Bapuji Educational Association (Regd)
Bapuji Institute of Engineering & Technology, Davangere.
Department of Mechanical Engineering

A Report on

Green Campus Initiative

(May 2024 to April 2025)

Staff Coordinator
(Dr. Pradeep N R)

Program Coordinator
Program Coordinator
Dept. of Mechanical Engg.
BIET-Davangere-577 004.

Faculty Coordinator
Dr. Pradeep N R
Assistant Professor

Program Coordinator
Dr. G Manavendra
Professor and Head

Student Coordinators:

4th year	4BD22ME435	Shreyas C Manchali
	4BD22ME426	Sandeep S H
3rdyear	4BD22ME009	Bharath Anjaneya Bandanath
	4BD23ME421	Bharath B N
2nd year	4BD23ME004	Jeevan KM
	4BD23ME005	K Tharun kumar

Bapuji Educational Association (Regd)
Bapuji Institute of Engineering & Technology, Davangere.
Department of Mechanical Engineering

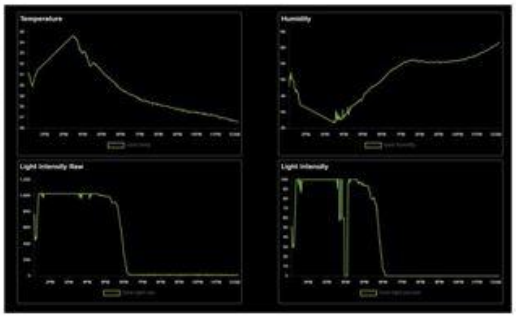
New Age Innovation Network 2.0 (NAIN 2.0)

Name of the College/Institution: BIET, Davanagere

Final Project approved from NAIN 2.0 Scheme (2024-25)

"Innovative Concept for a Zero-Energy Building: Harnessing Passive Solar Architecture and Sustainable Construction Techniques."

Zero-Energy Building Prototype



Cloud Data Acquisition System
Home Automation Unit

Rain Water Harvesting and Bio- digester Units

- **NAIN 2.O Funding :** 2 Lacks
- **BIET College Funding :** 0.8 Lacks
- **Total Amount Utilized:** 2.8 Lack Rupees

This holistic approach not only addresses environmental concerns but also presents a viable model for future zero-energy buildings. By combining traditional materials with modern technology, the design successfully demonstrates highly efficient, sustainable building systems that drastically reduce HVACR energy demands while ensuring optimal indoor environmental conditions.

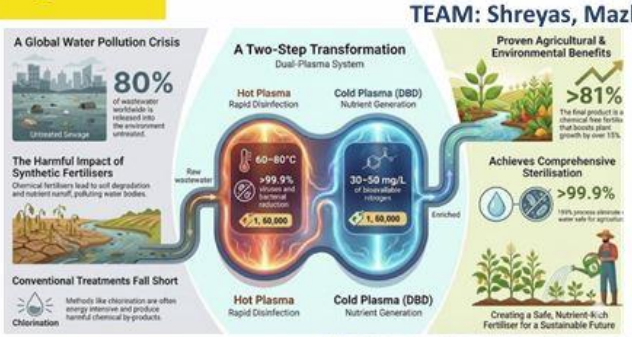
Project Team Member: MONIKA B, HEMANTHA R, SUMANTH H S,VINAYA H R
Project Mentor: Dr. Pradeep N R, Assistant Professor, Dept. of Mechanical Engineering.

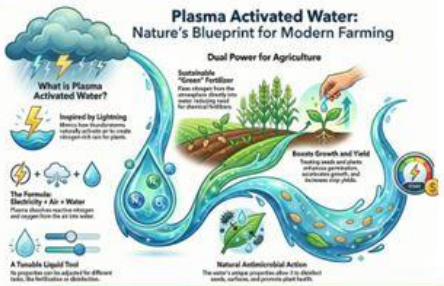
Bapuji Educational Association (Regd)
Bapuji Institute of Engineering & Technology, Davangere.
Department of Mechanical Engineering

Synthesis of Liquid Nano Fertilizer from Sewage Water using Plasma Technology

GUIDES: Dr. Sharan A.S & Dr. G Manavendra

TEAM: Shreyas, Mazhar, Jeevan, Nithin





Chemical-free fertilizer and pesticides production.

- Using only water and electricity.
- 20% more Crop Yield
- Removes harmful pathogens and pests
- Increases soil quality and nutrients.
- On-Site Production, no-chemicals
- Low operation cost
- Scalable for Small or Larger farms

Parameter	Contaminated water	Plasma treated water	Exposure time (treated)	Acceptable limits
pH	7.2	6.4	3 minutes	6.5 to 8.5
TDS (mg/L)	640 mg/L	275 mg/L	3 minutes	300 mg/L
TC (CFU/100 mL)	226 CFU/100 mL	0	20 seconds	0
FC (CFU/100 mL)	162 CFU/100 mL	0	25 seconds	0
E-coli (CFU/100 mL)	93 CFU/100 mL	0	25 seconds	0
BOD (mg/L)	68 mg/L	7 mg/L	15 minutes	≤5 mg/L
COD (mg/L)	86 mg/L	22 mg/L	15 minutes	≤25 mg

Sanctioned &Utilized Amount: ₹3,00,000 (Rupees Three Lakhs Only)

Bapuji Educational Association (Regd)
Bapuji Institute of Engineering & Technology, Davangere.
Department of Mechanical Engineering

GREEN CAMPUS ACTIVITIES
Academic Year 2023-24

WORLD ENVIRONMENT DAY – An Awareness Campaign

Staff Committee Members for world Environment Day

Sl. No.		Staff Name	Designation	Contact No
1	Dr.	G.MANAVENDRA	Professor & Head	9341000364
2	Dr.	PRADEEP N R	Assistant Professor	9964468423

World Environment Day (WED) is celebrated annually on 5th June every year. We all are responsible to safeguard our environment for the future generation. We, from Mechanical Department under the leadership of our Program coordinator Dr. G. Manavendra, created an environmental awareness program by planting samplings in our Department. So everyone unitedly planted small plant sampling in our Department Hostel. It is our duty to serve our nation. Every citizen of India must remember that he or she is an Indian has rights in this country but with certain duties too. During the Covid pandemic proved us the importance of oxygen required for survival. The prices of artificial oxygen for medical purposes were not affordable and available to all. The air pollution and level of impurities in air also in few cities of our nation makes survival more challenging. As Engineers, we hold the utmost responsibility of providing better tomorrow for the upcoming generation. On this World Environment Day, we need to realize that the environment provides us the essential resources to sustain life on Earth. All living things, including water, air, soil and vegetation form the environment. The day is such an initiative to spread awareness about the conservation and preservation of the environment.

Staff Coordinator
(Dr. Pradeep N R)

Program Coordinator

Program Coordinator
Dept. of Mechanical Engg.
BIET-Davangere-577 004.

On June 5th every year, environmentalists from all over the world stress on the environment protection. It is a successful initiative started by the United Nations as a part of the UN Environment Programme. World Environment Day provides a platform for everyone around the globe to speak out about issues facing the environment. On this great day, we As Engineers take an oath to follow the best environment healthy practices like planting and growing trees, using bio-degradable products, encouraging public transportation etc. We also pledge to create awareness in our locality on the growing environmental issues and bring social benefits to all people in all walks of our life. We feel privileged to organize and bring forward such a huge initiative for a global environmental cause.

Jai Hind.

Figure: Tree Plantion in the hostel By Program coordrinator (Dr. G. Manavendra)

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM
BAPUJI INSTITUTE OF ENGINEERING & TECHNOLOGY, DAVANGERE – 577 004
Department of Mechanical Engineering

GREEN CAMPUS ACTIVITIES: 2022-23

Design & Development Of Motorized 2 Wheel E-Scooter With GPS Tracking

ABSTRACT: The usage of electric scooters in cities has increased in recent years and it will keep growing. However, nowadays they cause problems to pedestrians, who are not used to this new technology. Therefore, this project consists of developing a smart scooter capable of respecting pedestrians and providing a greater safety to the driver and to pedestrians as well. The intention of this thesis work is to develop an electric kick scooter which possess the features and specifications makes it unique, pathbreaking. In this project, it has been improved a normal electric scooter in order to obtain a smart scooter. As this work is mainly to develop the product so we gathered all the information, like features and specifications of the electric kick scooters. We developed some sketches about 5 and chosen one out of all, which has an attractive design and features to develop that sketch to model in inventory. And we have searched for the companies which provides cheap and best parts like motor and batteries etc. for our product. Since we chose to develop a bike for public sharing, so the objectives of this thesis are to reduce the product cost, to optimize the features and specifications, providing safety and comfortable riding experience. The electricity is stored using a battery and the locomotion and movement of the vehicle is hence propelled using an electric hub motor. The electric scooter is not using an engine, becomes an effective way of road transport as it causes no pollution. It is eco-friendly and it definitely reduces human effort

Figure: Electrical Mi-Scooter

ENVIRONMENTAL IMPACT: The developed scooter will be made up of different materials, since many items have been added to it. Therefore, a detailed environmental impact study must be done. The E- Scooter is formed by steel, most of all. This metal is recyclable with a melting process. In fact, to obtain recyclable steel is needed 95% less energy than normal production. Therefore, the vast majority of the developed scooter could be recycled. In addition, most of the elements incorporated to the original scooter are perfectly reusable, so that the environmental impact would diminish. If the scooter breaks, the vast majority of components can be removed to use them for another purpose. For example, the mobile phonesupport can easily be taken out and put in another scooter. Moreover, the scooter will replacesome cars. There will be people who will use the developed scooter as a means of transportation instead of taking the car or the motorcycle. And as electric energy contaminates less than oil, it would be positive for the environment. It may also have an impact in cities. Since it will be a scooter with the aim of interacting with pedestrians and respecting citizens, it will contribute in changing some people's mind and see the electric scooter as something good for a city. In conclusion, the E-Scooter won't adversely affect the environment. However, it won't have a null impact because of the production of the energy and the manufacture of its components.

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM
BAPUJI INSTITUTE OF ENGINEERING & TECHNOLOGY, DAVANGERE – 577 004
Department of Mechanical Engineering

"SOLAR POWERED ELECTRIC BICYCLE"

ABSTRACT:

The increasing mobility has directly led to deteriorating traffic conditions, extra fuel consumption, increasing automobile exhaust emissions, air pollution and lowering quality of life. Apart from being clean, cheap and equitable mode of transport for short-distance journeys, cycling can potentially offer solutions to the problem of urban mobility. Many cities have tried promoting cycling particularly through the implementation of bike-sharing. Apparently the fourth generation bike sharing system has been promoted utilizing electric bicycles which considered as a clean technology implementation. Utilization of solar power is probably the development keys in the fourth generation bike sharing system and will become the standard in bikes haring system in the future. Electric bikes use batteries as a source of energy, thus they require a battery charger system which powered from the solar cells energy. This research aims to design and implement electric bicycle battery charging system with solar energy sources using fuzzy logic algorithm. It is necessary to develop an electric bicycle battery charging system with solar energy sources using fuzzy logic algorithm. The study was conducted by means of experimental method which includes the design, manufacture and testing controller systems.

Figure: Solar Panel Connection

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM
BAPUJI INSTITUTE OF ENGINEERING & TECHNOLOGY, DAVANGERE – 577 004
Department of Mechanical Engineering

GREEN CAMPUS ACTIVITIES

Academic Year 2021-22

Date: 31-01-2022

Staff Committee Members for Technical Webinar (off-line) on

"Deep Dive into Electric-Vehicle subsystems and its Design Principles"

Sl. No.		Staff Name	Designation	Contact No
1	Dr.	G.MANAVENDRA	Professor & Head	9341000364
2	Mr.	PRADEEP N R	Assistant Professor	9964468423

Summary of the Technical Webinar on 31-01-2022 (Monday) during the academic year 2021-22

No of Participants attended	No of Participants given feedback	No of Participants received E-certificate
97	86	86

Staff Coordinator
(Dr. Pradeep N R)

Program Coordinator

Program Coordinator
Dept. of Mechanical Engg.
BIET-Davangere-577 004.

Co-curriculum activity organized by the Mechanical Engineering Department

Objective:

The program will provide a valued platform for the industry specialists and academicians from institutes to understand exchange and explore the new developments in field of Electrical Vehicles and new battery technology that makes the faster adoption of EVs.

About Webinar:

This webinar will be discussing the innovation in electric vehicles technology. It will also aim to understand the concept of vehicle modelling, battery chemistry, drive train and future load demand and charging infrastructures. It explains why electric vehicles are important as a replacement of conventional engines. Major thrust area targeted:

• Government policies and incentives

• Future load demand and challenges

• Prospective of Electric Vehicles

• Connected Vehicles, a new paradigm in the world of IOTs

• Challenges for EV and Hybrid Electric Vehicles in India

• Electric Mobility in India: Why? What? When?

• Powertrain for Electric Vehicles

• Electric vehicle modelling

Technical Webinar (off-line) on Deep Dive into Electric-Vehicle subsystems and its Design Principles was organized on 31st January -2022 at Bapuji Institute of Engineering & Technology, Davangere. About 97 students participated in the event and 86 students have received E-certificate from the Mechanical Engineering Department.

Mr. Shreyas S Vernekar, CEO, Rove Labs Pvt. Ltd. Bangalore has inaugurated this Technical webinar. Program was presided by Dr.G Manavendra, Program coordinator of

the department. Faculty members and participants are present in the webinar. Event is coordinated by Sri. Pradeep N R, Assistant Professor, Mechanical Engineering Department.

Mr. Shreyas S Vernekar, has delivered session on "What is EV, Challenges of EV/HEV, An IoT connected to Vehicles and Industry" and covered the topic on "Challenges of EV/HEV in India." He was explained in more on Automobile Past, Present market and EV/HEV. Design and development process of automobiles sector, Electric vehicles setting a course for 2030, recent auto news and Buzzword in Auto industries these all are of Challenges of EV/HEV.

He also explained automobile domestic selling trends from 2015 to 2022 as category wise like Passenger Vehicles, Commercial Vehicles, Three-Wheeler, and Two-wheelers. He shared the vision and target of AMP-2026 (Automotive Mission Planning-2026) through Make in India, Skill India, and "ATMA NIRBHAR BHARAT". He explained the scope of improvement in EV/HEV as battery revolutions. At finally he passed the message to teachers need to more contribution on this way with an eye-opener.

He explained in detail the performance optimization through BMS as Power of connected vehicles and Archiving data of Road conditions, Climate conditions, Battery conditions, Load carrying conditions, also Traffic Sensitivity.

Finally Questionaries' sessions were also arranged for the participants.

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM
BAPUJI INSTITUTE OF ENGINEERING & TECHNOLOGY, DAVANGERE – 577 004

Department of Mechanical Engineering

GREEN CAMPUS METHODOLOGY

We assembled a panel of experts in institution for green practices to produce a survey for college campus. The departmental panel then selected key questions and weighted them for the rating. As with all our research, nearly all 4-year, colleges and universities are invited to participate early in the year. We then produce the plan for each participating college based on their responses.

It includes:

1. whether students have a campus quality of life that is both healthy and sustainable,
2. how well a college is preparing students for employment in the clean-energy economy of the 21st century as well as for citizenship in a world now defined by environmental concerns and opportunities and
3. How environmentally responsible a college's policies are.

- Does the college offer programs including mass transit programs like bike sharing, and facilities, prohibiting idling?

  It's simple: By providing proper vehicle parking for all individuals' results in transportation that increases access, colleges can improve the healthy atmosphere. While reducing pollution.

- Does the college have a formal committee with participation from students that is devoted to advancing sustainability on campus?

  With participation from administration to faculty and staff to students, ensure more dynamic, long-lasting solutions.

- Are college buildings that were constructed for utilization of natural resources?

  In respected measure of building energy efficiency and environmental design for colleges to build sustainable structures.

- What is a college's overall waste-diversion rate?

  A waste-diversion rate measures both the reduction in waste output and a college's rate of recycling.

- Does the college have a formal plan to mitigate its greenhouse gas emissions?

  College has planted trees to deplete the greenhouse gas emission.

- What percentage of the college's energy consumption is derived from renewable resources?

  College is constructed in such a manner in day time it utilizes the mass amount of sun light and natural air circulation in class room.

1. DEPARTMENTAL BEST GREEN CAMPUS ACTIVITES

- Small-Scale Energy Efficiency Initiatives
  Computer Energy Savings
  Light Bulb Replacement
- Large-Scale Efficiency Initiatives
  Cogeneration
- Transportation
  Bicycle Initiatives
  Biofuels
- Food
  Gardens
  Food Waste management
- Environmental Procurement
  Reuse Paper
- Green Building Design
  White Roofs
  Laboratories
  Day lighting
- Ecological Design
  Native Plants
  Parking Improvements
- Education and Outreach
  Expanding the Curriculum
  Incorporate Sustainability Awareness program.

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM
BAPUJI INSTITUTE OF ENGINEERING & TECHNOLOGY, DAVANGERE – 577 004

Department of Mechanical Engineering

GREEN CAMPUS ACTIVITIES

Academic Year 2020-21

Sl. No	Department	Project Title	Students List	Guides
1.	**Mechanial Engineerng**	Design and Development of Underwater Monitoring Robot for Aquaculture	Ms.Ruqaiya Mehwish Mr.Madhukumara M Mr.Manikanta Mr.Suresha P	Mr.Pradeep N R
2.		Effect of Water Absorption on Mode-I Inter Laminar Fracture Toughness of Hybrid Composite	Mr.Ashok Mahadev K Mr.Akash Biradar Mr.Anand kumar N Mr.Ashish Bhushan Singh	Mr. Mohan T R
3.		Development of Solar Powered AgriBot	Mr.Karthik K Bhat Mr.Nikhil Puthanikar Mr.Premalinga L Mr.Rakshit Gowda B	Mr.Umesh B S
4.		Synthesis of Silver Nanoparticles using Electro Chemical Discharge Machining Process for Medical Application	Mr.Harsha M S Mr.Arun S B Mr.Karthik K B Mr.Karthik M P	Dr.Sadashivappa Mr.Santhosha M
5.		Synthesis of Liquid Fertilizer for Agriculture Using Cold Plasma Technology.	Mr. Ashish V Dandin Mr. Abhishek R P Mr. Alok K S Ms. Manjula S E	Mr. Anand K J Dr. Sharan A S
6.		Design and Development of High Performance Graphene Based Super Capacitor and Sensors by Laser Induced Process	Mr. Shreyas J K Mr. Sharath B K Mr. Santhosh K S	Dr.SadashivapaK Dr. Sharan A S
7.		Nano Coating with Cu-TiO_2 Composite on Mild Steel Substrate by Electroplating Techniqu for t	Mr. Kishan Solanki Mr.Rudramuniswamy K Mr.Sangameshwara T S Mr. Shivaraj B N	Dr.Thippeswamy E Mrs. Sushma A Patil
8.		Development of Bio-Degradable and Eco-Friendly Articraft Bags Using Areca Sheath	Mr. Chidananda Mr. Manjunatha H Mr. Praveen Kumar Mr. Sunil A S	Dr. Sharan A S Mr. Basavaraj B
9.		Biodiesel Extraction from Microalgae and Testing its Properties	Mr.Vinayaka B H Mr.Devaraj G B Mr.Harshavardhan M J Mr. Ajay Kumar N	Dr.Sadashivappa K Dr. Sharan A S

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM
BAPUJI INSTITUTE OF ENGINEERING & TECHNOLOGY, DAVANGERE – 577 004

Department of Mechanical Engineering

1. Design and Development Of Under Water Monitoring Robot for Aquaculture

Funding Agency: Institute Project Funding BIET, Davangere. **Amount Sanctioned:** Rs. 5,000/-
Project Guide: Pradeep N R
Project Associates: Ruqaiya Mehwish, Madhukumara M, Manikanta, Suresha P

Abstract

Since its beginning, around the 50s decade, until present days, the area of unmanned underwater vehicles (UUV) has considerably grown through time; those have been used for many tasks and applications, from bomb searching and recovery to sea exploration. Initially, these robots were used mainly for military and scientific purposes. However, nowadays, they are very much extended into civils, and it is not hard to find them being used for recreation. In this context, the present research is an effort to make a walkthrough of evolution in this area, showing a diversity of structure designs, used materials, sensor and instrumentation technologies, kinds and the number of actuators employed, navigation control techniques, and what is new in development trends. The paper gives a clear starting point for those who are initializing into this research area; also, it brings some helpful knowledge for those who already have experience.

A set of real-time monitoring systems are designed for automatic obstacle avoidance in water environments. Through these designs and remote-controlled robotic fish, based on the set depth and planning of the acquisition point, five water quality environmental measures are obtained, including water level and temperature, pH, dissolved oxygen, conductivity, and turbidity; this is achieved using real-time acquisition, processing, remote storage, display, analysis and warning. It demonstrates a high value for online monitoring and early warnings for inland lakes and fine aquaculture.

Applications

Traditional unmanned underwater vehicles depend upon active propulsion, limiting their range and runtime, making them unsuitable for long duration monitoring missions. Our Underwater robot use a buoyancy engine to change the mass , allowing them to ascend and descend through the water. With power only being used to power the engine intermittently, robot can typically run for weeks or months without recharge, making them ideal for environmental monitoring.

As our underwater robot travel slowly through the water, they disturb the surrounding water truly little, allowing for accurate and reliable data recording. Underwater robots are normally AUVs (Autonomous Underwater Vehicles) and can run a pre-determined route without requiring human interaction. Their low speeds and autonomy, combined with long battery life, make our underwater robot ideal for long duration, environmental monitoring missions, capable of recording dissolved gas levels, pH, temperature, and optical sensing

- Underwater environmental monitoring
- The robot should permit measuring water quality by collecting data of parameters like pH, ORP and temperature and correlate these parameters with hydro biological data.
- Develop a highly efficient buoyancy engine and to precisely control vertical motion of the robot.
- The robot will be designed to take pictures underwater to monitor fish growth.

Figure: Robot for Aquaculture

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM
BAPUJI INSTITUTE OF ENGINEERING & TECHNOLOGY, DAVANGERE – 577 004
Department of Mechanical Engineering

2. Effect of Water Absorption on Mode-I Inter Laminar Fracture Toughness of Hybrid Composite

Funding Agency: Institute Project Funding BIET, Davangere. **Amount Sanctioned:** Rs. 5,000/-
Project Guide: T R Mohan
Project Associates: Ashok Mahadev K, Akash Biradar, Anand kumar N, Ashish Bhushan Singh

Abstract

- In this study the influence of water absorption on the Mode I interlaminar fracture toughness of jute-glass fiber reinforced with epoxy (J- G-E) hybrid composites with and without fly ash particulate filler.
- A hand lay-up technique is used to fabricate all the laminate of various thickness 8mm, 10mm, 12mm. these composites were investigated for mode-I fracture toughness as per ASTM standard.
- The fly ash particulate-filled hybrid composite shoes a better toughness found in with fly ash 12mm of 10mm crack length. It was found from the experimental results that the Mode-I fracture toughness initiation and propagation of water immersed composites were decreased compared to the dry specimens.

Objectives

The objectives of present work are defined below:

- To fabricate the Hybrid composite of various thickness using Hand layup technique.
- To compare the fracture toughness of Jute/glass hybrid composite with and without fly ash particulate filler.
- To study the influence of water absorption on the Mode I fracture toughness.

Applications

- Transportation: automobiles, railway coach interior, boat, etc.
- Aerospace: much of the structural weight of today's aero planes and helicopters consist of advanced FRPs(fiber reinforced plastic).
- Automotive: some body panels for cars trucks.

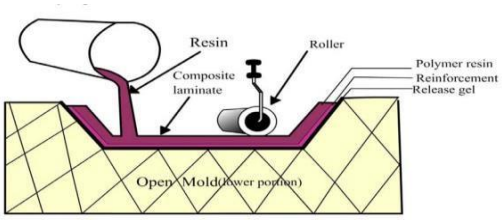


Figure.1: Hand lay-up technique

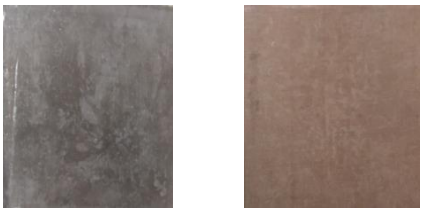


Figure.2: Board of 8mm thickness with and without fly ash

Figure.3: Specimens

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM
BAPUJI INSTITUTE OF ENGINEERING & TECHNOLOGY, DAVANGERE – 577 004
Department of Mechanical Engineering

3. Development of Solar Powered AgriBot

Funding Agency: Innovative Project Financial Assistance VTU Belagavi. **Amount Sanctioned:** Rs. 5,000/-
Project Guide: Prof. Umesh B S
Project Associates: Mr.Karthik K Bhat , Mr.Nikhil Puthanikar, Mr.Premalinga L, Mr.Rakshit Gowda B

Abstract

This project emphasizes the use of robotics technology in the field of agriculture. The basic agricultural applications includes weed cutting, ploughing, seed sowing, fertilizer spraying and watering. This project aims to fulfill all the needs mentioned above with little human effort and interaction. This robotic system works completely on the solar power which makes it way for non- conventional source of energy utilization. This robot is controlled and processed using Atmega328p micro-controller and infrared remote technology. The aim of developing this project is to introduce modern advance technology in the field of agriculture and to reduce manual labour and increase the efficiency of the farming.

Applications

- In farm, Agribots are used for planting seeds in all the rows of the farming plot, thus watered and fertilizers are sprayed on all the plants.
- Some crops need fertilizers when the seed germinates and plants begins to grow.
- Agricultural robots can be used for harvesting and picking operations.
- In greenhouse, the Irrigation and Fertilization operation can be performed precisely.
- Automation in agricultural activities is used, where manual labourers are not available during required time.

Figure.1: Robotic Farming

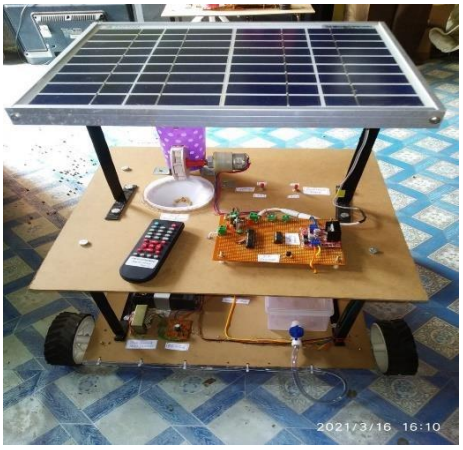


Figure.2: AGRIBOT

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM
BAPUJI INSTITUTE OF ENGINEERING & TECHNOLOGY, DAVANGERE – 577 004
Department of Mechanical Engineering

4. Synthesis of Silver Nanoparticles using Electro Chemical Discharge Machining Process for Medical Application

Funding Agency: Innovative Project Financial Assistance VTU Belagavi. **Amount Sanctioned:** Rs. 5,000/-
Project Guide: Dr. Sadashivappa K , Mr.Santhosha M
Project Associates: Mr.Harsha M S, Mr.Arun S B, Mr.Karthik K B, Mr.Karthik M P

Abstract

ECDM (Electro Chemical Discharge Machining) process involves high temperature melting of work piece material assisted by accelerated chemical etching. It is the combination of two non- conventional machining process ECM and EDM, and is known as hybrid machining. It can be applied for micro machining and micro finishing of conducting material. A setup is used for constant tool feeding rate and maintaining constant stand-off distance (SOD). Experiments are carried out by Silver as a tool (cathode) and work piece (anode). In the present work, experiments are carried out for micro drilling of Silver work piece using aqueous NaOH at 1 molar concentration of an electrolyte solution. In the process of micro drilling, Silver Nanoparticles are generated which are in the form of spherical particles and wire rods. Further the silver nanoparticles are studied for their antibacterial, anti-oxidant and anti-inflammatory activities.

Applications

- Silver Nanoparticles for Drug delivery system.
- Silver Nanoparticles for Catheter Modification.
- Silver Nanoparticles for Dental Applications.
- Silver Nanoparticles for Wound Healing.
- Silver Nanoparticles for Bone Healing.
- Silver Nanoparticles for Contact lenses.
- Silver Nanoparticles for Other Medical Applications.

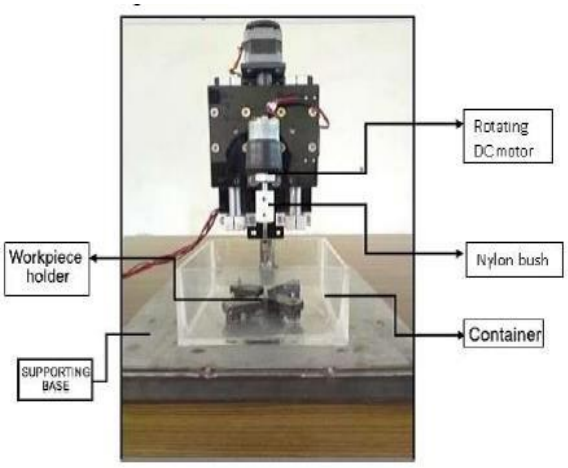


Figure.1: CNC feeding unit

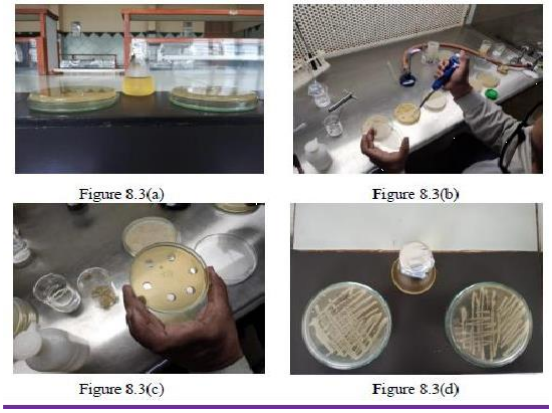


Figure.2: (a), (b), (c) & (d): Anti-Bacterial Activity

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM
BAPUJI INSTITUTE OF ENGINEERING & TECHNOLOGY, DAVANGERE – 577 004
Department of Mechanical Engineering

5. Synthesis of Liquid Fertilizer for Agriculture Using Cold Plasma Technology.

Funding Agency: KSCST, Bengaluru. **Amount Sanctioned:** Rs. 9,000/-
Project Guide: Mr. Anand K J, Dr. Sharan A S
Project Associates: Mr. Ashish V Dandin , Mr. Abhishek R P, Mr. Alok K S, Ms. Manjula S E

Abstract

In the present scenario with manifold increase in urbanization will further elevate the problem associated with waste management. This results in more sewage water generation and it indirectly elevates local environmental problems and health risk- related issues. In agriculture sector more use of chemical manure has posed many challenges on health issues and soil fertility.

To address the above problems, we have demonstrated a natural way of treating the sewage water for its effective use as organic manure in the form liquid fertilizer. Our aim is to overcome the problem of municipal sewage wastewater and produce synthesis of liquid fertilizer which helps the plant to grow effectively for better and faster yield. Initially municipal sewage waste water is treated with active charcoal filtration and then treated with plasma. This plasma activated water provides an alternative option for fixing the nitrogen supply to plants. It has been considered an effective agent for surface decontamination and increasingly used for disinfecting the plant parts. The cold atmospheric plasma increases rooting speed and Enhance seed germination and prevent pests. The cold atmospheric plasma activated water generated will be characterized for its low pH, nitrites, nitrates and hydrogen peroxides.

Applications

- Technology provides a way to treat the sewage water.
- This plasma treated water can be used as a liquid fertilizer.
- It can be used as a natural fertilizer. Eliminates the uses of chemical pesticides.
- Eco-friendly and economical approach to improve plant health as well as crop production.

Figure.2: Water treatment by Plasma arc

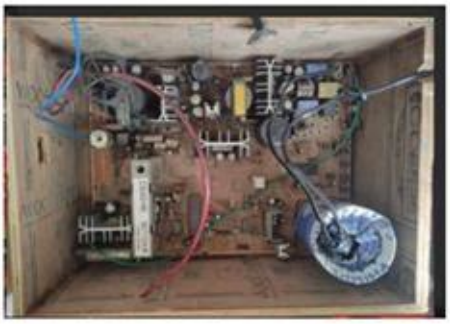


Figure.1: Hot Plasma Generator

Figure.2: Cold Plasma Generator

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM
BAPUJI INSTITUTE OF ENGINEERING & TECHNOLOGY, DAVANGERE – 577 004
Department of Mechanical Engineering

6. Design and Development of High Performance Graphene Based Super Capacitor and Sensors by Laser Induced Process

Funding Agency: KSCST, Bengaluru. **Amount Sanctioned:** Rs. 9,000/-
Project Guide: Dr. Sadashivappa K, Dr. Sharan A S
Project Associates: Mr. Shreyas J K, Mr. Sharath B K, Mr. Santhosh K S

Abstract

In the present work, an attempt is made to design a low-cost and easy-to-fabricate laser-induced graphene sensor and supercapacitors together with its implementation for multi-sensing applications. In our lab, commercial polyimide films can be readily transformed into porous graphene for the fabrication of flexible, supercapacitors and sensors. Laser induction on both sides of polyimide sheets enables the fabrication of vertically stacked supercapacitors to multiply their electrochemical performance while preserving device flexibility. Laser-induced process can be easily applied to the fabrication of many sensors. With ultrahigh specific surface area and excellent electrical conductivity, LIG can be well applied to the field of energy storage. Meanwhile, the simplicity of the preparation method, low cost, and precise control of processing conditions will make LIG a hot topic for energy storage materials to support the development of micro and wearable devices in the near future.

Applications

- Portable consumer devices: mobile power for an unplugged society, power tools.
- Medical devices: life-sustaining and life-enhancing medical devices, including pacemakers, defibrillators, hearing aids, pain management devices, and drug pumps.
- Electric vehicles: The environmental concerns over the use of fossil fuels have spurred great interest in electric and hybrid-electric vehicles powered by batteries.
- Large-scale energy storage: Batteries are widely used to store electrical energy during times when production (from power plants) exceeds consumption and the stores are used at times when consumption exceeds production.
- Space: Lithium ion batteries are used in the two Mars Exploration Rovers.

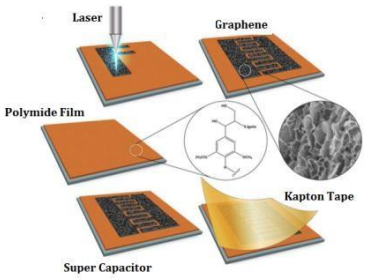


Figure.1: **Schematic illustration for laser writing of 3D graphene patterns on Polymide surface for micro-super capacitor fabrication**

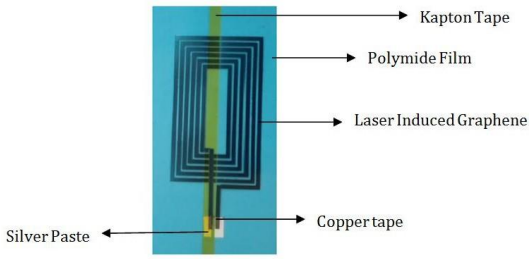


Figure.2: photograph of fabricated super capacitor

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM
BAPUJI INSTITUTE OF ENGINEERING & TECHNOLOGY, DAVANGERE – 577 004
Department of Mechanical Engineering

7. Nano Coating with Cu-TiO_2 Composite on Mild Steel Substrate by Electroplating Technique for the Improvement of Mechanical Properties.

Funding Agency: KSCST, Bengaluru. **Amount Sanctioned:** Rs. 8,000/-
Project Guide: Dr.Thippeswamy E, Mrs. Sushma A Patil
Project Associates: Mr. Kishan Solanki, Mr.Rudramuniswamy K, Mr.Sangameshwara T S, Mr. Shivaraj B N

ABSTRACT

Cu-TiO_2 Nano composites were prepared by electroplating method on to Mild Steel substrate using an acid copper plating bath containing dispersed nanosized TiO_2 with three different levels of electroplating parameters (Voltage, Speed and Time). With the help of Thermo Scientific NitonXL12 analyser machine the composition of uncoated and coated specimens were found.

Micro Hardness test was conducted to know the hardness of the electrodeposited with and without shot peening. The results of micro hardness test were taken as major responsible data and electroplating control parameters such as Voltage, Speed and Time as opposite factors to for the determination of optimum combination of control parameters by Taguchi Technique and ANOVA analysis. Morphology images were obtained by Scanning Electron Microscopic (SEM) analysis to study and observe structure and bonding on the surfaces of the specimens.Various tests were conducted to evaluate mechanical properties of coated specimens under optimum combination of control parameters. The tensile test results indicate decrease in stress values in case of electroplated specimens compared to normal mild steel specimen. To overcome this, shot peening process was done on electroplated specimens and improved in test results was observed.

The average surface roughness values of coated specimens were measured with the help of Tally Surf instrument. The surface roughness found to increase on electroplated shot peened specimens and it was minimum on electroplated specimens.

The outcome of the work indicate that Cu-TiO_2 Nano composites coating followed by shot peening process improve mechanical properties.

APPLICATIONS

- The application of these coatings includes wear and abrasion resistant surface, high hardness tools dispersion strengthened alloys and for protection against oxidation and hot corrosion.
- This coating may be applied to parts and components such as premium threaded connections, couplings, tubulars, risers, and alloy premium drill pipes.

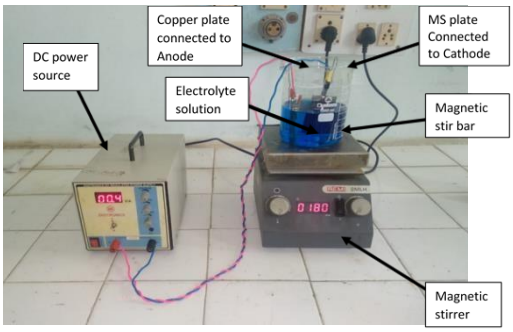


Fig 1: Experimental setup

Fig 2. Mild steel specimens after Electroplating

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM
BAPUJI INSTITUTE OF ENGINEERING & TECHNOLOGY, DAVANGERE – 577 004
Department of Mechanical Engineering

8. Development of Bio-Degradable and Eco-Friendly Articraft Bags Using Areca Sheath

Funding Agency: KSCST, Bengaluru. **Amount Sanctioned:** Rs. 8,000/-
Project Guide: Dr. Sharan A S, Mr. Basavaraj B
Project Associates: Mr. Chidananda, Mr. Manjunatha H, Mr. Praveen Kumar, Mr. Sunil A S

Abstract

Sustainable Design complies with social, economic and ecological viability while designing products, built environment, Systems and services. The intent is to minimize or completely eliminate negative environmental impact through skillful and sensitive design". In order to demonstrate this mission the Areca Sheath, one of the many natural resources will be explored throughout this project. In this project an attempt is made for effective utilization of Areca sheath for development of the bags. Innovative chemical treatment approach is implemented for the design and development of the bag. From the products developed we can ensure eco-friendly safety bags.

Applications

- Bags For cake shops
- Bags for Saree showrooms
- Bags for Optical stores
- Bags for Sweet & Farsan Stores
- Jewellery bags
- Eco Friendly Canvas Bags

Figure.1 Design and Development of Areca Bag

Fig: 2. Final Product

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM
BAPUJI INSTITUTE OF ENGINEERING & TECHNOLOGY, DAVANGERE – 577 004
Department of Mechanical Engineering

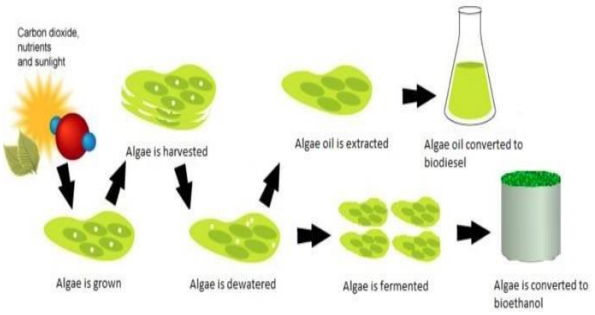
9. Biodiesel Extraction from Microalgae and Testing its Properties

Funding Agency: KSCST, Bengaluru. **Amount Sanctioned:** Rs. 6,000/-
Project Guide: Dr. Sadashivappa K, Dr. Sharan A S
Project Associates: Mr.Vinayaka B H, Mr.Devaraj G B, Mr.Harshavardhan M J, Mr. Ajay Kumar N

Abstract

The production and processing of algae from an industry point of view and the algae processing in Industry 4.0 as well as a paradigmatic shift from Industry 4.0 to Industry 5.0 were well-delineated. In the present an attempt has been made to extract biodiesel from microalgae.
Lipase was extracted from the cultures of P.aeruginosa and purified by dialysis using a membrane of MWCO- 20kDa. The purified crude lipase was found to have protein concentration of approximately 158 µg/ml. Algal oil obtained from dried B.braunii algal mat was extracted using Soxhlet apparatus. The final concentrated Algal oil was separated using separating funnel; yield of algal oil was found to be approximately 49% of its dried biomass. The extracted algal oil was subjected to lipase mediated trans- esterification for 6 hours at 35°C-40°C and the yield of biodiesel obtained from algal oil was approximately64.32%. From present work it can concluded that microbial trans-esterification is more beneficial than chemical trans- esterification process.

Graphical Abstract



Applications

.

Algae bio-refineries integrated with Industry 4.0 approach presented that no matter how the biomass is processed in an optimized biorefinery that allows for the production of the greatest numbers of goods and co-products (Fig. 1) and the lowest residual quantity, downstream capital is always assured for optimal returns. This implies that in an algae bio-refinery, it can automate the algae growth and harvesting system in order to reduce operational costs, and also enable operators to track growth and output of algae in real time via a network of Internet of Things (IoTs) plug-and-play sensors.

The industry 4.0 idea goes a step forward by creating a replica or digital duplicate of the device from the sensor data of the algae population. In the attempt to satisfy anticipated commodity demand, and minimize waste, such simulations will allow a forecast of potential cellular performance in real time basis.

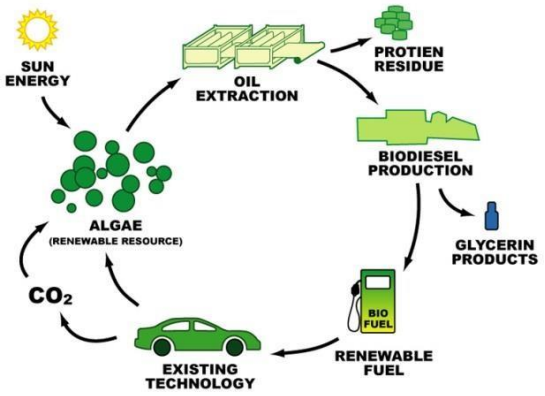


Fig. 1. Flow cycle of algae of microalgae biomass

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM
BAPUJI INSTITUTE OF ENGINEERING & TECHNOLOGY, DAVANGERE – 577 004
Department of Mechanical Engineering

10. Design and Development Of Under Water Monitoring Robot for Aquaculture

Product developed suggested by Robert Bosch Engineering and Business Solutions, Bengaluru
Project Guide: Pradeep N R
Project Associates: Dhanush R, Gagan Cm, Gourang Bongale, Kunal R Patel

Abstract

The agriculture industry plays an important role in the needs of humankind. The rising of the world population, as well as the decrease in the number of workers in the agricultural sector, calls for an increased demand for food suppliers. In the following report is a description of the process we took in developing Farming robot over the course of 2021. We decided early on that it was best for our team to focus primarily on the task of designing the hardware for Farming robot to perform its primary functions, and to create a template for a system that would be adaptable for future users and developers. The scope of our project included creating a universal tool mount, a seeding system, and a watering and nutrient mixing system. A visual representation to show how the aluminum extrusions could fit and move around a garden plot. There were attached stepper motors to control the motion of the gantry. The end goal with Farming robot is to create a robot that will tend to a variety of plants in a garden, with minimal user interaction through a computer or mobile application. Each plant could be given specialized care according to their needs, and Farming robot could monitor the growth of each plant from seeding to harvesting time. Each test helped develop the three subsystems further, until properly functional parts were incorporated onto the Farming robot. All the created parts were designed for 3D printability. This helped us in pave the way for future development of each subsystem.

Applications

Agricultural robots automate slow, repetitive, and dull tasks for farmers, allowing them to focus more on improving overall production yields. Some of the most common robots in agriculture are used for:

- Harvesting and picking
- Weed control
- Autonomous mowing, pruning, seeding, spraying, and thinning
- Phenotyping
- Sorting and packing
- Utility platforms

Harvesting and picking is one of the most popular robotic applications in agriculture due to the accuracy and speed that robots can achieve to improve the size of yields and reduce waste from crops being left in the field.

These applications can be difficult to automate, however. For example, a robotic system designed to pick sweet peppers encounters many obstacles. Vision systems must determine the location and ripeness of the pepper in harsh conditions, including the presence of dust, varying light intensity, temperature swings and movement created by the wind.

Figure.1: Robot for Precision Farming

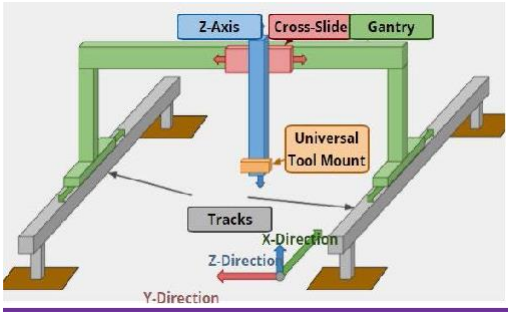


Figure.2: Robot Architecture

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM
BAPUJI INSTITUTE OF ENGINEERING & TECHNOLOGY, DAVANGERE – 577 004
Department of Mechanical Engineering

GREEN CAMPUS ACTIVITIES

Academic Year 2020-21

NIRMANA 1.0 Virtual PROJECT EXHIBITION – 2021 was organized on 13th August 2021 at Bapuji Institute of Engineering & Technology, Davangere. About 50 students participated in the event and exhibited 12 Projects in Mechanical Engineering Department.

Dr. H.B.Arivinda, Principal, Mr. Vageesh V Prasanna, Project Manager Robert Bosch chief Guest and Expert member inaugurated the Project exhibition. Program was presided by Dr.G Manavendra, Program coordinator of the department. Faculty members, participants and invitees are present in the exhibition and appreciated the exhibited projects. Event is coordinated by Sri.Pradeep N R, Assistant Professor.

Mr. Vageesh V Prasanna, Expert member evaluated the exhibited projects and gave suggestions for improvement in the projects and finally recommended awards for the exhibited projects. Expert recommended 3 Projects for Best Project of the department also for Institute awards.

Faculty members and students of other department were also visited exhibition center gave feedback about the projects. Parents, Press and media persons are also visited the exhibition center and acknowledged the efforts of students and supervisors/faculty members guided the students in successful completion of the projects.

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM
BAPUJI INSTITUTE OF ENGINEERING & TECHNOLOGY, DAVANGERE – 577 004
Department of Mechanical Engineering






Photo Gallery of NIRMANA 1.0 Exhibition of Mechanical Department