



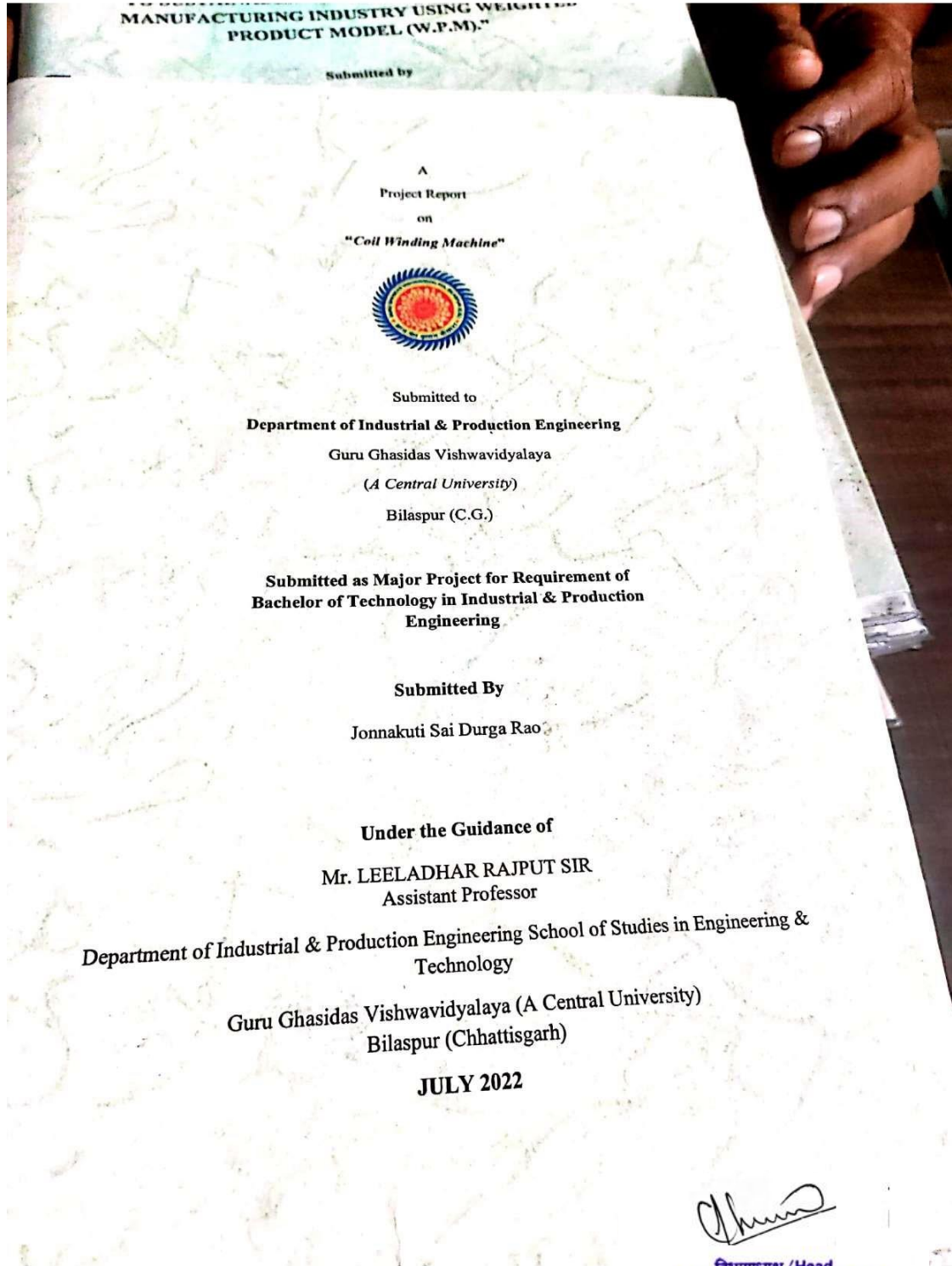
Department	:	Industrial and Production Engineering
Academic Year : 2021-22		
Sr. No.	Programme Code	Name of the Programme
01.	215	B. Tech. Industrial and Production Engineering

Following students have carried out their Project work/ Internship/  
Field Project/Industrial Training for the academic session 2021-22

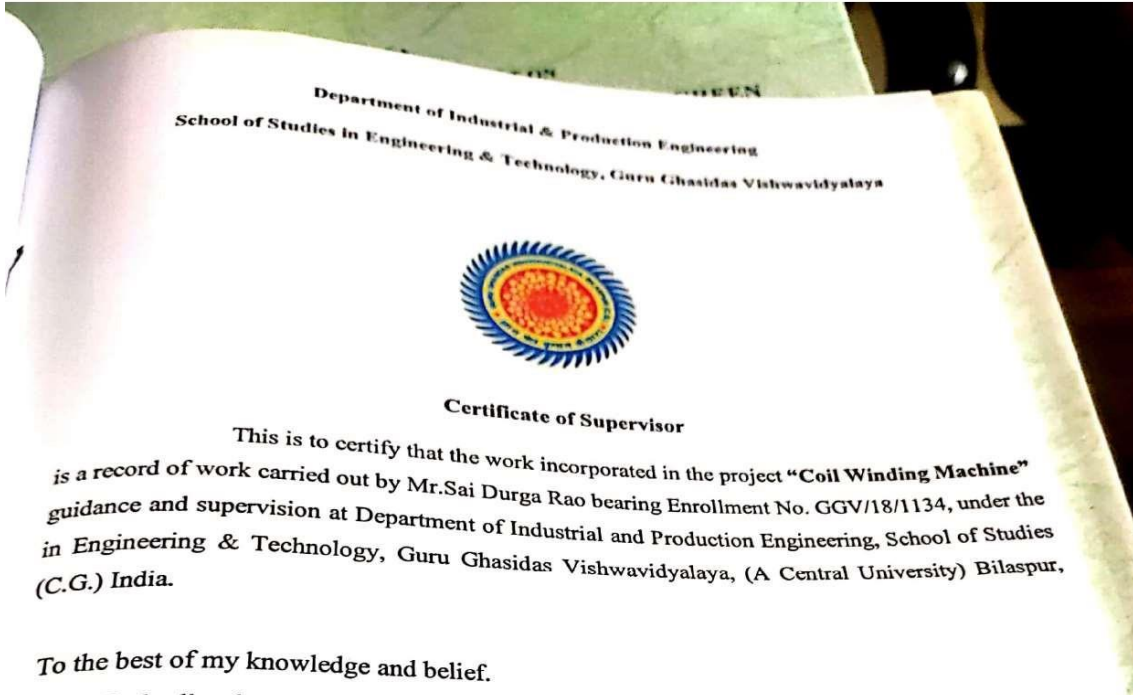
Si.No.	Name of the Students	Page No
1.	Jonnakuti Sai Durga Rao	2-4
2.	Anuj Ranjan Singh	5-7
3.	Nikhil Diwan	8-10
4.	Abhijeet Katyayan	11-13
5.	Shivam	14-16
6.	Ritesh Gupta	17-19
7.	Monika Sharma	20-22
8.	Akhilesh Tirkey	23-25
9.	Abhinav Anand	26-28
10.	R. Shree Pragya	29-31

  
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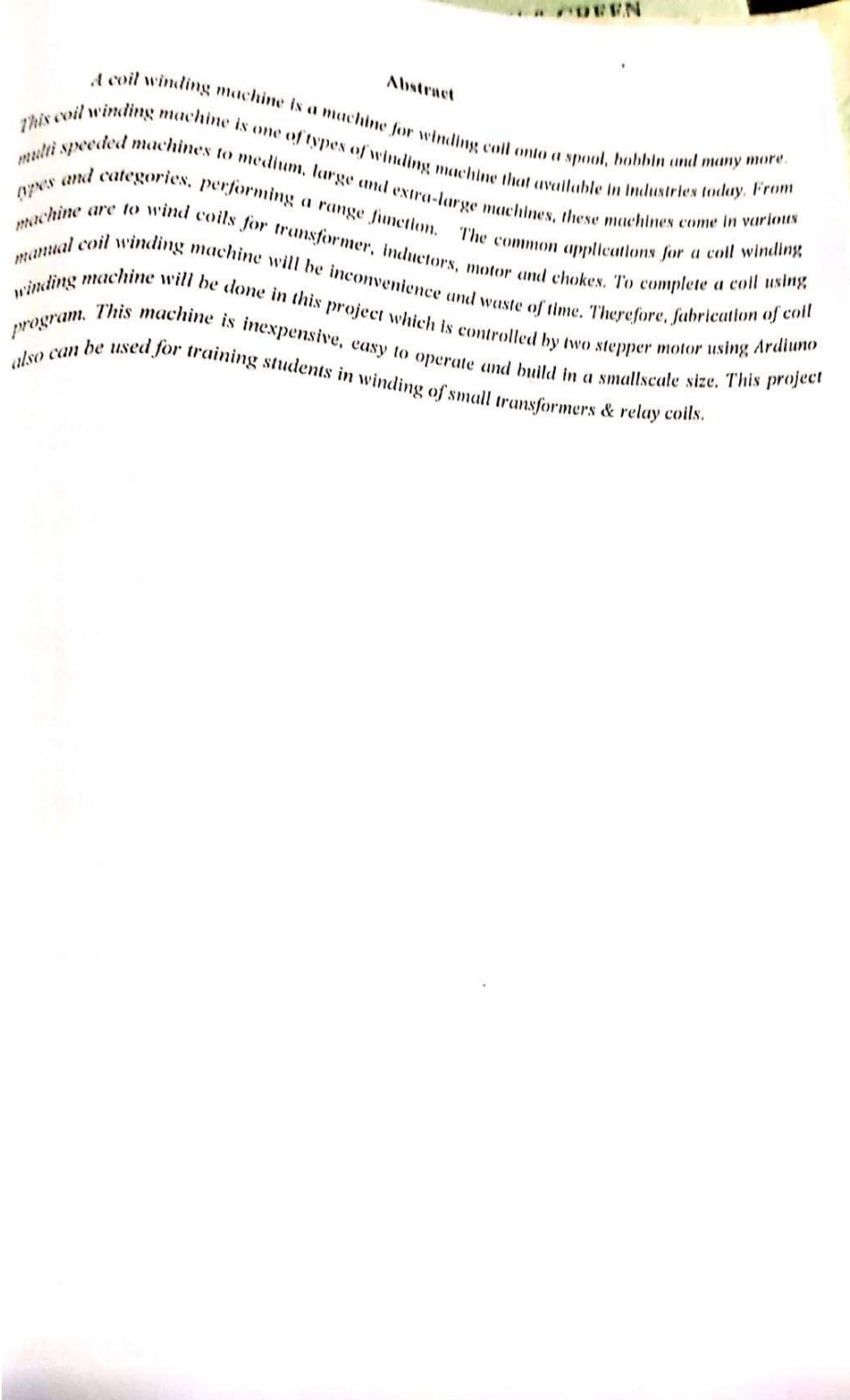
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Assistant Professor

Department of Industrial & Production Eng



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(केन्द्रीय विश्वविद्यालय अधिनियम 2009 क्र. 25 के अंतर्गत स्थापित केन्द्रीय विश्वविद्यालय)  
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**Guru Ghasidas Vishwavidyalaya**  
(A Central University Established by the Central Universities Act 2009 No. 25 of 2009)  
Koni, Bilaspur - 495009 (C.G.)

A  
MAJOR PROJECT REPORT ON  
"BARRIER'S IN IMPLEMENTING FROM LEAN & GREEN  
TO SUSTAINABLE MANUFACTURING IN INDIAN  
MANUFACTURING INDUSTRY USING WEIGHTED  
PRODUCT MODEL (W.P.M)."

Submitted by

**ANUJ RANJAN SINGH**  
(Roll - 18105004)  
(Enrollment No. - GQV/18/1054)

Supervised by:

**ARPITA ROY CHOUDHARY**  
(Assistant Professor)  
(Department of industrial production engineering)



**DEPARTMENT OF INDUSTRIAL & PRODUCTION ENGINEERING,  
SCHOOL OF STUDIES IN ENGINEERING AND TECHNOLOGY,  
GURU GHASIDAS VISWAVIDYALAYA, BILASPUR (C.G.)**  
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**SESSION - 2021-22**


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**CERTIFICATE**

We hereby submit the major project report entitled "BARRIER'S IN IMPLEMENTING FROM LEAN & GREEN TO SUSTAINABLE MANUFACTURING IN INDIAN MANUFACTURING INDUSTRY USING WEIGHTED PRODUCT MODEL (W.P.M)." in the Department of Industrial & production engineering of Guru Ghasidas Vishwavidyalaya, under the supervision of ARPITA ROYCHOUDHARY, Assistant Professor, Department of Industrial & production engineering Engineering, Guru Ghasidas Vishwavidyalay, Bilaspur (C.G.)'.

  
**ANUJ RANJAN SINGH**  
(Roll - 18105004)  
(Enrollment No. - GGV/18/1054)

The major project report is hereby approved for submission.

  
**ARPITA ROY CHOUDHARY**  
(Supervisor)  
(Assistant Professor)  
Department of Industrial & production Engineering)  
(I.T., GGV)

  
**EXTERNAL EXAMINEE**

**Dr. SHARAD CHANDRA SRIVASTAVA**  
(Head of Department)  
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विभागाध्यक्ष / Head  
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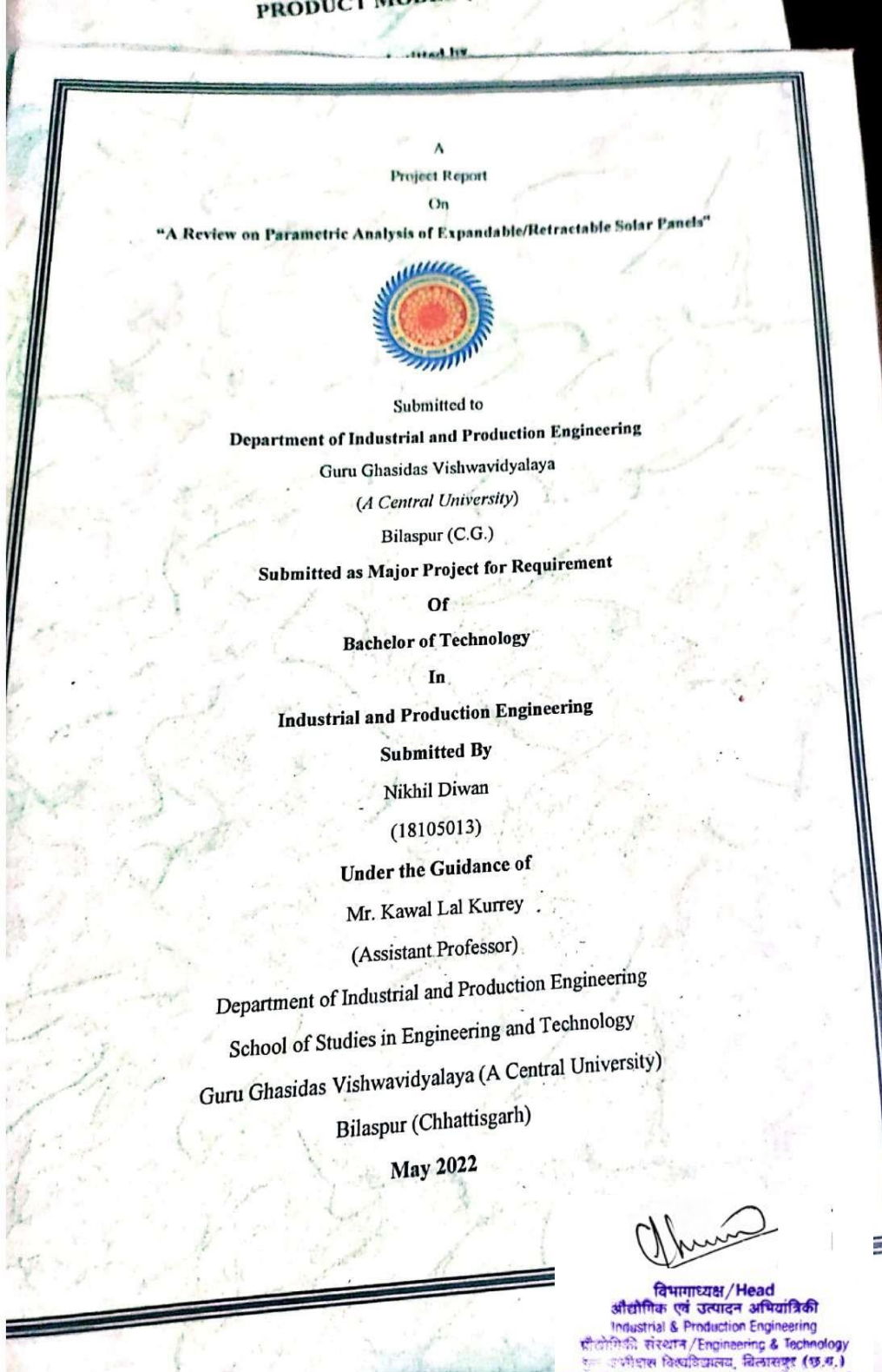


## ABSTRACT

Indian manufacturing industry's especially Small- and medium-sized enterprises (SMEs) have inherent characteristics, which require specific solutions for improving the sustainability performance of their operations. The purpose of this paper is to increase the knowledge on barriers for the adoption of lean, green to sustainable manufacturing by categorized the barriers in seven major sections by the help of questionnaire held on group of people. Taking, as a starting point, a systematic literature review, this paper presents a categorization of barriers for the adoption of lean, green to sustainable manufacturing by manufacturing SMEs. In total, seven categories for classifying the barriers for the adoption of lean, green to sustainable manufacturing within SMEs were identified: organizational, managerial and attitudinal; informational; governmental; financial; training and skills development; market and business context; and technological. Additionally, this study elaborates in seven section in each section there are three barrier's. The study found that the section which is extreme barrier in adopting lean, green to sustainable manufacturing rather than focus on specific barrier of any section. By the help of multi criteria decision making mathematical model weighted product model (W.P.M).

## KEYWORDS

SMEs; lean green manufacturing ; sustainable manufacturing; barriers; systematic literature review; categorization ; w.p.m ;sectional ; etc.







School of Studies in Engineering & Technology, Guru Ghasidas Vishwavidyalaya



**Certificate of Supervisor**

This is to certify that the work incorporated in the project

**“A Review on Parametric Analysis of Expandable/Retractable Solar Panels”**

is record of work carried out by Mr. Nikhil Diwan bearing Enrolment No. GGV/18/1183, under my guidance and supervision at Department of Industrial and Production Engineering, School of Studies in Engineering and Technology, Guru Ghasidas Vishwavidyalaya (A Central University), Bilaspur, (C.G), India to the best of my knowledge and belief.

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**Mr. Kawal Lal Kurrey**  
Assistant Professor  
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.....  
**Head of Department**

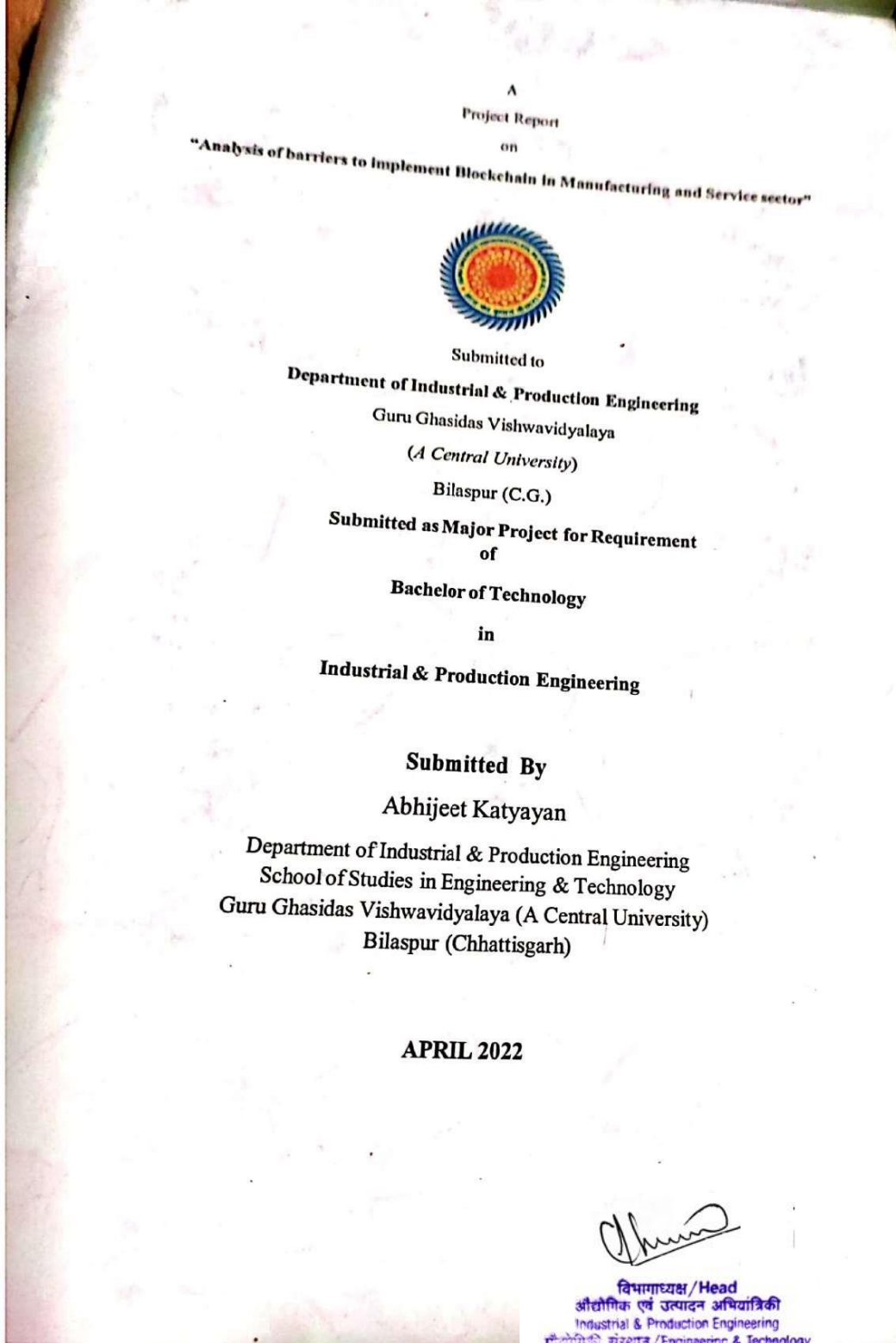
**Dr. Sharad Chandra Srivastava**  
Professor & Head  
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### Abstract


This project focuses on the applications of geometrically transformable and expandable structures with deployed energy production replace the fixed photovoltaic (PV) panels and tracking systems currently used in buildings rooftop installations. The significance of this expandable geometric system relies on its embedded motion grammar, i.e., rotation and translation transformations, in the system. The research draws inspiration from reconfiguration of compound tree leaves in nature, and addresses issues of redesign and modelling challenges that led to digital fabrication of the Prototype. With the increasing demand for new sources of energy, solar power has become an attractive solution for the current energy crisis. Photovoltaic systems have been increasingly used in the form of solar panel arrays. Foldable Solar Panels are lightweight, durable and extremely portable. The solar panels are mounted to weather resistant fabric that quickly fold for storage and unfold for use. A new portable solar generator has been developed to generate electricity. It has the potential to replace petrol generator. The solar generator can generate 20 Watts of electricity. This amount of power can supply up to 96 hours of electricity for the purpose of lighting and running small electrical appliances. The power output is (alternating current) AC current using 150 Watts inverter with 200 Watts surge, suitable for all commercial single phase electric appliances. Modern low earth orbit (LEO) satellites that require multi-mission flexibility are highly likely to be repositioned between different operational orbits. While executing this process the satellite may experience high levels of vibration and environmental hazards, exposing the deployed solar panel to dangerous stress levels, fatigue and space debris, hence it is desirable to retract the solar array before satellite repositioning to avoid damage or failure. A novel concept of deployable/retractable hybrid solar array system composed of both rigid and flexible solar panels arranged within a petal formation, aimed to provide a greater power to v ratio while dramatically reducing mass and cost is proposed.



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Department of Industrial & Production Engineering  
School of Engineering & Technology, Guru Ghasidas Vishwavidyalaya




**Certificate of Supervisor**

This is to certify that the work incorporated in the project  
**“Analysis of barriers to implement Blockchain in Manufacturing and Service sector”**  
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## Abstract

Blockchain technology (BCT) has been gaining popularity due to its benefits for almost every industry. However, despite its benefits, the organizational adoption of BCT is rather limited. This lack of uptake motivated us to identify the factors that influence the adoption of BCT from an organizational perspective. In recent times, organizations are increasingly adopting blockchain technology in their supply chains due to various advantages such as cost optimization, effective and verified record-keeping, transparency, and route tracking. This thesis aims to examine the barriers to implement Blockchain in Manufacturing and Service sector in India. A questionnaire-based survey was used to collect data from service and manufacturing-based company in India. The research framework is presented based on analysis of barriers to implement blockchain in service and manufacturing sector.

The three factor which affect most in adaptation of blockchain are Complexity in setup/use, Security and privacy concern and Technological awareness. Furthermore, the three factors, namely, Market dynamics, Scalability and Cost do not influence the intention to adopt the technology. The study contributes to filling a significant gap in the academic literature since only a few studies have endeavored to ascertain the technology adoption factors by supply chains of SMEs in a developing country like India. The study has also proposed a novel integrated technology adoption framework that can be employed by future studies. The findings are expected to enable SMEs to understand important factors to be considered for adopting blockchain technology in their Industries. Furthermore, the study may benefit the blockchain technology developers and suppliers as they can offer customized solutions based on the findings.



A  
Project report  
on

**Effect of Process Parameters of Electrical Discharge Machine on  
Machining Characteristics**

Submitted in  
Partial fulfillment of requirement for the award of degree  
of  
**Bachelor of Technology**  
in  
**Department of Industrial and Production Engineering**  
School of Studies in Engineering & Technology  
Guru Ghasidas Vishwavidyalaya  
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Session 2018-2022**

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(A CENTRAL UNIVERSITY)



**CERTIFICATE OF SUPERVISOR**

This is to certify that the work incorporated in the project "Effect of Process Parameters of Electrical Discharge Machine on Machining Characteristics" is the Record of project work carried out by Mr. Shivam bearing Enrollment No. GGV/18/1294 under my guidance and supervision for the award of degree of Bachelor of Technology in the department of industrial and Production Engineering, School Of Studies In Engineering & Technology, Guru Ghasidas Vishwavidyalaya (A Central University), Bilaspur, Chhattisgarh, India. To the best of my knowledge and belief the project.

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13/05/2022

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### ABSTRACT

Electric discharge machining (EDM) is a non-traditional machining process that involved a transient spark discharge through the fluid due to the potential difference between the electrode and the work piece. The aim of this project is to determine the proper electrode material for machining tool tungsten work pieces using electrical discharge machining (EDM). Basically, improper choose of electrode material in EDM machine may result a few problems like the machine may cause of poor machining performance and it will decrease the accuracy of the products. This project presents a fundamental study of characteristic of electrode discharge machine (EDM) that is electrode wear ratio (EWR) and material removal rate (MRR) by using copper electrode materials in order to increase the understanding of EDM processes. To archive this project objective, an experiment will be doing properly. By following the method, some literature review is going to do first before preparing the experimental set-up. Then experiment will be runs and the data of the experiment are taken. This is to make sure the analysis can be done in order to find the best electrode material. There is electrode material should be copper. Regarding the literature review, the higher material removal rate in the EDM machine, the better is the machining performance while the lower electrodes wear ratio in the EDM machine is the better and accurate performance characteristic. Thus, as the expected result for this experiment, the copper electrode material will be the best electrode among others electrode for EDM machining process.





A

Project report

On

**“Improvement in Yield of Carbonated Soft Drinks on Polyethylene  
Terephthalate (PET) and Returnable Glass Bottles (RGB) Line”**

At Narmada Drinks Pvt.Ltd Bilaspur

-a methodology of Six Sigma



Submitted to  
Institute of Technology  
Guru Ghasidas Vishwavidyalaya  
(A Central University)  
Bilaspur (Chhattisgarh)

In partial fulfillment of requirement for the award of degree

Of

Bachelor of Technology  
In  
Industrial and Production Engineering

**Supervisor:**  
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Associate Professor  
Department of Industrial and Production Engineering

**Submitted By:**  
Mr. Ritesh gupta

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Bilaspur (Chhattisgarh)  
Session 2018-2022

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**“Improvement in Yield of Carbonated Soft Drinks on Polyethylene Terephthalate (PET) And Returnable Glass Bottles (RGB) Line”**

the Record of research work carried out by Mr. Ritesh gupta bearing Enrollment No. GGV/18/1259. der my guidance and supervision for the award of degree of Bachelor of Technology in the Institute Technology, Guru Ghasidas Vishwavidyalaya(A Central University), bilaspur, Chhattisgarh, India. To a best of my knowledge and belief the project.

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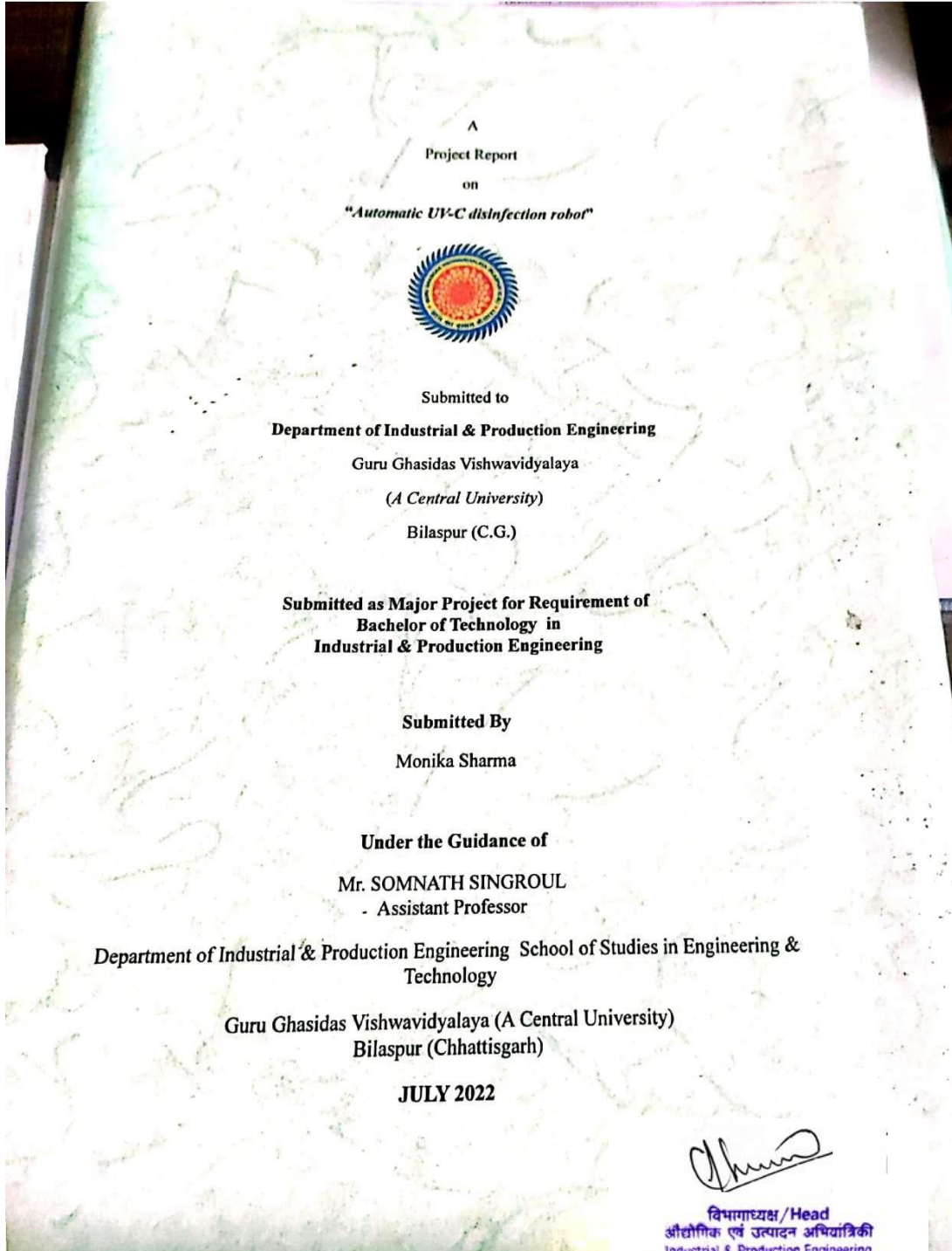


## Abstract

Six Sigma is an industry-accepted and proven methodology used for business process improvement. This methodology helps an organization achieve a superior performance and improved profitability, and is very effective for service-based businesses as well as those that are product-related. The Six Sigma program applies several specialized skill sets to streamline operations including process analysis, statistical measurement, and group facilitation.

It is an approach that improves quality by analyzing data with statistics. In recent years there has been a significant increase in the use and development of the six sigma methodology in manufacturing industry and others. It is high time to have a review on the six sigma approach. This paper reviews some related literatures to describe methodology, implementation and future researches. The present paper summaries four issues within the sub-category of the initial six sigma concepts: basic concept, DMAIC, DFSS and deployment. Then, some sectors that benefit from the implementation of six sigma are listed out, and the key factors influencing the successful six sigma project implementation are identified. At last, some topics for future research are presented.

Keywords: Carbonated Soft Drinks (CSD), PolyethyleneTerephthalate (PET), Returnable Glass Bottles (RGB) Line, Critical to quality (CTQ)



A  
Project Report  
on  
"Automatic UV-C disinfection robot"



Submitted to  
**Department of Industrial & Production Engineering**  
Guru Ghasidas Vishwavidyalaya  
(A Central University)  
Bilaspur (C.G.)

Submitted as Major Project for Requirement of  
**Bachelor of Technology in  
Industrial & Production Engineering**

Submitted By  
Monika Sharma

Under the Guidance of  
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- Assistant Professor

Department of Industrial & Production Engineering School of Studies in Engineering &  
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JULY 2022

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Department of Industrial & Production Engineering  
School of Studies in Engineering & Technology, Guru Ghasidas Vishwavidyalaya



**Certificate of Supervisor**

This is to certify that the work incorporated in the project

*"Automatic UV-C disinfection robot"*

is a record of work carried out by Miss. Monika Sharma bearing Enrollment No. GGV/18/1172, under my guidance and supervision at Department of Industrial and Production Engineering, School of Studies in Engineering & Technology, Guru Ghasidas Vishwavidyalaya, (A Central University) Bilaspur, (C.G.) India. To the best of my knowledge and belief.

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#### Abstract

A prototype of a robot that can disinfect surfaces using UV-C rays. In this pandemic, all surfaces are prone to contamination. Scientists have discovered that UV-C can kill coronavirus, so I will be presenting my Automatic UV disinfection robot which will be using UV-C rays to disinfect surfaces when humans are not around.

Ultraviolet (UV) light is used for disinfection or sterilization of rooms and surfaces. UV-C is employed as it has germicidal properties, in particular - bacteria and viruses, but it is detrimental to human beings as well. So, for disinfection without human interference, a UV Robot has been designed and implemented that follows a predefined path. It was equipped with three UV lamps which radiated light in all directions.

The effectiveness of the developed robot was verified in practical scenarios, such as hospitals, hotels, offices, and laboratories. Results demonstrate the high efficiency of the developed disinfection robot dedicated to autonomous indoor disinfection work. So, one of the effective ways to avoid getting infected with SARS-COV-2 (Coronavirus) is by sterilizing rooms using a UV robot.

Real-time monitoring and optimization of production and logistics processes significantly improve the efficiency of systems. Advanced healthcare management solutions require real-time information about the status of products, staff, and resources. As real-time locating systems (also referred to as indoor positioning systems) can enrich the available information, these systems started to gain attention in industrial environments in recent years. This paper provides a review of the possible technologies and applications related to wait time control, quality management, safety, and efficiency monitoring.

This work also provides a workflow to clarify the steps of a typical real-time locating system project, including the cleaning, pre-processing, and reference for research and development of indoor positioning-based healthcare solutions.



**OBSTACLE AVOIDANCE OF WHEELED MOBILE ROBOT IN CLUTTERED  
ENVIRONMENT**

Report of major project

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT OF 8<sup>th</sup> SEMESTER

**BACHELOR OF TECHNOLOGY**

(Industrial & Production Engineering)

Submitted by

**Akhilesh Tirkey**



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**April 2022**

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#### ABSTRACT

This report first describes the kinematic of wheeled robot, the velocity decomposition of the two wheels and robot body are analyzed to establish the kinematic model. Finally, the kinematic constraints are established for fixed standard wheels of the two-wheeled robot.

The aim of this project work is to add to the development in the area of path analysis and planning of wheeled mobile robot for known and unknown environments by avoiding static obstacles. An intelligent controller enables the robot to cope-up with its environment. This project is related to the design of an intelligent controller of wheeled mobile robots using heuristic rule base network so that wheeled mobile robot is able to navigate in its environments avoiding static as well as moving obstacles. The developed algorithm may be used for applying to an intelligent driverless vehicle for public and goods transport.





Department of Industrial & Production Engineering



School of Studies in Engineering & Technology, Guru Ghasidas Vishwavidyalaya

Certificate of Supervisor

This is to certify that the work incorporated in the project

“Obstacle avoidance of wheeled mobile robot in cluttered environment”

is record of work carried out by Mr. Akhilesh Turkey bearing Enrollment No. GGV/18/1025, under my guidance and supervision at Department of Industrial and Production Engineering, School of Studies in Engineering & Technology, Guru Ghasidas Vishwavidyalaya, (A Central University) Bilaspur, (C.G.) India. To the best of my knowledge and belief.

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A  
Major Project Report on  
The mechanical study of

**"Reinforced Epoxy Based Hybrid Composite"**



Submitted to

**Department of Industrial and Production Engineering**  
Guru Ghasidas Vishwavidyalaya  
(A Central University)  
Bilaspur (C.G.)

Submitted as Project Work for 8th Semester Requirement of Bachelor  
Of Technology  
in  
**Industrial and Production Engineering**

Submitted By

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**"Reinforced Epoxy Based Hybrid Composite"**

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The amount of similarity in the project report is 01%. Signed URKUND similarity report is attached with certificate.

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## ABSTRACT

Composite materials are becoming more popular due to their superior properties such as high tensile, flexural, and impact strength, high stiffness, and high corrosion resistance when compared to traditional materials. The carbon, glass, and Kevlar synthetic fibres have excellent mechanical properties and are used in a variety of fields including aircraft, automobiles, biomedical, and sports. The experimental analysis of a hybrid composite based on carbon-glass-Kevlar fiber reinforced with epoxy resin is presented in this paper. Hybrid composites were fabricated for different stacking sequences and fiber orientations (ply angles) by performing the hand lay-up technique. The tensile strength, flexural strength, and hardness tests were performed by ASTM D638, ASTM D790, and ASTM D2583, respectively. The result revealed that the stacking sequence affects the tensile, flexural strength and hardness whereas fiber orientation affects the tensile, and flexural strength except hardness. The discussed hybrid composite fabrication scheme, testing, data interpretation, analysis and results are tabulated and represented graphically throughout the presented research work.



A  
Project Report  
on  
A Review on Hydrogen Economy and Policies across the Globe: Focus on National  
hydrogen Mission in India



Submitted to

Department of Industrial & Production Engineering

Guru Ghasidas Vishwavidyalaya

(A Central University)

Bilaspur (C.G.)

Submitted as Major Project for Requirement  
of  
Bachelor of Technology  
in  
Industrial & Production Engineering

Submitted By

R. Shree Pragya

Under the Guidance of

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