

Department of Mechanical Engineering

MECH-MARVELS

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Ajay Binay Institute of Technology

MECH-MARVELS

Technical Magazine of
Department Of Mechanical Engineering



AJAY BINAY INSTITUTE OF TECHNOLOGY

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MECH-MARVELS

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From the desk of Head Governing Board



There has never been a more exciting time for technologists in the history of mankind. In the last few years, the world has witnessed rapid progress and proliferation of technologies across areas of mobility, communication, data storage, genetics, 3D printing, artificial intelligence, robotics and above all space technology. As engineers and professionals the scope and choices in front of you is unbounded. I urge all students and faculties to continuously invest time in understanding and utilizing contemporary technology for their own growth as well as the growth of the community they live in. Mech-Marvels is a first step towards that.

Er. Satyadarshi Mishra

From the desk of Director- Placement and New Initiatives



As we start our journey into a new decade, I am very excited for all the opportunities that lies ahead of us. Traditional engineering practices are paving way for new innovative and disruptive technologies. It is imperative to us hone our basics and move ahead to meet these challenges. This transition will be smooth if we keep abreast with the changing technical scenario and one critical and simple state ahead in this regard to keep oneself updated through self study and learning. It is thus important as an educational institute to come up with newsletter and study material that will address the reading requirements of the younger generation. I am sure this issue of Data Loop will enlighten our students on the various aspects of technical scenario. I would like to thank the editorial team with this issue.

Er. Payal Mohapatra

From the Desk of Principal



In its early stages, human mind is a coarse grain of sand, recurring a nurturing shell of broad spectrum of earning opportunities and experiences. It eventually gets nourishes into natures most gifted ominous pearl of creative ideas, knowledge and critical Hinging that ever revolutionized the world. I am extremely sanguine that ABIT has offered itself as a shell for sheltering & fostering human minds in their raw state to be matured into empowered innovators, inversionist and discovers. The Institution has unlocked the store house of taken and creative genius and set buoyant human spirit ever eroding and co-curricular activities. The wheel of excellence and continual progress has been steered with values and conventions as its fulcrum, quality education and constant improvement in infrastructure, educational technology, teaching and learning processes as its spokes to fortify innumerable efforts to set the wheel on its track.

Prof. (Dr.) Leena Samantaray

From the Desk of HOD (Mechanical Engineering)



It gives me immense pleasure to contribute a message for MECH-MARVELS, the Mechanical Engineering Departmental Magazine of Ajay Binay Institute of Technology, Cuttack. This platform not only showcases the technical prowess and creative flair of our budding engineers but also reflects the spirit of innovation and teamwork that defines our department. As we navigate through rapid advancements in technology, it becomes essential for students to engage in activities beyond the classroom to sharpen their skills and broaden their perspectives. I congratulate the editorial team and all contributors for their sincere efforts and encourage every student to continue striving for excellence in both academics and co-curricular pursuits. Let this magazine be a source of inspiration and pride for all.

Er. Chinmay Das

ABOUT ABIT

ABIT group operates an Architecture college and Engineering College with MBA and MCA at CDA in Cuttack, Odisha. This Institution was established in 1998 with the aim to improve availability of skilled technical manpower for industries as well as to enhance the reach of technical education to rural Odisha. The institution is approved by AICTE, New Delhi, affiliated to BijuPatnaik University of Technology, Rourkela and is NAAC accredited. ABIT has a balanced distribution of technical streams with equal emphasis on the core sector and IT sector. The institute actively operates a R&D cell, Incubation centres and ED cell to supplement the learning environment.

Institution Vision

To promote quality teaching, exploration, research and facilitate holistic development of students that would help create capable technical man power needed for industry and academia.

Institution Mission

M1: To enable efficiency and prosperity in society through application of technical knowledge in collaboration with industry and other institutions.

M2: Ensure an effective teaching on contemporary topics and a rational examination system.

M3: Support and create centers of excellence for exploratory technical and behavioural projects that would promote originality and uniqueness.

M4: Establish partnership with local industries for collaborating, understanding and addressing real life technical challenges.

DEPARTMENT OF MECHANICAL ENGINEERING

Department of Mechanical Engineering was established in the year 1998 with approval of AICTE. Over the last two decades the department has established itself as a centre of excellence for advanced education in the state of Odisha. The primary objectives of the department is to impart quality education, training and research at the Under Graduate levels. The department is cherished with full-fledged team of experienced, dynamic and highly qualified faculties and supporting staff for imparting quality education.

Vision of the Department

To become a Centre of Experiential Learning in the field of Mechanical Engineering.

Mission of Department

M1. To nurture a good eco-system that encourages students and faculty to engage in meaningful learning, research and development.

M2. To continually improve teaching-learning process using modern pedagogy that produces mechanical engineers having sound technical capabilities and human value.

M3. To make our students industry ready through hands-on skill training, industrial visits and project works facilitated by academia-industry linkage.

M4. To encourage students to convert ideas into products through innovation and entrepreneurship.

Program Educational Objectives (PEOs)

PEO1: Design, make, operate and maintain mechanical systems effectively and efficiently.

PEO2: Build successful career in mechanical engineering and allied fields utilizing appropriate industry specific knowledge and contemporary skills.

PEO3: Work effectively as a team member and plan, document and communicate properly.

PEO4: Demonstrate a professional approach to engineering practice that takes into account ethical, legal, social, environmental, and safety concerns.

PEO5: Demonstrate a lifelong learning attitude in order to accomplish professional, organizational, and entrepreneurial goals.

Program Specific Outcomes (PSOs)

PSO1: Identify, analyze and formulate solutions for engineering problems related to production, thermal, fluid and mechatronic systems.

PSO2: Apply technical and professional skills effectively and efficiently to pursue successful career.

Program Outcomes (POs)

Engineering Graduates will be able to:

- 1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
- 6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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DRONE TECHNOLOGY AND ITS SIGNIFICANCE

Adikant Jena
2nd Year Student

Drone technology has revolutionized the way we approach various tasks, from aerial surveillance and precision agriculture to infrastructure inspection and delivery. Drones, also known as unmanned aerial vehicles (UAVs), are remotely controlled or autonomous flying devices equipped with sensors, cameras, and other payloads. They offer a cost-effective and efficient way to conduct aerial operations, reducing the risk of accidents and improving productivity.

One of the significant applications of drone technology is in precision agriculture. Drones equipped with sensors and cameras can monitor crop health, detect pests and diseases, and optimize irrigation systems, leading to increased crop yields and reduced waste. They can also inspect critical infrastructure, such as bridges, roads, and buildings, reducing the risk of accidents and improving maintenance efficiency. Additionally, drones are being used for delivery and logistics, providing faster and more efficient delivery options.

Drones are also playing a crucial role in environmental monitoring and conservation. They can monitor wildlife populations, track climate changes, and detect natural disasters, providing valuable insights for conservation and research efforts. In the event of a disaster, drones can quickly assess damage, locate survivors, and provide critical infrastructure inspections. They are also being used for search and rescue operations, reducing response times and improving outcomes.

The benefits of drone technology are numerous. They can automate tasks, reducing labor costs and improving productivity. They can also capture high-resolution images and data, providing accurate insights for various applications. Drones can reduce the risk of accidents and injuries by inspecting hazardous areas and detecting potential threats. They can also reduce costs associated with traditional methods, such as manned aircraft or ground-based inspections.

However, there are also challenges and limitations associated with drone technology. Regulatory frameworks vary by country and region, creating challenges for widespread adoption. Safety concerns, such as collisions with other aircraft or obstacles, are also a major issue. Cybersecurity is another concern, as drones can be vulnerable to cyber threats, compromising data security and integrity. Finally, public acceptance is also a challenge, as drones may face resistance due to concerns about privacy, noise, and safety.

Despite these challenges, the future of drone technology looks promising. Advancements in AI and autonomy will make drones increasingly autonomous, leveraging AI and machine learning to improve navigation, obstacle avoidance, and decision-making. Drones will also be integrated with other technologies, such as IoT sensors, blockchain, and 5G networks, to create more complex and powerful systems. As drones become more widespread, counter-drone technologies will emerge to address security concerns and mitigate potential threats.

DESIGNING THE NEXUS BETWEEN MAN AND UNIVERSE

Pabitra Das
2nd Year Student

The universe is not just a vast expanse of space and time; it is also a complex web of relationships that binds us to the land, the stars, and each other. Every breath we take, every bite we eat, and every thought we think is connected to the universe and its rhythms. The universe is our home, and we are an integral part of its fabric.

As we explore the universe, we are also discovering the depths of our own humanity. We are learning that we are not separate from the universe, but an expression of it. Our thoughts, emotions, and experiences are all part of the universe's unfolding story. This realization is both humbling and empowering, inviting us to see ourselves as part of a larger whole and to live in greater harmony with the universe.

The universe is also a mirror, reflecting back to us our own values, beliefs, and aspirations. Our relationship with the universe is a reflection of our relationship with ourselves and with each other. As we gaze out into the vastness of space, we are also gazing inward, exploring the depths of our own consciousness and the mysteries of our own existence.

Ultimately, the relationship between humans and the universe is one of reciprocity and mutualism. We give to the universe, and the universe gives back to us. We breathe in the oxygen it provides, and we breathe out the carbon dioxide it needs. We are part of the universe's cycle of life, and the universe is part of our own cycle of growth and transformation.



LAW OF ATTRACTION

Jaslin Jena
4th Year Student

The Law of Attraction is a universal principle that suggests that like attracts like, and that by focusing on positive thoughts and emotions, we can bring positive experiences into our lives. This law is based on the idea that everything in the universe is made up of energy, and that similar energies attract and repel each other. By aligning our thoughts and emotions with the energy of what we want to attract, we can create a magnetic force that draws it into our lives.

One of the key principles of the Law of Attraction is that our thoughts and emotions have the power to shape our reality. When we focus on positive thoughts and emotions, we create a positive energy field around ourselves that attracts positive experiences. On the other hand, when we focus on negative thoughts and emotions, we create a negative energy field that attracts negative experiences. By becoming aware of our thoughts and emotions, and by making a conscious effort to focus on the positive, we can begin to shift our energy and attract more of what we want into our lives.

The Law of Attraction is not just about getting what we want, but also about becoming the person we need to be in order to attract what we want. When we focus on personal growth and development, and when we work on becoming the best version of ourselves, we become a magnet for positive experiences and relationships. By letting go of negative patterns and habits, and by embracing positive ones, we can create a powerful energy field that attracts abundance, joy, and fulfillment into our lives.

Another important aspect of the Law of Attraction is the power of visualization. When we vividly imagine ourselves already in possession of what we want, we create a powerful energy field that attracts it into our lives. Visualization is not just about seeing things in our mind's eye, but also about feeling the emotions of already having what we want. By combining visualization with positive emotions, we can create a powerful magnetic force that draws what we want into our lives. The Law of Attraction is not a magic formula that can bring us instant success, but rather a powerful tool that can help us create the life we want. It requires patience, persistence, and a willingness to let go of negative patterns and habits. By applying the principles of the Law of Attraction, and by making a conscious effort to focus on the positive, we can begin to shift our energy and attract more of what we want into our lives.



THE FUTURE SCOPE OF 3D PRINTING

Ananta Kishore Paul
3rd Year Student

INTRODUCTION

3D printing technology, also known as additive manufacturing, has emerged as a groundbreaking innovation since its inception in the 1980s. Initially utilized for rapid prototyping, it has now expanded into various fields, revolutionizing manufacturing processes, product design, and even medical applications. This technology enables the creation of complex geometries and customized solutions that traditional manufacturing methods struggle to achieve, offering significant advantages in terms of time, cost, and resource efficiency.

The future scope of 3D printing is expansive, driven by ongoing advancements in materials science, digital technologies, and manufacturing processes. Industries such as healthcare are harnessing 3D printing for bespoke implants and prosthetics, while the aerospace and automotive sectors are adopting it for lightweight components and on-demand production, reducing both costs and environmental impact. Additionally, the construction industry is exploring the potential of 3D-printed homes, which could address housing shortages and promote sustainable building practices.

Despite its vast potential, the technology faces challenges, including regulatory issues, intellectual property concerns, and the need for a skilled workforce. Addressing these hurdles will be crucial for realizing the full capabilities of 3D printing.

Application

The future scope of 3D printing (additive manufacturing) is vast and spans a multitude of industries. As technology advances and new materials, techniques, and applications emerge, 3D printing has the potential to revolutionize manufacturing, healthcare, construction, aerospace, and many other sectors. Here are some of the key future trends and applications for 3D printing:

1. Manufacturing & Industrial Applications

3D printing is already disrupting traditional manufacturing by enabling faster, more efficient, and customizable production methods. In the future, it is expected to:

- **Mass Customization:** 3D printing will allow manufacturers to produce bespoke, tailored products at scale. This can range from customized automotive parts to personalized consumer goods such as shoes or wearable.
- **Supply Chain Optimization:** Companies could use 3D printing to create spare parts on-demand, reducing the need for large inventories. This could help companies adapt quickly to supply chain disruptions and minimize waste.
- **Distributed Manufacturing:** 3D printers could be deployed in decentralized locations to produce goods closer to the point of consumption, reducing transportation costs and time.

- Tooling and Production Aids: 3D printing will enable the rapid creation of custom tools, fixtures, jigs, and moulds that enhance production processes.

2. Aerospace & Defence

The aerospace and defense industries are already leveraging 3D printing for producing complex, lightweight components. Moving forward, we can expect:

- Lightweight Components: 3D printing can reduce the weight of aircraft, spacecraft, and defense equipment by allowing the design of lightweight, high-strength parts that would be difficult or impossible to produce using traditional methods.
- Advanced Aerospace Materials: 3D printing enables the use of new and specialized materials, such as titanium alloys, to create high-performance components for airplanes and rockets.
- Rapid Prototyping & Design Iteration: Faster proto typing cycles for aerospace designs will enable more efficient development of new technology.

3. Automotive Industry

In the automotive sector, 3D printing is already being used for prototyping, tooling, and producing parts. The scope will expand to:

- Light weight Vehicle Components: 3D printing allows manufacturers to design lighter, stronger components, which could help make vehicles more fuel-efficient and environmentally friendly.
- Customization & Spare Parts: 3D printing will enable on-demand, customized vehicle parts for individual customers or for rare or vintage cars, reducing the need for mass production and distribution.
- Electric and Autonomous Vehicles: 3D printing could be used to create parts specifically tailored for electric and self-driving vehicles, offering enhanced performance and reduced costs.

4. Education & Research

3D printing can significantly enhance educational tools, research, and development in both formal education and industrial R&D:

- Educational Tools: 3D printing allows students and educators to create tangible models of complex concepts, whether for biology, engineering, architecture, or history.
- Prototyping & Experimentation: Researchers can use 3D printing to rapidly prototype and test new ideas in fields such as robotics, materials science, and biotechnology.

Advantages

1. Customization & Personalization.
2. Cost Efficiency.

3. Speed & Efficiency.
4. Complexity & Design Freedom.
5. Sustainability & Environmental Benefits.
6. Supply Chain Resilience.
7. Advanced Manufacturing Techniques.
8. Space Exploration.
9. Healthcare Advancements.
10. Advanced automation.

Disadvantages

1. Material Limitations.
2. Speed & Scalability.
3. Quality Control & Consistency.
4. Cost Issues.
5. Limited to Certain Types of Products.
6. Intellectual Property and Piracy Risks.
7. Environmental Concerns.
8. Health and Safety Concerns.
9. Lack of Standardization and Regulation.
10. Skilled Labor & Training.

Conclusion

The future scope of 3D printing is both transformative and promising, with the potential to revolutionize a wide range of industries, from manufacturing and healthcare to construction, aerospace, and automotive. As technology continues to evolve, 3D printing is expected to drive significant advancements in customization, efficiency, sustainability, and innovation.

Some of the key advantages of 3D printing that will shape its future include:

1. Customization and Personalization: The ability to produce tailor-made products, from medical implants to consumer goods, allows for a level of personalization that traditional manufacturing cannot match.
2. Cost and Time Efficiency: Reducing material waste, cutting down lead times, and eliminating expensive tooling will make 3D printing more cost-effective, especially for low-volume or on-demand production.
3. Complexity and Innovation: 3D printing enables the creation of intricate geometries and complex parts that would be impossible or prohibitively expensive using traditional methods, enabling groundbreaking designs.

NANO-TECHNOLOGY : AN OVERVIEW

Harshajit Mohapatra
4th Year Student

Introduction

Nanotechnology is a term that is used to describe the science and technology related to the control and manipulation of matter and devices on a scale less than 100 nm in dimension. It involves a multidisciplinary approach involving fields such as applied physics, materials science, chemistry, biology, surface science, robotics, engineering, electrical engineering and biomedical engineering. At this scale the properties of matter are dictated and there are few boundaries between scientific disciplines. Nanotechnology (sometimes shortened to "nanotech") is the study of manipulating matter on an atomic and molecular scale. Generally, nanotechnology deals with developing materials, devices, or other structures with at least one dimension sized from 1 to 100 nanometres. Quantum mechanical effects are important at this quantum-realm scale. Nanotechnology is considered a key technology for the future. Consequently, various governments have invested billions of dollars in its future. The USA has invested 3.7 billion dollars through its National Nanotechnology Initiative followed by Japan with 750 million and the European Union 1.2 billion. Nanotechnology is very diverse, ranging from extensions of conventional device physics to completely new approaches based upon molecular self-assembly, from developing new materials with dimensions on the nanoscale to direct control of matter on the atomic scale. Nanotechnology entails the application of fields of science as diverse as surface science, organic chemistry, molecular biology, semiconductor physics, micro fabrication, etc.

Scientists debate the future implications of nanotechnology. Nanotechnology may be able to create many new materials and devices with a vast range of applications, such as in medicine, electronics, biomaterials and energy production. On the other hand, nanotechnology raises many of the same issues as any new technology, including concerns about the toxicity and environmental impact of nano-material [1] and their potential effects on global economics, as well as speculation about various doomsday scenarios.

Application

Nanotechnology is helping to considerably improve, even revolutionize, many technology and industry sectors: information technology, homeland security, medicine, transportation, energy, food safety, and environmental science, among many others. Described below is a sampling of the rapidly growing list of benefits and applications of nanotechnology.

Mechanical Engineering

- ✓ Wear-Resistant Coatings: Nano coatings on mechanical parts reduce wear and friction, leading to extended component lifespan and reduced maintenance in machinery.
- ✓ Lubrication and Friction Control: Nano particles can be added to lubricants to reduce friction and improve heat tolerance, optimizing the performance and lifespan of

engines and other machinery.

- ✓ **Lightweight, Strong Materials :** Nano composites, such as carbon nanotubes, provide materials that are both lightweight and extremely strong, ideal for applications requiring strength without adding automotive weight, such as in space sectors.

Electrical and Electronics Engineering

Smaller and Faster Semiconductors: Nanotechnology has enabled transistors and memory storage devices at scales previously unimaginable, helping build smaller, faster, and more energy-efficient processors.

Flexible Electronics: Nanomaterials, like graphene, are used to create flexible, bendable electronics, opening possibilities for wearable tech, flexible displays, and more.

Energy Storage (Batteries): Nanotechnology enhances the capacity, charge rate, and life of batteries. For example, silicon nanowires in lithium-ion batteries increase storage capacity, which is crucial for electric vehicles and renewable energy storage.

AEROSPACE ENGINEERING

- ✓ **Lightweight, High-Strength Materials:** Nanocomposites provide a combination of light weight and high strength, essential for reducing fuel consumption in aircraft. For example, carbon nanotubes and graphene are used to reinforce aircraft parts.
- ✓ **Thermal Protection Systems:** Nano coatings are used for thermal insulation, particularly in spacecraft and high-speed aircraft, where temperature extremes are common.
- ✓ **De-icing Systems:** Nano coatings can prevent ice buildup on aircraft surfaces, improving safety and reducing the need for de-icing procedures.

INDUSTRIAL AND MANUFACTURING

- ✓ **Enhanced Tooling and Cutting:** Nano coatings increase the hardness and durability of cutting tools, improving performance and extending tool life.
- ✓ **Efficient Manufacturing Processes:** Nanotechnology enables precise control over material properties, leading to the development of advanced manufacturing techniques such as nanoscale 3D printing.
- ✓ **Self-Healing Materials :** Nanomaterials can be used to create self-healing coatings that repair minor scratches and damages automatically, which is useful in manufacturing and maintenance.

CONCLUSION

Nanotechnology represents a transformative frontier in science and engineering, offering vast potential to improve human life across numerous fields. From revolutionizing medicine with targeted drug delivery and advanced diagnostics to creating more sustainable energy solutions and enhancing the durability of materials, nanotechnology has the power to reshape industries and address global challenges like environmental degradation, energy scarcity, and health care limitations. However, as we harness the potential of this technology, it's crucial to approach its development responsibly, addressing any safety, ethical, and environmental concerns. With balanced innovation and regulation, nanotechnology holds great.

DESALINATION CONVERSION OF SEA WATER TO FRESHWATER

Subrat Kumar Malik
4th Year Student

Introduction

Desalination, the process of converting sea water in to fresh water, has become essential in addressing global water scarcity. As the demand for freshwater rises and natural sources become limited, desalination provides a sustainable solution, especially for arid regions and coastal areas.

There are two primary methods for desalination : **thermal desalination** and **membrane desalination**.

Thermal Desalination: This method involves heating seawater to produce vapour , which is then condensed in to pure water. Variants of this method include Multi-Stage Flash Distillation (MSF) and Multi-Effect Distillation (MED). These processes rely on heat to separate water from salt, which is effective but energy-intensive.

Membrane Desalination (Reverse Osmosis): In this method, seawater is pushed through a semi-permeable membrane under high pressure, allowing only fresh water to pass through while retaining salts and impurities. Reverse Osmosis (RO) is widely used for its efficiency and lower energy requirements compared to thermal methods.

Each method has its advantages and challenges. Thermal desalination is reliable and can handle high-salinity water, while membrane desalination is more energy-efficient and widely applicable.

Environmental Impact: Desalination processes can have environmental implications, such as brine disposal (highly concentrated saltwater) and energy consumption, which often depends on fossil fuels. Advances in renewable energy integration, like solar-powered desalination, are promising for reducing these impacts.

Importance: As fresh water needs continue to grow, desalination stands out as a critical technology in achieving water security for the future.

Application

Desalination is the process of converting seawater into freshwater, making it suitable for drinking, irrigation, and industrial use. This technique is essential in areas where fresh water resources are limited or insufficient to meet demands. Desalination plants primarily use two methods:

1. **Reverse Osmosis (RO):** This method forces seawater through a semi-permeable membrane under high pressure. The membrane filters out salt and other impurities, allowing only fresh water to pass through. RO is energy-efficient and commonly used in large-scale desalination plants.

Thermal Desalination (e.g., Multi-Stage Flash, MSF): In this process, sea water is heated to produce steam, which then condenses to form fresh water, leaving the salts and minerals behind. Thermal desalination is often used in conjunction with power plants, utilizing waste heat to reduce energy costs.

Example

In Saudi Arabia, where freshwater is scarce, desalination provides nearly 50% of the country's water supply. The world's largest desalination plant, Ras Al Khair, combine reverse osmosis and multi-stage flash processes, supplying over 1million cubic meters of freshwater daily to meet both residential and industrial needs.

Advantages

Desalination, the process of converting sea water to fresh water, offers significant advantages, particularly for regions facing water scarcity. Here's a brief overview:

1. **Reliable Water Source:** Desalination provides a consistent supply of potable water, especially for coastal areas with limited freshwater resources. For example, in arid regions like the Middle East, desalination plants supply a large portion of drinking water. The Jebel Ali plant in Dubai, for instance, produces millions of gallons of freshwater daily, supporting the city's growing population and tourism industry.
2. **Drought Resilience:** In areas prone to droughts, desalination offers a solution to maintain water availability when traditional sources like rivers and reservoirs are low. California's Carlsbad Desalination Plant helps offset water shortages by supplementing water supplies during dry seasons.
3. **Boosts Agriculture:** Desalination enables the use of freshwater for agriculture, essential in arid regions where crop irrigation would otherwise be limited. For instance, Israel uses desalinated water to irrigate crops, enhancing food production and self-sufficiency.
4. **Supports Industry Growth:** Desalinated water is used in various industries, reducing dependence on natural freshwater sources and supporting industrial development. In Saudi Arabia, desalination supports industries by providing water for processes that otherwise would rely on scarce freshwater sources.

These examples highlight how desalination technology serves as a sustainable solution to water scarcity, helping meet human, agricultural, and industrial water demands in regions with limited access to freshwater.

Disadvantages

Desalination, the process of converting sea water to fresh water, provides essential water resources in arid regions but has several disadvantages:

1. **High Energy Consumption:** Desalination, especially via reverse osmosis, requires large amounts of energy. This energy demand increases operational costs and environmental footprint. For example, desalination plants in California consume

significant power, contributing to green house gas emission unless renewable energy sources are used.

Environmental Impact: The process generates brine, a concentrated salt solution that, if not properly managed, can harm marine ecosystems when discharged back into the ocean. For instance, brine disposal in the Persian Gulf has affected marine life by raising the salinity and temperature of local waters.

1. **Costly Infrastructure :** Building and maintaining desalination plants is expensive. Small communities may struggle to afford these costs.

For example, in Australia, Some desalination plants were shutdown due to high operating expenses, which were unsustainable for local economies.

2. **Limited Freshwater Quality:** While desalination removes most salts and minerals, some remain in the water, making it less ideal for agricultural use compared to natural freshwater sources. In Saudi Arabia, desalinated water is often used for drinking but less commonly for farming due to these limitations.

3. **Potential Health Concerns:** Some studies suggest that desalinated water might lack essential minerals, which could pose health risks. In regions like the Middle East, residents often add minerals back to drinking water for improved health outcomes. These factors make desalination a costly, environmentally sensitive solution for addressing water scarcity.

Conclusion

The conclusion of "Desalination: Conversion of Seawater to Freshwater" highlights desalination as an effective solution to address freshwater scarcity by converting abundant seawater into usable freshwater. Desalination techniques, primarily reverse osmosis and distillation, have proven highly effective in regions with limited natural fresh water sources, such as arid coastal areas. For example, in places like the Middle East, desalination plants are essential, supplying up to 90% of the freshwater used. Similarly, California uses desalination to supplement its water supply, especially in times of drought. While desalination provides a reliable water source, it also requires substantial energy and infrastructure, which can be costly and have environmental impacts. However, ongoing advancements are making the process more efficient and sustainable, allowing for broader adoption worldwide.

CONCENTRATING SOLAR THERMAL : A GLANCE

Er. Subhrajyoti Behura
Department of Mechanical Engineering

Introduction

Concentrating Solar Thermal (CST) technologies represent a promising approach to harnessing solar energy by focusing sunlight to produce heat, which is then used for electricity generation or industrial processes. Unlike photovoltaic systems, which convert sunlight directly into electricity, CST technologies use mirrors or lenses to concentrate sunlight onto a receiver, where it is converted to thermal energy. This thermal energy can then be used to drive a turbine for electricity generation or to supply high-temperature heat for industrial applications such as desalination, chemical production, and enhanced oil recovery. As a sustainable and scalable energy source, CST offers the potential to reduce dependence on fossil fuels and decrease greenhouse gas emissions. Key types of CST technologies include parabolic troughs, solar towers, linear Fresnel reflectors, and parabolic dishes, each with specific applications and benefits.

With growing concerns over climate change and the need for clean energy sources, CST technology has gained attention for its ability to provide reliable, dispatchable power when paired with thermal storage systems. This enables CST plants to store excess thermal energy during periods of high sunlight, which can then be released to generate electricity even when the sun is not shining. As innovations in CST systems continue, these technologies are increasingly positioned to complement other renewable energy sources in the transition to a low-carbon energy grid.

Advantages of Concentrating Solar Thermal(CST)

1. **Renewable Energy Source:** CST systems use sunlight, a clean and renewable resource, making it a sustainable option with a low environmental impact.
2. **Energy Storage Capability:** Thermal storage (e.g., molten salt) enables CST plants to store energy as heat, allowing electricity generation even when the sun isn't shining.
3. **Reduced Greenhouse Gas Emissions:** CST systems produce little to no emissions, making them a cleaner alternative to fossil fuels and helping reduce air pollution and carbon footprint.
4. **Job Creation and Economic Benefits :** CST projects require skilled labor for construction, maintenance, and operations, generating jobs and stimulating local economies. **Scalability:** CST technology can be used in various scales, from small plants for local communities to large-scale power plants for utility grids.

Disadvantages of Concentrating Solar Thermal(CST)

1. **High Initial Costs:** CST systems require a large upfront investment for installation, especially for storage infrastructure, which can be a financial barrier.

2. **Land and Water Use:** CST plants require significant land area in sunny regions, which can disrupt local ecosystems, and may need substantial water for cooling, which is a challenge in arid regions.
3. **Intermittent Power Generation:** CST systems depend on sunlight, so weather conditions and seasonal variations can affect performance, though storage can mitigate this issue.
4. **Complex Infrastructure and Maintenance:** CST plants require advanced technology, and complex systems can make maintenance challenging and costly.
5. **Location Limitations:** CST is most efficient in areas with abundant direct sunlight, typically desert regions, making it less practical in cloudy or high-latitude areas.

Applications of Concentrating Solar Thermal(CST)

1. **Electricity Generation :** CST plants produce electricity for the grid, particularly useful in regions with high solar isolation like deserts.
2. **Industrial Process Heat :** CST systems can provide high-temperature heat for industrial processes like cement, steel, and chemical manufacturing.
3. **Desalination :** CST technology can be used for seawater desalination, producing freshwater for drinking and agriculture in arid regions.
4. **Enhanced Oil Recovery:** CST technology can generate steam for enhanced oil recovery, reducing reliance on fossil fuels in extraction processes.
5. **Heating and Cooling :** CST systems can be used for district heating or combined heat and power (CHP) applications in buildings and communities.

Conclusion

Concentrating Solar Thermal (CST) technology offers a promising, renewable solution for generating electricity and industrial heat, especially in sunny regions. With its ability to store thermal energy, CST can provide power beyond daylight hours, addressing some of the intermittency challenges faced by solar power. While the technology involves high initial costs, land use, and geographical limitations, CST's environmental and economic benefits make it a viable choice for sustainable energy. As technology advances and costs decrease, CST has the potential to play a significant role in reducing global reliance on fossil fuels and advancing the clean energy transition.

SMARTER MACHINES AND MANUFACTURING

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I. Introduction

Modern engineering systems and manufacturing processes are becoming increasingly complex, and are operating in highly dynamic environments. Thus, sustaining the reliability of such systems is becoming a more complex and challenging requirement. In most cases, manufacturing systems are highly sophisticated and dynamic, which makes the process of predicting reliability and performance far from trivial. The main barriers for predicting reliability of a complex system include the inability to anticipate unknown faults particularly for complex engineering systems in which hundreds to thousands of sub-systems or components interact and contribute to the overall system functionality and performance and etc. The concept of engineering immune systems refers to designing systems with features and mechanisms that mimic the adaptive and protective capabilities of biological immune systems. In the context of engineering, this concept is applied to create resilient and robust systems that can detect, respond to, and recover from disruptions, faults, or attacks. The goal is to enhance the overall reliability and security of complex systems. Here are key aspects of engineering immune systems. Reliability, which is a key performance indicator of any industrial production system, is the probability that a system will be able to perform its function without failing for a specific time period under certain operating conditions. However, regardless how highly reliable a product or equipment is, it will degrade over time. Systems, with high uncertainty and are applicable to non-intrusive approaches only, require solutions that are more advanced than preventive maintenance in order to avoid untimely maintenance and non-optimal cost. Self-maintenance could be a suitable approach to this problem. Self-maintenance refers to the ability to carry out regular quality and safety checking by machine itself, to detect anomaly, and to make immediate repairs when needed by using stocked spare parts. Beyond resilient system and self-maintenance, EIS will be the next-generation maintenance methodology. EIS is an analogy of the biological immune system which protects against invasion and infection by identifying and killing the pathogens. It can address the machine maintenance issues in highly complex and uncertain environment. The goal of having an EIS is to achieve efficient near-zero breakdown performance with minimal human intervention. EIS should be robust in diverse and dynamic environments.

II. Self Maintenance in Manufacturing

Predictive maintenance: Self-maintenance systems can utilize sensors and data analytics to predict when equipment is likely to fail. This enables proactive maintenance, reducing unplanned downtime and extending the lifespan of machinery. Continuous monitoring of the condition of machines and manufacturing processes allows for real-time assessment. Self-maintenance systems can autonomously adjust parameters or initiate maintenance actions based on the health status of equipment. Self-maintenance can be integrated into control systems to optimize production processes. Machines can autonomously adjust settings to ensure optimal performance and energy efficiency. Automated self-maintenance mechanisms

decrease the need for manual inspections and interventions, allowing human operators to focus on more complex tasks and decision-making.

III. Engineering Immune System in Manufacturing

Manufacturing systems are increasingly connected, and cyber-security threats are a concern. Engineering immune systems can include robust cyber-security measures, such as intrusion detection systems and firewalls, to protect against cyber-attacks. Immune systems in manufacturing can involve the implementation of anomaly detection algorithms. These algorithms can identify unusual patterns in data, signalling potential issues in the production process or indicating a cyber threat. Engineering immune systems contribute to the design of control systems that can adapt to changes, recover from faults, and ensure the continuous and safe operation of manufacturing processes. Manufacturing systems can be designed with fault-tolerant features that allow them to continue operating even in the presence of component failures. This contributes to the overall reliability of the manufacturing infrastructure.

IV. Integration for Smarter Machines and Systems

The combination of self-maintenance and engineering immune systems enables adaptive manufacturing processes. Machines can adapt to changing conditions, modify production schedules, and optimize resource usage in response to real-time data. The continuous monitoring and analysis of data by self-maintenance and immune systems provide valuable insights. This data-driven approach supports informed decision-making in optimizing processes and addressing potential issues before they impact production. The proactive nature of self-maintenance, coupled with the resilience provided by engineering immune systems, contributes to minimizing downtime. This is crucial for maintaining the efficiency and profitability of manufacturing operations. Self-maintenance and immune systems contribute to the overall life cycle management of machines and manufacturing systems. This includes optimizing performance, extending equipment lifespan, and ensuring a smooth transition to newer technologies.

CONCLUSION

The integration of self-maintenance and engineering immune systems into manufacturing aligns with the broader Industry 4.0 paradigm, where the focus is on creating smart, connected, and adaptive industrial processes. As technology continues to advance, these concepts will play an increasingly important role in shaping the future of manufacturing towards greater efficiency, sustainability, and resilience.

A REVIEW ON RECENT DEVELOPMENT ON AGRICULTURAL DRONE

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1. Introduction

In the past few years, uses of agricultural drones have been increased significantly in the developing countries like India and China. Agricultural drones become very useful for handling crop diseases and pest control due to advanced technologies like real-time kinematic high-precision positioning and flight control. Due to these technologies, agricultural drones are able to fly at fixed height with fixed velocity which makes them effective for spraying pesticides leads to reduction of crop damage. Due to integration of spectral cameras, capabilities of agricultural drones have improved significantly. Due to this drone technologies become more informative and provides high resolution images, which becomes helpful to get data regarding crop and soil monitoring, natural resource management, irrigation and fertilization methods and detection of plant disease. In this way, agricultural drone becomes revolutionary instrument in modern farming and plant protection. Also, high resolution UAV data are easily accessed to the farmers, and used in different agricultural applications such as plant detection, plant monitoring, and yield prediction. Efficiency and effectiveness in crop management have been increased due to this advancement in agricultural drones which in turn minimizes the impact of harmful pesticides on environment and human health. Besides the above technologies, remote sensing is believed to be another technology consisting potential in smart and precision agriculture. Similarly, these drones could be used in several agricultural activities, including crop and growth monitoring, yield estimation, water stress assessment, and weeds, pest, and disease detection. Although, this field is very new, very comprehensive studies regarding this subject are available limitedly. Hence, this study describes the work done on the agricultural drones till now.

2. Materials and method

Unmanned aerial vehicle (UAV) is an aircraft which fly automatically without a human pilot and controlled by radio channel. UAV are classified as 1. fixed wing 2. helicopter 3. quadcopter 4. hexacopter 5. octocopter.



Fig. 1.(a) Fixed wing(b)Single rotor (c) Quad copter (d) Hexa copter (e) Octo copter

2.1 Methodology

Flight controller is the primary control board of the unmanned armed vehicle (UAV), which helps to control the flight of drone. It consists one micro controller which establishes communication with the four brushless motors. Electronic Speed controllers (ESC) communicate with these BLDC motors. Radio channel transmitter and receiver control the movement of unmanned armed vehicle.

2.2 Crop monitoring

Crop with different indices can be observed by unmanned armed vehicles. Inspection of hectares of agricultural land can be covered by single flight of the drone. Thermal and multi spectral cameras are calibrated in the bottom side of these drones to monitor reflectance of vegetation canopy of the land. One image per second is taken by the camera and these images are sent to the ground station through telemetry. MAVLINK protocol is used for this communication.

2.3 Sprinkling system

The sprinkling system is presented at the bottom of the drone, which consists a nozzle to spray the pesticide towards downward. Sprinkling system consists two modules, first one consists nozzle and the spraying content and second module is controller. A pressure pump is also present in the sprinkling system which forces the pesticide to flow through the nozzle. The pressure pump is controlled by an motor driver integrated circuit.

3. Conclusion

In the last few decades technologies are evolved to improve the productivity of land by precision agriculture. These agricultural drones are very helpful to in different applications such as crop and soil monitoring, natural resource management, irrigation and fertilization methods and detection of plant disease. The uses of these drones reduce the time consuming in pesticide spraying and also easy to flight. In one flight, drone camera captures millions of photographs which are analysed by the geographic indicator. Based on this data, the area on which pesticides will be sprayed is determined. The UAV sprinkling system auto navigated with the GPS coordinates to spray the pesticides on the infected areas where no vegetation identified by the NDVI. This could also be reduced the wasting of water and chemicals.

STRATEGY FOR EFFECTIVE ENERGY USE FOR SUSTAINABLE RURAL DEVELOPMENT

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Introduction

Achieving effective energy use for sustainable rural development involves a combination of strategies that address the unique needs and challenges of rural communities. Therefore, some suitable number of various alternate technologies such as biogas, biomass, gasifiers, smokeless chulha, solar cookers, solar lights and solar water heaters, etc. have been put forwarded to fulfil the demand-supply gap. Out of a number of aspects some worth noting points have been demonstrated underneath.

Course of Action

Renewable Energy Sources

Promote the use of solar panels for electricity generation, especially in areas with high solar potential. Implement solar micro-grids for decentralized energy distribution. Explore the feasibility of small-scale wind turbines in regions with consistent wind patterns. Encourage the use of biomass for cooking and heating by promoting efficient stoves and biogas systems.

Energy Efficient Technologies

Introduce and promote energy-efficient appliances to reduce overall energy consumption. Replace traditional lighting with energy-efficient LED bulbs to save on electricity costs and increase the lifespan of lighting systems.

Policy and regulatory Support

Develop and implement policies that support the growth of renewable energy and promote sustainable practices in rural areas. Establish regulations that facilitate the integration of renewable energy into the existing energy infrastructure.

Conclusion

By implementing these strategies, rural areas can achieve sustainable development through effective and responsible energy use. The success of such initiatives relies on collaboration among governments, local communities, NGOs, and private sector entities.

MAKING THE CLEAN AVAILABLE: ESCAPING INDIA'S TRADITIONAL STOVE TRAP

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Introduction

In India, it is estimated that about 90% of rural households cook food using biomass fuel such as firewood, animal dung, and crop residues. Women here spend roughly 5–8 hours in a week collecting those fuels and also suffer from the hazardous smoke emanating from these fuels. The push to adapt to LPG, a cleaner fuel, seems to have been not-so-successful in rural areas, as rural households often resort to using biomass fuels that are easily available. Hence, improved cook stoves, which are designed to use less biomass fuel and reduce smoke emissions, act as an intermediate solution for clean cooking as it uses freely-accessible biomass fuel. A recent study, published in the journal *Energy for Sustainable Development*, evaluates the adoption and impact of improved cook stoves in the villages of Udaipur district, Rajasthan. While the benefits of these stoves were proven under laboratory conditions, the study demonstrates for the first time their real-world utility. It was the result of a six-year-long collaborative effort between Duke University, US, Indian Institute of Management Udaipur and SevaMandir, a local non-governmental organisation in Udaipur. Udaipur Urja Initiatives Producer Co. Ltd., a Udaipur-based company, started promoting improved cook-stove in the studied villages, where it sold two cook-stoves per household at a subsidized rate of Rupees 500, while the market rate was around Rupees 4000. The researchers conducted surveys with 600 households in 40 villages in Rajasthan before and after providing them with improved cook stoves. They gathered data on the socio-economic conditions, demographics, awareness of cook stoves, environmental and health risks associated with biomass fuel consumption, cooking behaviours, and time spent on fuel collection and cooking by the primary cook in the households.

Strategies to Mitigate the Traditional Method

Improved Cook-stoves

Traditional stoves in many villages contribute to indoor air pollution. Improved cook-stoves are designed to burn more efficiently, reducing fuel consumption and emissions. They often have chimneys to direct smoke outside. Transitioning from traditional biomass fuels to cleaner alternatives, such as biogas, solar cookers, or electric stoves powered by renewable energy, can significantly reduce environmental impact. Proper ventilation is crucial for indoor air quality. Installing exhaust systems or improving the design of cooking spaces to allow for better airflow can help minimize the health risks associated with indoor pollution.

Community Initiatives

Community-based programs and initiatives can play a key role. Educating people about the benefits of clean cooking solutions and implementing them on a community level can have a more significant and lasting impact. Governments can contribute by implementing policies that promote clean cooking technologies and providing support for their adoption. This could include subsidies, incentives, or awareness campaigns.



Fig.-1. A woman cooking food using improved cook-stoves

Research and Development

Ongoing research and development in the field of clean cooking technologies can lead to more efficient and affordable solutions for villages. Innovation can help address specific needs and challenges. Providing training to villagers on the proper use and maintenance of clean cooking technologies is essential for their successful adoption. This can ensure long-term sustainability and effectiveness. Regular monitoring and evaluation of clean cooking projects can help assess their impact and identify areas for improvement. Feedback from communities can also guide future initiatives.

Conclusion

A significant reason for promoting improved cook-stoves is to improve the respiratory health of rural communities, especially women. However, the current study found no evidence of such improvements in households that used improved cook-stoves. Thus, these cook-stoves can deliver welfare-related benefits but they are not sufficient to improve the respiratory health. The success of such initiatives often depends on the collaboration of various stakeholders, including local communities, governments, NGOs, and the private sector.

GLOBAL GROWTH VIA COMMUNICATION ENGINEERING

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Advanced Telecommunications Infrastructure:

Communication engineering has led to the development of advanced telecommunications infrastructure, including the internet, satellite communication, and high-speed data networks. This enables seamless communication and connectivity between people, businesses, and governments worldwide. Rapid and efficient communication systems allow for the quick dissemination of information globally. This is essential for businesses, governments, and individuals to stay informed about market trends, news, and developments in various fields. Communication engineering has revolutionized the way businesses operate on a global scale. Through communication technologies, people from different cultures can connect and share ideas, art, and experiences. This helps in fostering cultural understanding and promotes a more interconnected global community. Communication engineering facilitates international collaboration in education and research. Researchers and academics can easily share findings, collaborate on projects, and participate in conferences without the constraints of geographical distance.

Political, Social and Economic Integration

Globalization involves increased political and social interaction among nations. Communication engineering enables diplomatic communication, international policy coordination, and the exchange of ideas on a global scale. Communication technologies play a pivotal role in economic integration by supporting financial transactions, online banking, and electronic commerce. This enables seamless financial interactions between countries and contributes to the global economy.

Remote Work, Media and Entertainment

The ability to communicate effectively over long distances has become crucial, especially with the rise of remote work. Communication engineering enables virtual collaboration, making it possible for teams scattered around the world to work together seamlessly. Communication technologies have transformed the media and entertainment industry, allowing content to be shared and consumed globally. In times of crises, communication engineering is instrumental in coordinating emergency response efforts and delivering humanitarian aid. It facilitates real-time communication among relief organizations, governments, and affected communities globally.

Conclusion

Communication engineering is a key enabler of globalization, breaking down barriers and fostering interconnectedness in the realms of business, culture, education, politics, and more. As technology continues to advance, the role of communication engineering in shaping and sustaining globalization will likely continue to evolve. Current research in this area encompasses a broad range of topics covering the theory and practice of networks and

optimization for communications and beyond, including distributed computing, data centre networks, stochastic control, reinforcement learning, statistical inference, robotics in cyber physical systems (CPS).

SIGNIFICANCE OF ENGLISH VERNACULAR IN RESEARCH

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1. Introduction

English Language plays a dominant role in everyone life's. The English Language is among the leading languages in terms of usage or application all over the globe. The usage of English has become common or mandatory or indispensable in all fields or sectors like education, medicine, media, internet, science and technology, business. Learning English is a way or means to get access to a wide range of information, connection and opportunities. The market for English as a Second Language is booming and more individual are studying courses such as this one that will help them improve own accent and understand native English. English learners opt to take English to develop for communication socially with others to become part of global economy.

Academic or scientific research should be intelligible, comprehensible, clear, unambiguous, direct, exact, accurate and short and brief in meaning for the understanding of the reader. Academic writing should also be written in a simple, plain formal tone. It should avoid colloquial, informal, conversational, idiomatic, vernacular, slangs, dialectical or journalistic expressions.

2. Academic English

Academic English is an exclusive set of ways which should be open, proper, ingenuous, specific and systematic in nature. Academic writing is compound, strict, clear, hedged, specific and responsible. It is prearranged and intended exactly and precisely.

Some Features

- Is usually prescribed in manner and uncongenial in technique
- Avoids contractions or abridged forms of verbs, such as won't, doesn't or it's
- Avoids using a connecting word such as 'and' or 'but' at the beginning of a sentence
- Avoids personal pronouns such as I, me , you, your
- May use the passive forms of verbs
- Avoids verbs that are collected of numerous words, such as 'give up', 'put up with'
- Tends to utilize a careful way of clearing up findings, using expressions such as 'may', 'it is possible that...', 'could'
- May use particular vocabulary.

2.1 English Language Skills

As a matter of fact, English is not a subject, but skill-oriented language. Language is vital to students' knowledge in order to converse or understand a subject. LSRW (Listening, Speaking, Reading and Writing) are the 4 basic skills of English Language. In addition to the

4 skills, the basic aspects of English grammar, vocabulary and punctuation are also important and very much useful in written and spoken English.

The above said skills and aspects play an important role in order to:

- recognize and make the mainly competent use of your revise resources
- build up the particular speech and vocabulary significant to your topic
- understand project questions and choose applicable and suitable stuff for your retort
- correspond your requirements to your tutors
- communicate effectively with other students.

3.2 Features of Academic English

The exercise of academic language is specific and exact, and the nature of academic writing are Complexity, formality, precision, objectivity, explicitness, accuracy, hedging, responsibility, organisation and planning.

Complexity: Written language has longer verbal skill, it is lexically extra opaque and it has an extra diverse words. It uses more noun-based phrases than verb-based phrases. Written texts are shorter and the speech has more grammatical intricacy, counting more secondary clauses and more passives.

Formality: Academic writing is comparatively proper. In universal this means that in a thesis, informal language and terms be ignored.

Precision: In academic script, truth and information are known exactly.

Objectivity: Written words are in universal aim rather than individual. It therefore has fewer words that refer to the author to the booklover. This means that the major stress should be on the order that you want to give and the influence you want to make, rather than you. For that cause, academic writing tends to use nouns and adjectives rather than verbs and adverbs.

Explicitness: Academic writing is open about the relations in the book. Furthermore, it is the liability of the author in English to make it apparent to the booklover how a variety of parts of the text are linked. These associations can be made overt by the use of dissimilar signalling words.

Accuracy: Academic writing uses language precisely. Most subjects have writing with slender exact meanings. Linguistics distinguishes obviously between “phonetics” and “phonemics” universal English does not.

Hedging: In any kind of academic writing, it is necessary to make decisions about the stance on a particular subject, or the strength of the claims. Different subjects prefer to do this in different way. A technique common in certain kinds of academic writing is known by linguists as a ‘hedge’.

Responsibility: In academic writing one must be liable for, and must be capable to supply facts and validation for, any claims. It is also liable for representative a sympathetic of any basis texts used.

Organisation: Academic writing is fine prepared. It flows simply from one part to the consequently in a rational way. A good place to start is the genre of the text. Once it is decided on the genre, the structure is easily determined.

4. Conclusion

English is extensively measured and largely used for writing academic or technical explore paper. English has been the idiom of choice for many international academic journals. Academic English is an exclusive set of system to be clear, official, accurate, aim and logical in nature. The four fundamental skills of English Language as well as the fundamental aspects of English grammar, vocabulary and punctuation are important and very much useful for Good Academic Writing. Researchers should use the English language in the most effective way in order to express their ideas, opinions, premise and insights to broadcast their research findings and results to the people of related research area.



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