



**J.K.K. MUNIRAJAH COLLEGE OF TECHNOLOGY**

**(AUTONOMOUS)**



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

Accredited by NAAC with "A" Grade

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

**AUTOMOBILE ENGINEERING**

**2023-2024**

S.NO	REG.NO	STUDENT NAME	PROJECT WORK	INTERNSHIP
1	731220102001	B.DHANALAKSHMANAN	✓	
2	731221102001	P.KAVIN		✓
3	731221102002	B.RAJKUMAR		✓
4	731222102002	V.PRADEEP KUMAR		✓
5	731222102003	K.PRAJEESH		✓
6	731222102005	P.SOORAJ		✓

**Principal**

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**DEPARTMENT OF AUTOMOBILE ENGINEERING**

**PROJECT BATCH LIST (2023-24)**

S.NO	REGISTER NO	NAME LIST	PROJECT TITLE	GUIDE NAME
1	731220102001	B.DHANALAKSHMANAN	MECHANICAL BEHAVIOUR OF NATURAL FIBER COMPOSITE MATERIAL	Mr.V.MAGESH,M.E.,

**Principal**

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

**MECHANICAL BEHAVIOUR OF NATURAL FIBER  
HYBRID COMPOSITE MATERIAL**

**PROJECT REPORT**

*Submitted by*

**DHANALAKSHMANAN B**

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

**BACHELOR OF ENGINEERING IN  
AUTOMOBILE ENGINEERING**



**J.K.K MUNIRAJAH COLLEGE OF TECHNOLOGY  
T.N. PALAYAM, GOBI-638 506.  
DEPARTMENT OF AUTOMOBILE ENGINEERING  
ANNA UNIVERSITY, CHENNAI**

**MAY 2024**



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

# ANNA UNIVERSITY, CHENNAI

## BONAFIDE CERTIFICATE

Certified that this Report titled "MECHANICAL BEHAVIOUR OF NATURAL FIBER HYBRID COMPOSITE MATERIAL" is the bonafide work of DHANALAKSHMANAN B (Reg.No.731220102001) who carried out the work under my supervision. Certified further that to the best of my knowledge and the work reported herein does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

  
SIGNATURE

**Mr. V.MAGESH M.E.,**  
**HEAD OF THE DEPARTMENT**

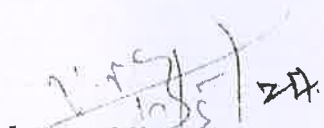
Assistant Professor  
Dept of Automobile Engineering  
J.K.K Munirajah College of Technology  
T.N.Palayam.

  
SIGNATURE

**Mr. V.MAGESH M.E.,**  
**SUPERVISOR**

Assistant Professor  
Dept of Automobile Engineering  
J.K.K Munirajah College of Technology  
T.N.Palayam.

Submitted for the Viva-Voce examination held on 10.5.24

  
Internal Examiner

  
External Examiner

  
Principal

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

## ABSTRACT

This project is focused on the evaluation of Mechanical properties of palmyra fiber reinforced hybrid composites. The composites were developed using 5% alkali treated and raw Borassus fruit fibers of 5 mm length with epoxy resin by using the hand layup and compression mould technique. Specimens were cut from the fabricated laminate according to the ASTM (American society for Testing & Materials) standards for different experiments. The mechanical testing of composite structures to obtain parameters such as strength and stiffness is a time consuming and often difficult process. Tensile test and compressive test are used to determine the mechanical properties of the materials. Also the mechanical properties were obtained by using the impact, flexural and the hardness test. The izod impact testing showed the impact strength was improved by decreasing the fiber length and by increasing the friction stress between the fiber and the matrix. Fiber morphology and the fiber/matrix interface were further characterized by Scanning Electron Microscopic (SEM) Test.

*Keywords: Palmyra Fiber, Glass Fiber, Epoxy Resin, Mechanical properties, SEM*



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## CHAPTER 7

### CONCLUSION

The mechanical properties of composites were investigated. The impact test, flexural test, Hardness test, tensile test, and SEM analysis were conducted on the specimen and following conclusions were arrived at.

- Out of the six specimens the impact strength of T3 hybrid polymer matrix samples was found improved upto 15% than the rest of the samples.
- The flexural strength of T3 ratio samples was found improved upto 30% than the remaining sample. The flexural strength is noticed as 48.7N of this sample.
- The tensile strength of T3 specimen was found better than the other five specimen. Similarly the Eng stress values corresponding to the strain values of T3 specimen was better than other.
- The fourier transform infrared spectroscopy conformed the existence of O-H bonds at the peaks between  $3000\text{cm}^{-1}$  to  $3500\text{cm}^{-1}$  this indicates strong bonding strength of this composites.
- The SEM analysis revealed the good bonding strength of glass fiber with the matrix. The fiber breakage, presence of debris also confined the same.



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**DEPARTMENT OF AUTOMOBILE ENGINEERING**

**INTERNSHIP DETAILS (2023-24)**

S.NO	REGISTER NO	NAME OF THE STUDENT	NAME OF THE COMPANY	LOCATION	DATE
1	731221102001	P.KAVIN	QUEEN INDIA ENGINEERING SERVICES	ERODE	18.12.2023 TO 22.12.2023
2	731221102002	B.RAJKUMAR			

**Principal**

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



---

**Internship**

1 message

---

TUE 12 DEC 2023 at 3.20PM

From: MAGESHV<hodauto@jkkmct.edu.in>

Date: TUE 12 DEC 2023 at 3.20 PM

Subject: Internship -reg

To: QUEENINDIAENGINEERINGSERVICES< info@queenindiaengineeringservices.com >

Dear Sir,

I am requesting to be joining your **QUEEN INDIA ENGINEERING SERVICES** regarding internship from **18.12.2023 to 22.12.2023**. 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 students:

**P.KAVIN,B.RAJKUMAR**

Sincerely,

**Head Of The Department,**

**J K K Munirajah College of Technology,**

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

**Principal**

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



## Internship

1 message

FRI 15 DEC 2023 at 2.10PM

From: QUEENINDIAENGINEERINGSERVICES <info@queenindiaengineeringservices.com >

Date: FRI 15 DEC 2023 at 2.10 PM

Subject: Internship-reg

To: MAGESHV <hodauto@jkkmct.edu.in>

Dear Sir,

I am writing to confirm my acceptance of your internship offer of 18.12.2023 to 22.12.2023 and to tell you how to be joining my QUEEN INDIA ENGINEERING SERVICES. I shall complete all insurance forms for the new intern orientation. I appreciate your confidence in me and providing the chance to work with and observe my outstanding staff.

Refer the following students:

**P.KAVIN,B.RAJKUMAR**

Sincerely,

The Managing Director,  
Queen India Engineering Services,  
Erode.

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



**QUEEN INDIA**  
ENGINEERING SERVICES

## Internship Certificate

This is to certify that **Mr. P.KAVIN (731221102001)**, III year Automobile 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.

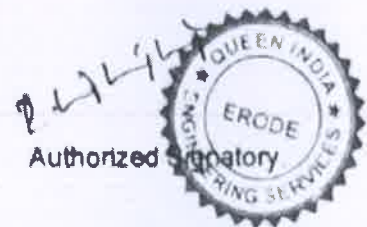
Erode

24.12.2023

**Principal**

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

FOR QUEEN INDIA ENGINEERING SERVICES,





**QUEEN INDIA**  
ENGINEERING SERVICES

## Internship Certificate

This is to certify that **Mr. B.RAJKUMAR (731221102002)**, III year Automobile 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.

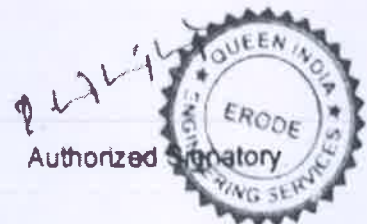
Erode

24.12.2023

FOR QUEEN INDIA ENGINEERING SERVICES,

  
Principal

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**DEPARTMENT OF AUTOMOBILE ENGINEERING**

**INTERNSHIP DETAILS (2023-24)**

S.NO	REGISTER NO	NAME OF THE STUDENT	NAME OF THE COMPANY	LOCATION	DATE
1	731222102002	V.PRADEEP KUMAR	PROFENAA TECHNOLOGIES PVT LTD	COIMBATORE	02.01.2024 TO 06.01.2024
2	731222102003	K.PRAJEESH			
3	731222102005	P.SOORAJ			

Principal

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



## Internship

1 message

FRI 22 DEC 2023 at 10.15AM

From: MAGESHV <hodauto@jkkmct.edu.in>  
Date: FRI 22 DEC 2023 at 10.15AM  
Subject: Internship -reg  
To: profenaatechnologiespvtltd <profenaa.cbe@gmail.com>

Dear Sir,

I am requesting to be joining your **PROFENAA TECHNOLOGIES PVT LTD** regarding internship from **2.1.2024 to 6.1.2024**. 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: **(V.PRADEEP KUMAR, K.PRAJEESH, P.SOORAJ)**

Sincerely,

**Head Of The Department,  
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

THU 28 DEC 2023 at 5.30PM

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

Date: THU 28 DEC 2023 at 5.30PM

Subject: Internship-reg

To: MAGESHV<hodauto@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 2.1.2024 and ending on 6.1.2024. 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:

V.PRADEEP KUMAR, K.PRAJEESH, P.SOORAJ

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.

09.01.2024

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Mr. V. Pradeep Kumar** (731222102002) II-Year Automobile 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

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Erode (Dt) - 638 506.

**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, Thirunelveli, Erode , Mettupalayam, Mallumichmapatti

09.01.2024

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Mr. K. Prajeesh (731222102003)** II-Year Automobile 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, Thirunelveli, Erode , Mettupalayam, Mallumichmapatti

09.01.2024

### TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Mr. P. Sooraj (731222102005)** II - Year Automobile 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.

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