittode for the period noted against the individual.

Sl. No	Student Name	Reg.No./ Course	Date of Training
1.	GOWRISANKAR,M	IV th B.E (Mechanical)	13.07.23 to 15.07.23, 17.07.23 to 22.07.23 & 24.07.23 to 27.07.23

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3921/P1/PD-II/TSTC/CBE/ER/2023

Date: 25-08-2023

CERTIFICATE

This is to certify student of J.K.K.MUNIRAJAH COLLEGE OF TECHNOLOGY, Gobi has completed Inplant Training in R/C Unit, Chittode for the period noted against the individual.

Sl. No	Student Name	Reg.No./ Course	Date of Training
1.	A KAVIN	IV th B.E (Mechanical)	13.07.23 to 15.07.23, 17.07.23 to 22.07.23 & 24.07.23 to 27.07.23

TNSTC (COIMBATORE) LTD., ERODE REGION,



For GENERAL MANAGER


Principal

J.K.K.Munirajah College of Technology
(Autonomous)
T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.



Internship

1 message

TUE 12 DEC 2023 at 11.45 AM

From: SRIRAM<hodmech@jkkmct.edu.in>

Date: TUE 12 DEC 2023 at 11.45 AM

Subject: Requesting Internship -reg

To: profenaatechnologiespvtltd<profenaa.cbe@gmail.com>

Dear Sir,

I am requesting to be joining your **PROFENAA TECHNOLOGIES PVT LTD** regarding internship from 02.01.2024 to 06.01.2024. 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.

Refer the following student: **PARTHIPAN M, JAGANKUMAR S, KODEESWARAN S, MAHENDRAN D, MANIKANDAN S, RAMESH B, RAVINDRAN L, SENTHILKUMAR G VELLINGIRI A, PALANIKUMAR M**


Sincerely,

**Mr.K.Sriram,
HOD/MECH**

J K K.Munirajah College of Technology,

T.N.Palayam, Erode-638506,

Tamilnadu.


Principal
J.K.K.Munirajah College of Technology
(Autonomous)
T.N.Palayam, Gobi (TK),
Erode (Dt) - 638 506.



Internship

1 message

WED 20 DEC 2023 at 2.10PM

From: profenaatechnologiespvtltd<profenaa.cbe@gmail.com>

Date: WED 20 DEC 2023 at 2.10PM

Subject: Internship-reg

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


Dear Sir,

I am writing to express my sincere gratitude for the opportunity to intern at Profenaa Technologies Pvt Ltd. I am thrilled to accept the offer for the internship, beginning on 02.01.2024 and ending on 06.01.2024. Thanks for choosing the company regarding internship. I give the assurance for gaining knowledge after the internship program. Kindly inform your students to come with proper dress code and college ID card and definitely must follow company rules and regulations at that time.

Students Name list:

**PARTHIPAN M, JAGANKUMAR S, KODEESWARAN S, MAHENDRAN D,
MANIKANDAN S, RAMESH B, RAVINDRAN L, SENTHILKUMAR G
VELLINGIRI A and PALANIKUMAR M**

Sincerely,
The Managing Director,
Profenaa Technologies Private Ltd,
Coimbatore.


Principal
J.K.K.Munirajah College of Technology
(Autonomous)
T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.



PROFENAA

TECHNOLOGIES PRIVATE LIMITED

Training | Placement | Engineering Services

Date: 09.01.2024

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Mr. PARTHIPAN M**
731220114006 IV Year Mechanical Engineering of
J.K.K. Munirajah College of Technology has
successfully completed **internship program** from
02.01.2024 to 06.01.2024. During the above mentioned
period the attendance and conduct of the student are
found to be good. We wish him every success in his life
and career.

Thank You

FOR PROFENAA TECHNOLOGIES PVT LTD

PROFENAA TECHNOLOGIES

Industrial Training Placement Engineering Services

H.O : 43/1, Agni Amman Complex

Raja Mill Road, Pollachi, Coimbatore - 642 001

B.O : K.R.S. Complex, Kinathukadavu - 642 109

Ohm Sakthi Complex, Udumalpet - 642 126

Ph : 9944897638 | 9698730528

Principal

J.K.K. Munirajah College of Technology
(Autonomous)

T.N. Palayam, Gobi (Tk),
Erode (Dt) - 638 506.

CONTACT US

Email : profenaa.cbe@gmail.com website : www.profenaagroups@gmail.com Phone no: +919944897638 , +919944643567

corporate office : 43/1, Agni amman complex, rajamill road, pollchi, Coimbatore our franchises: Pollachi, Kinathukadavu, Udumalpet, Coimbatore Madurai, Karaikudi, Neyveli, Hosur, Sivakasi, Dindigul, OMR Chennai , Tiruppur, Thirunelveli, Erode , Mettupalayam, Mallumichmapatti



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Date: 09.01.2024

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Mr.JAGANKUMAR S**
731220114001 IV Year Mechanical Engineering of
J.K.K. Munirajah College of Technology has
successfully completed **internship program** from
02.01.2024 to 06.01.2024. During the above mentioned
period the attendance and conduct of the student are
found to be good. We wish him every success in his life
and career.

Thank You

FOR PROFENAA TECHNOLOGIES PVT LTD

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Ph : 9944897638 | 9698730528

CONTACT US

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corporate office : 43/1, Agni amman complex, rajamill road, pollachi, Coimbatore our franchisees: O.P. Ghosh, Kinathukadavu,
Udumalpet, Coimbatore Madurai, Karaikudi, Neyveli, Hosur, Sivakasi, Dindigul, OMR Chennai, Mettupalayam, Thiruvavelli, Erode,
Mettupalayam, Mallumichmapatti
Principal
J.K.K. Munirajah College of Technology
(Autonomous)
Mettupalayam, Thiruvavelli, Erode,
Erode (Dt) - 638 506.



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Date: 09.01.2024

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Mr. KODEESWARAN S** 731220114002 IV Year Mechanical Engineering of J.K.K. Munirajah College of Technology has successfully completed **internship program** from **02.01.2024 to 06.01.2024**. During the above mentioned period the attendance and conduct of the student are found to be good. We wish him every success in his life and career.

Thank You

FOR PROFENAA TECHNOLOGIES PVT LTD

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 Ph : 9944897638 | 9698730528

Principal

J.K.K. Munirajah College of Technology
 (Autonomous)

T.N. Palayam, Gobi (Tk),
 Erode - 638 506

CONTACT US

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 corporate office : 43/1, Agni amman complex, rajamill road, pollachi, Coimbatore our franchises: Pollachi, Kinathukadavu, Udumalpet, Coimbatore Madurai, Karaikudi, Neyveli, Hosur, Sivakasi, Dindigul, OMR Chennai, Tiruppur, Thirunelveli, Erode, Mettupalayam, Mallumichmapatti



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TECHNOLOGIES PRIVATE LIMITED

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Date: 09.01.2024

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Mr. MAHENDRAN D**
731220114004 IV Year Mechanical Engineering of
J.K.K. Munirajah College of Technology has
successfully completed **internship program** from
02.01.2024 to 06.01.2024. During the above mentioned
period the attendance and conduct of the student are
found to be good. We wish him every success in his life
and career.

Thank You

FOR PROFENAA TECHNOLOGIES PVT LTD

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Ph : 9944897638 | 9698730528

CONTACT US

Email : profenaa.cbe@gmail.com website : www.profenaagroups@gmail.com Phone no : 9944897638 | 9698730528
corporate office : 43/1, Agni amman complex, rajamiill road, pollchi, Coimbatore our franchise (Autonomous) inathukadavu,
Udumalpet, Coimbatore Madurai, Karaikudi, Neyveli, Hosur, Sivakasi, Dindigui, OMR Chennai, Palayam, Tirupulveli, Erode,
Mettupalayam, Mallumichmapatti
T.N. Palayam, Gobi (Tik), Erode (Dt) - 638 506.

Principal

J.K.K. Munirajah College of Technology

(Autonomous)

T.N. Palayam, Gobi (Tik)

Erode (Dt) - 638 506.



PROFENAA

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Training | Placement | Engineering Services

Date: 09.01.2024

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Mr. **MANIKANDAN S**
731220114006 IV Year Mechanical Engineering of
J.K.K. Munirajah College of Technology has
successfully completed **internship program** from
02.01.2024 to 06.01.2024. During the above mentioned
period the attendance and conduct of the student are
found to be good. We wish him every success in his life
and career.

Thank You

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Ph : 9944897638 | 9698730528

Principal

J.K.K. Munirajah College of Technology

(Autonomous)

T.N. Palayam, Gobi (TK),

Erode (Dt) - 638 506

CONTACT US

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Udumalpet, Coimbatore Madurai, Karaikudi, Neyveli, Hosur, Sivakasi, Dindigul, OMR Chennai, Tiruppur, Thiruvananthapuram, Erode,
Mettupalayam, Mallumichmapatti



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Training | Placement | Engineering Services

Date: 09.01.2024

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Mr. **RAMESH B**
731220114007 IV Year Mechanical Engineering of
J.K.K. Munirajah College of Technology has
successfully completed **internship program** from
02.01.2024 to 06.01.2024. During the above mentioned
period the attendance and conduct of the student are
found to be good. We wish him every success in his life
and career.

Thank You

FOR PROFENAA TECHNOLOGIES PVT LTD

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Ohm Sakthi Complex, Udumalpet - 642 126
Ph : 9944897638 | 9698730528

CONTACT US

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corporate office : 43/1, Agni amman complex, rajamill road, pollchi, Coimbatore our franchisee offices are located at Kinathukadavu,
Udumalpet, Coimbatore Madurai, Karaikudi, Neyveli, Hosur, Sivakasi, Dindigul, OMR Chennai, Palayamkottai, Palayamkottai, Erode,
Erode (Dt) - 638 506.

Principal
J.K.K. Munirajah College of Technology

(Autonomous)
Palayamkottai, Palayamkottai, Erode,
Erode (Dt) - 638 506.



PROFENAA

TECHNOLOGIES PRIVATE LIMITED

Training | Placement | Engineering Services

Date: 09.01.2024

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Mr. SENTHILKUMAR G**
731220114010 IV Year Mechanical Engineering of
J.K.K. Munirajah College of Technology has
successfully completed **internship program** from
02.01.2024 to 06.01.2024. During the above mentioned
period the attendance and conduct of the student are
found to be good. We wish him every success in his life
and career.

Thank You

FOR PROFENAA TECHNOLOGIES PVT LTD

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Ohm Sakthi Complex, Udumalpet - 642 126
Ph : 9944897638 | 9698730528

CONTACT US

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Udumalpet, Coimbatore Madurai, Karaikudi, Neyveli, Hosur, Sivakasi, Dindigul, OMR Chennai, Tiruppur, Thirunelveli, Erode
T.N. Palayam, Gobbi (Tk),
Erode (Dt) - 638 506.

Principal

J.K.K. Munirajah College of Technology
(Autonomous)
T.N. Palayam, Gobbi (Tk),
Erode (Dt) - 638 506.



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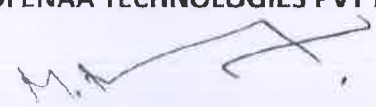
Date: 09.01.2024

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Mr. RAVINDRAN L**
731220114008 IV Year Mechanical Engineering of
J.K.K. Munirajah College of Technology has
successfully completed **internship** program from
02.01.2024 to 06.01.2024. During the above mentioned
period the attendance and conduct of the student are
found to be good. We wish him every success in his life
and career.

Thank You

FOR PROFENAA TECHNOLOGIES PVT LTD


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CONTACT US

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corporate office : 43/1, Agni amman complex, rajamill road, pollchi, Coimbatore
J.K.K. Munirajah College of Technology
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Udumalpet, Coimbatore Madurai, Karaikudi, Neyveli, Hosur, Sivakasi, Dindigul, Erode (Dt) - 638 506
Mettupalayam, Mailumichampatti



PROFENAA

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Training | Placement | Engineering Services

Date: 09.01.2024

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Mr. VELLINGIRI A**
731220114013 IV Year Mechanical Engineering of
J.K.K. Munirajah College of Technology has
successfully completed **internship program** from
02.01.2024 to 06.01.2024. During the above mentioned
period the attendance and conduct of the student are
found to be good. We wish him every success in his life
and career.

Thank You

FOR PROFENAA TECHNOLOGIES PVT LTD

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Ohm Sakthi Complex, Udumalpet - 642 126
Ph : 9944897638 | 9698730528

CONTACT US

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corporate office : 43/1, Agni amman complex, rajamill road, pollchi, Coimbatore our franchises : Pollachi, Kinathukadavu,
Udumalpet, Coimbatore Madurai, Karaikudi, Neyveli, Hosur, Sivakasi, Dindigul, OMR Chennai, Tiruppur, Thirumelveli, Erode,
Erode (T.S.)

Principal
J.K.K. Munirajah College of Technology
(Autonomous)
Pollachi, Kinathukadavu,
Udumalpet, Coimbatore
Erode (T.S.)



PROFENAA

TECHNOLOGIES PRIVATE LIMITED

Training | Placement | Engineering Services

Date: 09.01.2024

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Mr. PALANIKUMAR M**
731220114501 IV Year Mechanical Engineering of
J.K.K. Munirajah College of Technology has
successfully completed **internship program** from
02.01.2024 to 06.01.2024. During the above mentioned
period the attendance and conduct of the student are
found to be good. We wish him every success in his life
and career.

Thank You

FOR PROFENAA TECHNOLOGIES PVT LTD

PROFENAA TECHNOLOGIES
Industrial Training Placement Engineering Services
H.O : 43/1, Agni Amman Complex
Raja Mill Road, Pollachi, Coimbatore - 642 001
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Ohm Sakthi Complex, Udumalpet - 642 126
Ph : 9944897638 | 9698730528

Principal

J.K.K. Munirajah College of Technology
(Autonomous)

T.N. Palayam, Gobi (Tk)

Erode (Dt) - 638 552

CONTACT US

Email : profenaa.cbe@gmail.com website : www.profenaagroups@gmail.com Phone no : (91)9944897638 | +919944643567

corporate office : 43/1, Agni amman complex, rajamilli road, pollachi, coimbatore, tamil nadu
branches: Pollachi, Kinathukadavu, Udumalpet, Coimbatore Madurai, Karaikudi, Neyveli, Hosur, Sivakasi, Dindigul, OMR Chennai, Tiruppur, Thirunelveli, Erode,



Internship

1 message

FRI 10 NOV 2023 at 3.20 PM

From: SRIRAM<hodmech@jkkmct.edu.in>

Date: FRI 10 NOV 2023 at 3.20 PM

Subject: Requesting Internship -reg

To:QUEEN INDIA ENGINEERING SERVICES< info@queenindiaengineeringservices.com >

Dear Sir,

I am requesting to be joining your **QUEEN INDIA ENGINEERING SERVICES**. 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: **MATHANKUMAR M, PRABAKARAN S, SATHEESH C, VAIRAMUTHU S, VIGNESH S, ARUN S, GOWTHAM V, JEEVA P, NAVEENKUMAR N, PARTHASARATHI R , RAGUPATHI R, RAJESHKUMAR K, SANTHOSH M and SIVAKUMAR M**

Sincerely,

**Mr.K.Sriram,
HOD/MECH**

**J K K.Munirajah College of Technology,
T.N.Palayam, Erode-638506,
Tamilnadu.**

Principal
J.K.K.Munirajah College of Technology
(Autonomous)
T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.



Internship

1 message

WED 15 NOV 2023 at 9.45 AM

From: QUEEN INDIA ENGINEERING SERVICES <info@queenindiaengineeringservices.com >

Date: WED 15 NOV 2023 at 9.45 AM

Subject: Accepting for Internship-reg

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

Dear Sir,

I am writing to confirm my acceptance of your internship offer from 18.12.2023 to 22.12.2023 and to tell you how to be joining my QUEEN INDIA ENGINEERING SERVICES. 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: MATHANKUMAR M, PRABAKARAN S, SATHEESH C, VAIRAMUTHU S, VIGNESH S, ARUN S, GOWTHAM V, JEEVA P, NAVEENKUMAR N, PARTHASARATHI R, RAGUPATHI R, RAJESHKUMAR K, SANTHOSH M and SIVAKUMAR M

Sincerely,

The Managing Director,
Queen India Engineering Services,
Erode.

Principal
J.K.K.Munirajah College of Technology
(Autonomous)
T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.



QUEEN INDIA
ENGINEERING SERVICES

Internship Certificate

This is to certify that **Mr.MATHANKUMAR M** III Year Mechanical Engineering of JKK Munirajah College of Technology has successfully completed **internship Program** on Non-Destructive Testing (NDT) from **18.12.2023 to 22.12.2023** During the above mentioned period the attendance and conduct of the student are found to be good. We wish him every success in his life and career

Erode

22.12.2023

FOR QUEEN INDIA ENGINEERING SERVICES,


Principal

J.K.K.Munirajah College of Technology
(Autonomous)

T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.



Office Address: 247, First Floor, KCL Building, Bhavani Main Road, Asokapuram, Erode - 638 004.

Mail ID: info@queenindiaes.com Website: www.queenindiaes.com Phone: 0424 - 4061631

Mobile: +91 7373647070



QUEEN INDIA

ENGINEERING SERVICES

Internship Certificate

This is to certify that **Mr. PRABAKARAN S** III Year Mechanical Engineering of JKK Munirajah College of Technology has successfully completed **internship Program** on **Non-Destructive Testing (NDT)** from **18.12.2023 to 22.12.2023** During the above mentioned period the attendance and conduct of the student are found to be good. We wish him every success in his life and career

Erode

22.12.2023

FOR QUEEN INDIA ENGINEERING SERVICES,

Principal

J.K.K.Munirajah College of Technology
(Autonomous)

T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.



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Mall ID: info@queenindiaes.com Website: www.queenindiaes.com Phone: 0424 – 4061631

Mobile: +91 7373647070



QUEEN INDIA

ENGINEERING SERVICES


Internship Certificate

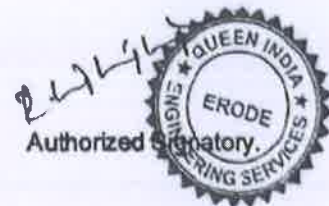
This is to certify that Mr. **SATHEESH C** III Year
Mechanical Engineering of JKK Munirajah College
of Technology has successfully completed
internship Program on Non-Destructive Testing
(NDT) from **18.12.2023 to 22.12.2023** During the
above mentioned period the attendance and
conduct of the student are found to be good.
We wish him every success in his life and career

Erode

22.12.2023

FOR QUEEN INDIA ENGINEERING SERVICES,


Principal
J.K.K. Munirajah College of Technology
(Autonomous)
T.N. Palayam, Erode (T.K.),
Erode (D) 638 506.



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QUEEN INDIA

ENGINEERING SERVICES


Internship Certificate

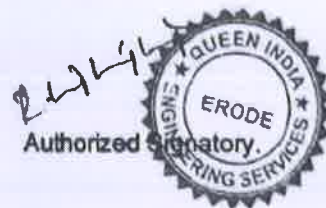
This is to certify that **Mr. VAIRAMUTHU S** III Year Mechanical Engineering of JKK Munirajah College of Technology has successfully completed **internship Program** on Non-Destructive Testing (NDT) from **18.12.2023 to 22.12.2023** During the above mentioned period the attendance and conduct of the student are found to be good. We wish him every success in his life and career

Erode

22.12.2023

FOR QUEEN INDIA ENGINEERING SERVICES,


Principal
J.K.K.Munirajah College of Technology
(Autonomous)
T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.



Office Address: 247, First Floor, KCL Building, Bhavani Main Road, Asokapuram, Erode - 638 004.

Mail ID: info@queenindiaes.com Website: www.queenindiaes.com Phone: 0424 - 4061631

Mobile: +91 7373647070



QUEEN INDIA
ENGINEERING SERVICES


Internship Certificate

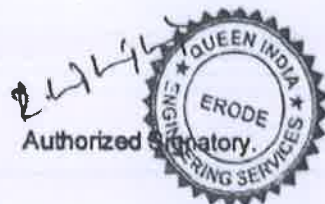
This is to certify that Mr. **VIGNESH S** III Year
Mechanical Engineering of JKK Munirajah College
of Technology has successfully completed
internship Program on Non-Destructive Testing
(NDT) from **18.12.2023 to 22.12.2023** During the
above mentioned period the attendance and
conduct of the student are found to be good.
We wish him every success in his life and career

Erode

22.12.2023

FOR QUEEN INDIA ENGINEERING SERVICES,


Principal
J.K.K.Munirajah College of Technology
(Autonomous)
T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.





QUEEN INDIA
ENGINEERING SERVICES

Internship Certificate

This is to certify that Mr. **ARUN S** II Year Mechanical Engineering of JKK Munirajah College of Technology has successfully completed **internship Program** on Non-Destructive Testing (NDT) from **18.12.2023 to 22.12.2023**. During the above mentioned period the attendance and conduct of the student are found to be good. We wish him every success in his life and career.

Erode

22.12.2023

FOR QUEEN INDIA ENGINEERING SERVICES,

Principal

J.K.K.Munirajah College of Technology
(Autonomous)

T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 505



Office Address: 247, First Floor, KCL Building, Bhavani Main Road, Asokapuram, Erode – 638 004.

Mail ID: info@queenindiaes.com Website: www.queenindiaes.com Phone: 0424 – 4061631

Mobile: +91 7373647070



QUEEN INDIA
ENGINEERING SERVICES


Internship Certificate

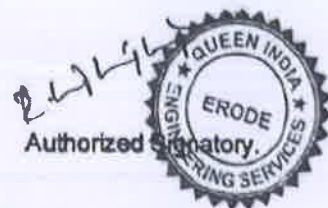
This is to certify that **Mr. GOWTHAM V** II Year Mechanical Engineering of JKK Munirajah College of Technology has successfully completed **internship Program** on Non-Destructive Testing (NDT) from **18.12.2023 to 22.12.2023** During the above mentioned period the attendance and conduct of the student are found to be good. We wish him every success in his life and career

Erode

22.12.2023

FOR QUEEN INDIA ENGINEERING SERVICES,


Principal
J.K.K.Munirajah College of Technology
(Autonomous)
T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.





QUEEN INDIA

ENGINEERING SERVICES

Internship Certificate

This is to certify that **Mr. JEEVA P** II Year
Mechanical Engineering of JKK Munirajah College
of Technology has successfully completed
internship Program on Non-Destructive Testing
(NDT) from **18.12.2023 to 22.12.2023** During the
above mentioned period the attendance and
conduct of the student are found to be good.
We wish him every success in his life and career

Erode

22.12.2023

FOR QUEEN INDIA ENGINEERING SERVICES,

Principal

J.K.K.Munirajah College of Technology
(Autonomous)

T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.



Office Address: 247, First Floor, KCL Building, Bhavani Main Road, Asokapuram, Erode - 638 004.

Mail ID: info@queenindiaes.com Website: www.queenindiaes.com Phone: 0424 - 4061631

Mobile: +91 7373647070



QUEEN INDIA

ENGINEERING SERVICES

Internship Certificate

This is to certify that **Mr.NAVEENKUMAR N** II Year Mechanical Engineering of JKK Munirajah College of Technology has successfully completed **internship Program** on Non-Destructive Testing (NDT) from **18.12.2023 to 22.12.2023** During the above mentioned period the attendance and conduct of the student are found to be good. We wish him every success in his life and career

Erode

22.12.2023

FOR QUEEN INDIA ENGINEERING SERVICES,

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(Autonomous)
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Mobile: +91 7373647070



QUEEN INDIA
ENGINEERING SERVICES

Internship Certificate

This is to certify that **Mr.R PARTHASARATHI** II Year Mechanical Engineering of JKK Munirajah College of Technology has successfully completed **internship Program** on Non-Destructive Testing (NDT) from **18.12.2023 to 22.12.2023** During the above mentioned period the attendance and conduct of the student are found to be good. We wish him every success in his life and career

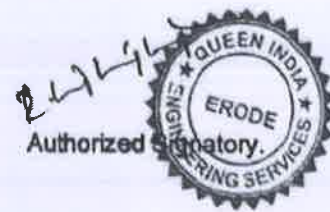
Erode

22.12.2023

FOR QUEEN INDIA ENGINEERING SERVICES,

Principal

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Mobile: +91 7373647070



QUEEN INDIA

ENGINEERING SERVICES

Internship Certificate

This is to certify that **Mr. RAGUPATHI R** II Year Mechanical Engineering of JKK Munirajah College of Technology has successfully completed **internship Program** on Non-Destructive Testing (NDT) from **18.12.2023 to 22.12.2023** During the above mentioned period the attendance and conduct of the student are found to be good. We wish him every success in his life and career

Erode

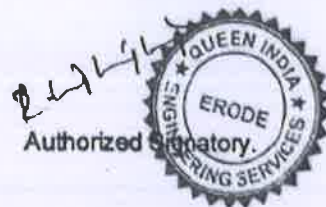
22.12.2023

FOR QUEEN INDIA ENGINEERING SERVICES,

Principal

J.K.K.Munirajah College of Technology
(Autonomous)

T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.





QUEEN INDIA
ENGINEERING SERVICES

Internship Certificate

This is to certify that **Mr.SANTHOSH M** II Year Mechanical Engineering of JKK Munirajah College of Technology has successfully completed **internship Program** on Non-Destructive Testing (NDT) from **18.12.2023 to 22.12.2023** During the above mentioned period the attendance and conduct of the student are found to be good. We wish him every success in his life and career

Erode

22.12.2023

FOR QUEEN INDIA ENGINEERING SERVICES,

Principal

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Erode (Dt) - 638 506.



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Mail ID: info@queenindiaes.com Website: www.queenindiaes.com Phone: 0424 – 4061631

Mobile: +91 7373647070



QUEEN INDIA
ENGINEERING SERVICES

Internship Certificate

This is to certify that Mr. RAJESHKUMAR K II Year Mechanical Engineering of JKK Munirajah College of Technology has successfully completed internship Program on Non-Destructive Testing (NDT) from 18.12.2023 to 22.12.2023 During the above mentioned period the attendance and conduct of the student are found to be good. We wish him every success in his life and career

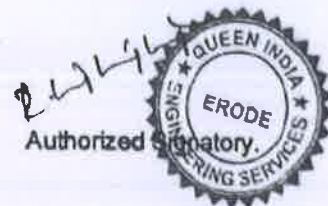
Erode

22.12.2023

FOR QUEEN INDIA ENGINEERING SERVICES,

Principal

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Mobile: +91 7373647070



QUEEN INDIA

ENGINEERING SERVICES

Internship Certificate

This is to certify that Mr. **SIVAKUMAR M** II Year Mechanical Engineering of JKK Munirajah College of Technology has successfully completed **internship Program** on Non-Destructive Testing (NDT) from **18.12.2023 to 22.12.2023** During the above mentioned period the attendance and conduct of the student are found to be good. We wish him every success in his life and career

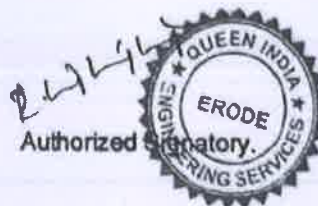
Erode

22.12.2023

FOR QUEEN INDIA ENGINEERING SERVICES,

Xoouuo
Principal

J.K.K.Munirajah College of Technology
(Autonomous)
T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.





Internship

1 message

MON 27 NOV 2023 at 02.40 PM

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

Date: MON 27 NOV 2023 at 02.40 PM

Subject: Accepting for **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: **SURIYAKUMAR S YOGAPRAKASH M, DURAI ANBARASU S POOVARASU M and RAGU B**

Sincerely,

**Mr.K.Sriram,
HOD/MECH**

**J K K.Munirajah College of Technology,
T.N.Palayam, Erode-638506,
Tamilnadu.**

Principal

**J.K.K.Munirajah College of Technology
(Autonomous)
T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.**



Internship

1 message

TUE 12 DEC 2023 at 01.30 PM

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

Date: TUE 12 DEC 2023 at 01.30 PM

Subject: Internship -reg

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

Dear Sir,

I am writing to confirm my acceptance of your internship offer of 02.01.2024 to 06.01.2024 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: **SURIYAKUMAR S YOGAPRAKASH M, DURAI ANBARASU S POOVARASU M and RAGU B**

Sincerely,

HR Manager,
Periyasamy Hydraulic Equipment's,
Tirupur.

Principal

J.K.K.Munirajah College of Technology
(Autonomous)
T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.



PHE

PERIYASAMY HYDRAULIC EQUIPMENTS



TO WHOM IT MAY CONCERN

This is so certify that Mr. **SURIYAKUMAR S**, student of B.E (Mechanical Engineering) J.K.K.Munirajah College of Technology. Has successfully completed a **internship** in the hydraulics from **02.01.2024 to 06.01.2024** under the guidance of Mr. K.Ramasamy (Chief Engineer),

During the period of his internship program with us he had been exposed to different process was found punctual, hardworking and inquisitive.

We wish him every success in his life and career.

Tirupur

Date: 06.01.2024

Principal

J.K.K.Munirajah College of Technology
(Autonomous)
T.N.Palayam, Gobi (Tk),
Erode (Dt) - 638 506.

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

AUTHORIZED SIGN

PERIYASAMY HYDRAULIC EQUIPMENTS

24 - A/1, E. N. Road, Kunnathur - 638 103, District Tirupur, Tamilnadu (INDIA) Tel. : +91 4294 264788 Fax : +91 4294 264588
Cell : +91 97865 58888, 97865 00188 Email : pheindia@yahoo.com Website : www.pheindia.com



PHE

PERIYASAMY HYDRAULIC EQUIPMENTS



TO WHOM IT MAY CONCERN

This is so certify that Mr. YOGAPRAKASH M, student of B.E (Mechanical Engineering) J.K.K.Munirajah College of Technology. Has successfully completed a internship in the hydraulics from 02.01.2024 to 06.01.2024 under the guidance of Mr. K.Ramasamy (Chief Engineer),

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We wish him every success in his life and career.

Tirupur

Date: 06.01.2024

Principal

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PHE

PERIYASAMY HYDRAULIC EQUIPMENTS

Makers of Green India



TO WHOM IT MAY CONCERN

This is so certify that Mr. DURAI ANBARASU S, student of B.E (Mechanical Engineering) J.K.K.Munirajah College of Technology. Has successfully completed a internship in the hydraulics from 02.01.2024 to 06.01.2024 under the guidance of Mr. K.Ramasamy (Chief Engineer),

During the period of his internship program with us he had been exposed to different process was found punctual, hardworking and inquisitive.

We wish him every success in his life and career.

Tirupur

Date: 06.01.2024

Principal

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PHE

PERIYASAMY HYDRAULIC EQUIPMENTS



TO WHOM IT MAY CONCERN

This is so certify that Mr. POOVARASU M, student of B.E (Mechanical Engineering) J.K.K.Munirajah College of Technology. Has successfully completed a internship in the hydraulics from 02.01.2024 to 06.01.2024 under the guidance of Mr. K.Ramasamy (Chief Engineer),

During the period of his internship program with us he had been exposed to different process was found punctual, hardworking and inquisitive.

We wish him every success in his life and career.

Tirupur

Date: 06.01.2024

Principal

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PHE

PERIYASAMY HYDRAULIC EQUIPMENTS



TO WHOM IT MAY CONCERN

This is so certify that Mr. RAGU B, student of B.E (Mechanical Engineering) J.K.K.Munirajah College of Technology. Has successfully completed a internship in the hydraulics from 02.01.2024 to 06.01.2024 under the guidance of Mr. K.Ramasamy (Chief Engineer),

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Tirupur

Date: 06.01.2024

Principal

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