CHANDIGARH
ENGINEERING COLLEGE
CGC, LANDRAN, MOHALI

Building Careers. Transforming lives.

MECHNOTIMES

Department of Mechanical Engineering

NEWSLETTER

VOLUME-8

ISSUE-III

(JANUARY-MARCH 2024)

VISION OF CHANDIGARH ENGINEERING COLLEGE-CGC,LANDRAN

To become a leading institute of the country for providing quality technical education in a research-based environment for developing competent professionals and successful entrepreneurs.

MISSION OF CHANDIGARH ENGINEERING COLLEGE-CGC,LANDRAN

1. To provide state of the art infrastructure and engage proficient faculty for enhancing the teaching learning process to deliver quality education.
2. To give a conductive environment foe utilising the research abilities to attain new learning for solving industrial problems and societal issues.
3. To collaborate with prominent industries for establishing advanced labs and using their expertise to give contemporary industry exposure to the student and faculty.
4. To cater opportunities for global exposure through association with foreign universities.
5. To extend choice-based career options for students in campus placements, entrepreneurship and higher studies through career development program.

DEPARTMENT OF MECHANICAL ENGINEERING

Vision of the Department

To emerge as centre of quality education for creating competent mechanical engineers catering to the ever-changing needs of industry and society.

Mission of the Department

M1: To provide quality education by constantly updating departmental resources and using effective teaching learning methodology.

M2: To promote research practices in the field of mechanical engineering in pursuit of academic excellence and for the benefit of society.

M3: To establish industrial collaborations for imparting contemporary knowledge to keep pace with the technological challenges in the interdisciplinary and core areas of mechanical engineering.

M4: To provide opportunities to the students for global exposure through international collaborations.

M5: To nurture students through pre-placement training programs to succeed in campus placements and to provide guidance for entrepreneurship and higher studies.

EDITOR'S COLUMN

A newsletter reflects the vision and mission of a department. It also showcases events, activities, and academic accomplishments. The field of mechanical engineering is a continuous pursuit to improve the world. By embracing innovation and sustainability, we can bring about positive change and make a lasting impact on society. While we are proud of our past achievements, we also look to the future with excitement. The possibilities for mechanical engineering are boundless, and we are committed to preparing the next generation of engineers to meet the demands of tomorrow. As readers and contributors to this publication, you are integral to this transformative journey, and we eagerly anticipate the exciting advancements that await us. We are delighted to share glimpses of the activities undertaken by our enthusiastic students under the guidance of their faculty as they navigate through this period. We trust that this culture of disseminating the newsletter will endure indefinitely and serve as a model for others to emulate.

AISHNA MAHAJAN

EDITOR-IN-CHIEF

MECHNOTIMES

FROM EDITORIAL'S BOARD

Welcome to our latest edition of Mechnotimes of Mechanical Department Newsletter of Chandigarh Engineering College-CGC, Landran for JANUARY-MARCH 2024. As we venture into the realm of engineering and technology, we are reminded of the vast opportunities and responsibilities that lie ahead. In this editorial, we underscore the significance of embracing innovation and sustainability to propel progress in the mechanical world. Innovation is the lifeblood of the engineering discipline. From the advent of the steam engine to the contemporary electric vehicle, innovation has moulded the way we live, work, and interact with the world. As budding mechanical engineers, we are at the forefront of this dynamic metamorphosis, constantly pushing the limits of what is achievable.

ANURAAG GILHOTRA (2102424), SEM VI

NIKHIL (2102438), SEM VI

SHRESTHA PRATAP SINGH (2237670), SEM IV

Alumni Talk and Workshop on Latest Innovations in Designing & Simulation

The Department of Mechanical Engineering arranged an Alumni Talk and Workshop on Latest Innovations in Designing & Simulation on January 23, 2024. The session was conducted by Aman Sharma, a CAE Engineer from P2P Analysis and Solutions. The event aimed to familiarize undergraduate students with new innovations and commands in designing software. The program's primary goal was to enhance students' understanding of innovative design software to prepare them for successful entrepreneurship. Mr. Aman Sharma emphasized the abundance of opportunities available in the field of design and simulation, motivating students to explore and leverage these advancements for their future endeavors.

Mechanical Engineering Students Won Ideathon Punjab 2.0

The students of the Department of Mechanical Engineering at CEC-CGC, Landran, Mohali, demonstrated exceptional innovation at Ideathon Punjab 2.0, hosted by ACIC RISE and sponsored by Startup Punjab on 16 JANUARY 2024. Their outstanding project, a Robotics Device for Borewell Rescue Operation, earned them the first position at the event, along with a cash prize of Rs. 30,000/-. This accomplishment not only reflects the dedication and ingenuity of our students but also highlights the Department's commitment to fostering cutting-edge solutions.

Mechanical Engineering Students Won Best Project/Working Model Award

The Mechanical Engineering department students achieved a significant milestone by winning the award for the best Project/Working model at the 9th National Conference and Exhibition on Emerging and Innovative Trends in Engineering Technology held at Government College of Engineering and Technology, Jammu (**GCET Jammu**). The event was organized in technical collaboration with IIT Kharagpur and in association with the World Consortium of Universities. This accolade not only highlights the students dedication and innovative prowess but also underscores the department's commitment to excellence. Such achievements strengthen our position as a leading institution in fostering cutting-edge research and academic excellence in engineering.

Outstanding Victory for CEC-CGC, Landran Students at IDE Bootcamp

In a remarkable display of talent and innovation, the students from Department of Mechanical Engineering, CEC-CGC, Landran, have secured the prestigious "Best Performing Team" award in the Idea Pitching Session at the Innovation, Design, and Entrepreneurship (IDE) Bootcamp (Phase II). This event, organized by the Ministry of Education's Innovation Cell (MIC) and AICTE, highlights the students' exceptional abilities. The IDE Bootcamp, held from January 29th to February 2nd, 2024, provided a platform for students to showcase their innovative ideas and entrepreneurial skills. The winning team's achievement underscores CEC-CGC, Landran's commitment to fostering a culture of innovation and excellence among its students.

Gate Awareness Session

The Department of Mechanical Engineering organized a Gate Awareness Session on 29th February 2024. Mr. Gurvinder Singh from Engineers Career Point was the resource person for this event. The session focused on the GATE exam, a crucial national-level test for engineers and technologists seeking admission to postgraduate programs and PSU employment. Students gained insight into the exam pattern, emphasizing the need for strategic time management and subject understanding. The session also stressed the importance of adhering to application timelines and being well-prepared for exam day for success in the GATE exam.

Expert Talk on “Green Hydrogen: Revolutionizing Sustainable Energy Pathways”

On March 6, 2024, Mr. J. P. Kundra, Consultant Engineer on Hydrogen Technologies at Cheema Boilers Limited, delivered an expert talk titled "Green Hydrogen: Revolutionizing Sustainable Energy Pathways." He highlighted the potential of hydrogen as a green fuel in industrial and domestic sectors. The talk educated students about the use of hydrogen fuel cells and their revolutionary impact on future energy consumption. Mr. Kundra's insights provided valuable knowledge on the applications of hydrogen, indicating its promising role in shaping sustainable energy pathways.

My Story – "Motivational Session by Successful Alumni"

The Department of Mechanical Engineering, in collaboration with the Institution's Innovation Council (IIC) at Chandigarh Engineering College-CGC Landran, organized a motivational session for students on February 27, 2024. The session featured Er. Rahul Kumar Jha, Tata Consulting Engineer, Mumbai, as the speaker. Er. Jha shared insights on idea generation, implementation, the importance of the right approach, execution methodology, overcoming challenges, and setting target goals. He engaged students through interactive talks, storytelling, and informative presentations, drawing from his industrial experience. The session inspired students to consider entrepreneurship and think about startups, encouraging them to strive for success in their careers.

“Expert Talk on “Funding Opportunities for Early-Stage Entrepreneurs”

The Department of Mechanical Engineering, in collaboration with the Institution’s Innovation Council (IIC) at Chandigarh Engineering College-CGC Landran, organized an expert talk on funding opportunities for early-stage entrepreneurs on February 23, 2024. The session, aimed at various streams of engineering graduate students, featured Dr. Sonam Sharma, Assistant Professor at CBSA, as the speaker. Dr. Sharma provided insights into funding opportunities, including angel investments and venture capital funds. She discussed the application process, eligibility criteria, common mistakes to avoid, and legal concepts associated with funding. The session aimed to motivate CEC-CGC, Landran students to consider entrepreneurship as a career path and provided valuable information on funding sources for aspiring entrepreneurs.

Expert Talk on "Quality Control"

The Department of Mechanical Engineering hosted an expert talk on quality control by Mr. Raj Kumar, Operations Head at KDDL, Parwanoo, on January 25, 2024. Mr. Kumar demonstrated the latest techniques and innovations in quality control measurement, providing students with valuable insights into precision equipment production units' quality control processes. The session enhanced students' understanding of the practical application of quality control principles in manufacturing, emphasizing the importance of maintaining high standards in product quality.

Two Days Workshop on Problem Solving and Ideation

The Department of Mechanical Engineering conducted a two-day Problem Solving and Ideation Workshop from February 8 to 9, 2024. The workshop focused on brainstorming different ideas and utilizing a brainstorming approach to tackle various challenges. Expert mentors, including Mr. Sudhanshu Sisodia and Mr. Ramandeep, a Design Engineer from P2P Analysis and Solution, Mohali, guided students on skill development and problem-solving methodologies. The workshop emphasized the importance of brainstorming in generating innovative solutions for clearly defined design problems. It aimed to equip participants with the skills to generate a wide range of ideas and establish connections between them to identify potential solutions.

Industrial Visit to AK Textiles

The Department of Mechanical Engineering organized an industrial visit to AK Textiles, Derabassi, on March 19, 2024. The company operates within the Fiber, Yarn, and Thread Mills industry, specializing in the production of various textile goods. This company is part of a broader manufacturing sector that includes diverse industries such as Textile Mills, Aerospace Product and Parts Manufacturing, Agriculture, Construction, and Mining Machinery Manufacturing, and many others. The company's textile manufacturing operations extend to related activities like fabric mills, cut and sew apparel manufacturing, and textile finishing. With its involvement in producing textile goods, the company is a key player in the Textile Mills industry, contributing to the supply of essential materials used in various applications across the manufacturing landscape. Other related sectors within this expansive manufacturing industry include glass and glass products, industrial machinery, motor vehicle parts, and medical equipment manufacturing, highlighting the interconnected nature of these production processes. The visit aimed to provide mechanical engineering students with firsthand exposure to industrial processes and machinery, bridging the gap between theory and practice. Students observed spinning, weaving, dyeing, and finishing processes, gaining insights into textile manufacturing complexities. The visit also familiarized students with different types of machinery, offering practical application of mechanical engineering principles. It provided hands-on experience and a deeper understanding of the operations and mechanisms involved in textile manufacturing, enhancing their overall learning experience.

5th International Conference on Contemporary Advances in Mechanical Engineering (ICCAME-2024)

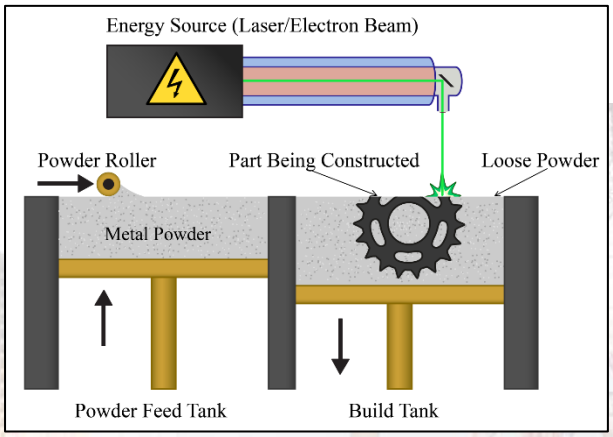
The Department of Mechanical Engineering at Chandigarh Engineering College-CGC successfully organized the 5th International Conference on Contemporary Advances in Mechanical Engineering (ICCAME-2024) on March 21-22, 2024. The event was honored by distinguished guests including Chief Guest Prof. Baldev Setia from Punjab Engineering College, Guest of Honor Prof. Sanjiv Gupta, and Guest of Honor Prof. Sarbjit Singh from PEC, Chandigarh.

Keynote speakers Dr. M V Reddy from Nouveau Monde Graphite, Montreal, QC, Canada, and Prof. HaNa Yu from the University of BATH, UK, joined virtually, adding global perspectives to the conference. The conference received an

overwhelming response with over 130 research articles submitted, out of which 76 were selected for presentation. Participants engaged in 8 technical sessions, presenting their research and engaging in fruitful discussions. The organizing team was lauded for their efforts, and 8 participants received Best Paper Presentation Awards, highlighting the conference's success.

Powder Bed Fusion (PBF)

Powder Bed Fusion (PBF) is a cutting-edge additive manufacturing technology that is revolutionizing the production of complex and high-precision components. The process involves spreading a thin layer of powdered material, such as metal, plastic, or ceramic, across a build platform. A heat source, typically a laser or electron beam, selectively fuses the powder according to the design from a digital model, creating a solid layer. This layering process continues until the entire part is built, with excess powder removed and potential post-processing steps such as heat treatment or surface finishing completed to enhance the part's properties.PBF is widely used in industries like aerospace, where it produces lightweight, complex parts such as turbine blades and structural components; in medical fields for customized implants and prosthetics; in automotive manufacturing for prototypes and performance-critical parts; and in industrial manufacturing for tools and molds. The technology offers significant benefits, including the ability to create intricate geometries, minimize material waste, produce customized parts, and achieve excellent mechanical properties suitable for high-stress applications.



However, PBF also faces challenges such as high initial costs, relatively slow production speeds, material limitations, and the need for additional post-processing. Recent advancements are addressing these challenges, with innovations like in-situ monitoring and machine learning for flaw detection improving reliability and quality, and microstructures on heated plates enhancing heat transfer efficiency. Efforts to develop more sustainable hardware and reduce energy consumption are also aligning PBF with greener manufacturing practices. These advancements continue to expand the capabilities and applications of PBF, solidifying its role as a vital technology in modern manufacturing.

Written by: Harsh Raj Singh (2237644), Sem IV

Neuralink Brain Implants

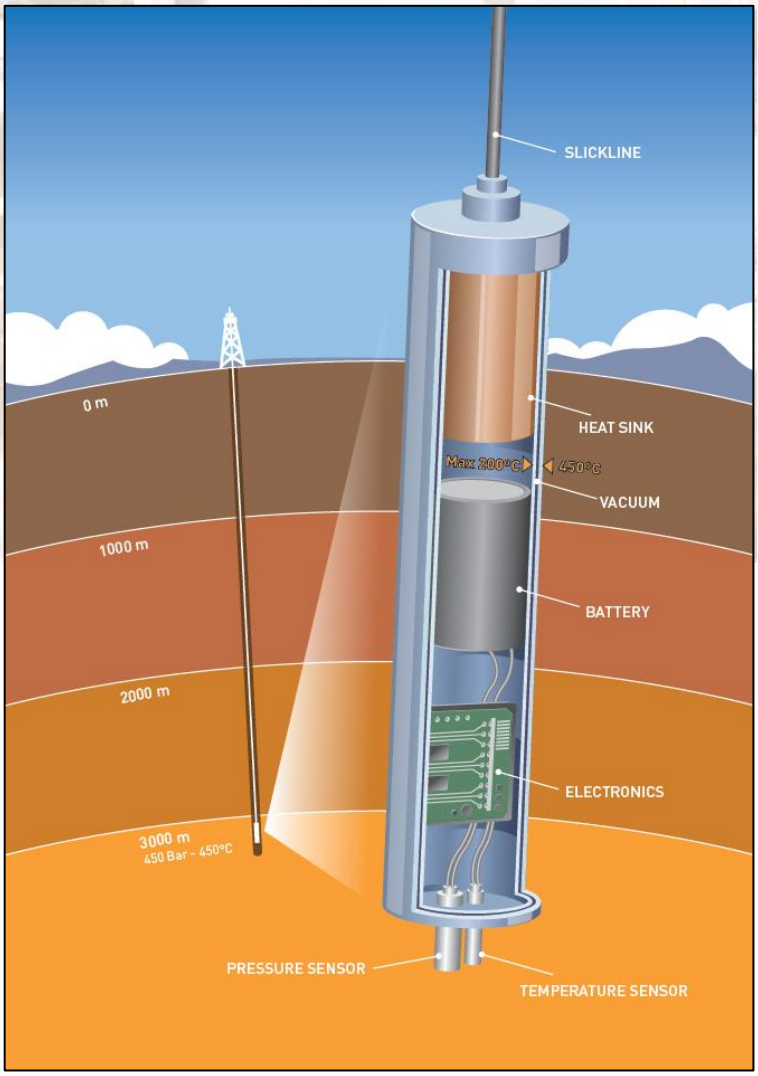
Neuralink, a company founded by Elon Musk, is pioneering the development of brain-computer interfaces (BCIs) designed to revolutionize the interaction between the human brain and external devices. The core technology involves implanting tiny, flexible threads equipped with electrodes into the brain. These threads are designed to read and transmit neural signals, which can then be decoded by a computer. The primary goal of Neuralink's brain implants is to enable direct communication between the brain and external devices, potentially allowing individuals to control computers, prosthetics, and other electronic devices merely with their thoughts. The process begins with the implantation of these electrodes into specific regions of the brain, a procedure intended to be minimally invasive using a specialized surgical robot. Once implanted, the electrodes can monitor, amplify, and digitize neuron activity. This data is then transmitted wirelessly to an external device for processing. Initially, the technology targets medical applications, such as helping individuals with paralysis regain control over their limbs or use computers more effectively. The long-term vision includes broader applications, such as enhancing human cognition and communication. Neuralink's advancements have sparked significant interest and controversy. The company's plans for its first clinical trials, announced for 2024, aim to involve volunteers with severe paralysis. Ethical concerns have been raised about the speed of development, the potential risks associated with brain surgery, and the treatment of animals in preclinical testing, with reports indicating that numerous animals have been used in the development and testing phases. Despite these challenges, the potential benefits of Neuralink's technology are substantial. If successful, Neuralink's brain implants could dramatically improve the quality of life for individuals with neurological conditions, providing them with new ways to interact with the world. The technology could also pave the way for future advancements in brain-machine interfaces, pushing the boundaries of what is possible in human-computer interaction and neurotechnology.

Written by: Lovenshu (2237653), Sem IV

Deep Geothermal Drilling

Deep geothermal drilling is an innovative technology aiming to tap into the Earth's internal heat at unprecedented depths to produce sustainable energy. Companies like Quaise Energy are at the forefront of this technology, utilizing millimeter wave drilling systems to reach depths of up to 20 kilometers. This approach allows access to geothermal energy sources with temperatures exceeding 500 degrees Celsius, which are significantly hotter and more energy-dense than those typically exploited by conventional geothermal methods.

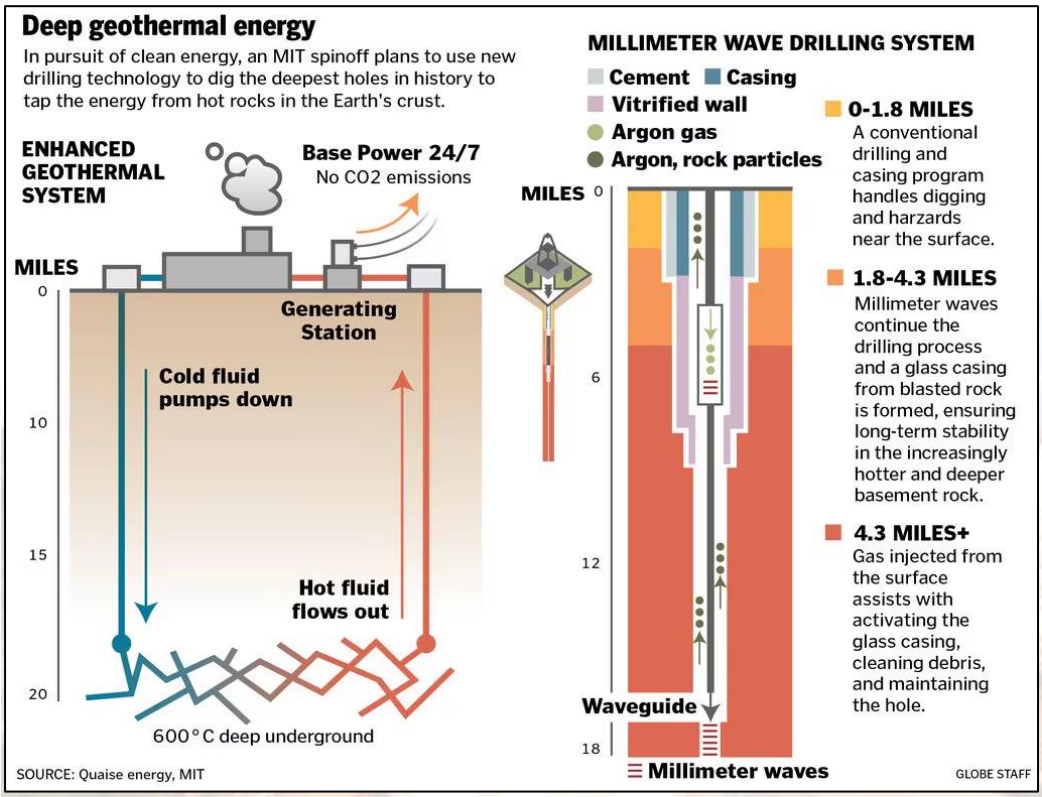
The deep geothermal drilling process begins with the millimeter wave drilling system, which uses high-frequency electromagnetic waves to vaporize rock and create a borehole. This technology can drill through the hardest rock formations much faster than traditional mechanical drills, significantly reducing the time and cost associated with deep drilling. The heat harnessed from these depths can be converted into electricity or used directly for heating purposes, providing a reliable and continuous source of clean energy.



This method of geothermal energy extraction holds several advantages. Firstly, it offers a virtually inexhaustible energy source, as the Earth's heat is continuously replenished. Secondly, it provides a low-carbon alternative to fossil fuels, significantly reducing greenhouse gas emissions.

Additionally, deep geothermal systems can operate independently of weather conditions, offering a stable and predictable energy output, unlike solar or wind power.

However, deep geothermal drilling also faces several challenges. The high costs of developing and deploying millimeter wave drilling technology, along with the technical difficulties of drilling to such extreme depths, pose significant hurdles. Moreover, the environmental impact of deep drilling, including the potential for induced seismic activity, must be carefully managed.



Recent advancements in drilling technology are helping to overcome these challenges. Innovations in material science, drilling techniques, and real-time monitoring systems are enhancing the efficiency and safety of deep geothermal projects. As these technologies continue to evolve, deep geothermal drilling is poised to become a key player in the global transition to sustainable energy sources.

Written by: Brijesh Bhatia (2237641), Sem IV

Green Computing

Green computing, also known as green IT, refers to the practice of designing, manufacturing, using, and disposing of computers, servers, and associated subsystems in an environmentally sustainable manner. This approach aims to reduce the carbon footprint and environmental impact of IT operations while improving energy efficiency and promoting the responsible use of resources.

Green computing encompasses several strategies and technologies. One key aspect is the development of energy-efficient hardware, which includes the design of processors, memory, and storage devices that consume less power. Manufacturers are increasingly focusing on creating components that deliver high performance with lower energy consumption. For instance, energy-efficient CPUs and GPUs are designed to provide optimal performance without excessive power usage, thereby reducing heat output and the need for cooling.

Another important strategy is the implementation of power management features in both hardware and software. Techniques such as dynamic voltage and frequency scaling (DVFS), advanced power management settings, and the use of solid-state drives (SSDs) over traditional hard drives can significantly reduce energy consumption. Data centers, which are major consumers of electricity, are increasingly adopting these technologies to improve their energy efficiency and reduce operational costs.

Virtualization and cloud computing also play crucial roles in green computing. By virtualizing servers and storage, organizations can consolidate their IT resources, leading to more efficient utilization of hardware and a reduction in the number of physical machines required. Cloud computing further enhances this efficiency by providing scalable resources on demand, allowing companies to only use the energy and computing power they need, thus minimizing waste.

Recycling and proper disposal of electronic waste (e-waste) are critical components of green computing. As electronic devices reach the end of their lifecycle, it is essential to dispose of them responsibly to prevent harmful materials from contaminating the environment. Many companies now offer take-back programs and partner with certified e-waste recyclers to ensure that obsolete equipment is recycled in an environmentally friendly manner.

Recent advancements in green computing focus on reducing the environmental impact of IT operations through innovative solutions. For example, the development of biodegradable and recyclable materials for electronic components, along with the use of renewable energy sources to power data centers, represents significant progress in this field. Additionally, researchers are exploring the use of AI and machine learning to optimize energy consumption patterns in real-time, further enhancing the efficiency of IT systems.

The benefits of green computing are manifold. It not only reduces the environmental footprint of IT operations but also leads to cost savings through lower energy bills and improved efficiency. Moreover, it supports corporate social responsibility initiatives and helps organizations comply with environmental regulations and standards. In conclusion, green computing represents a holistic approach to minimizing the environmental impact of IT operations. Through energy-efficient hardware, advanced power management, virtualization, cloud computing, and responsible e-waste management, the industry is making significant strides toward sustainability. As technology continues to evolve, ongoing innovations and the adoption of green practices will play a crucial role in achieving a more sustainable future for the IT sector.

Written by: Vaishnavi (2237675), Sem IV

Mahindra XUV 3XO- 2024

The Mahindra XUV 3XO, a facelifted version of the XUV300, is a compact SUV that has garnered significant attention and popularity in the market. The vehicle offers a variety of engine options, including a 1.2-litre turbo-petrol, a 1.2-litre T-GDi turbo-petrol, and a 1.5-litre diesel engine. These engines are paired with either a 6-speed manual or a 6-speed automatic transmission, providing flexibility for different driving preferences. In terms of design, the XUV 3XO features a refreshed exterior with a new grille, updated headlights, and redesigned alloy wheels. The rear has been updated with connected LED taillamps and a sharper tailgate design. The interior boasts a modernized dashboard, a 10.25-inch touchscreen infotainment system, and a digital driver's display. Additional features include a panoramic sunroof, wireless charging, and a dual-zone climate control system. Safety is a major focus for the XUV 3XO, which comes equipped with six airbags, a 360-degree camera, electronic stability control, and advanced driver assistance systems (ADAS) such as adaptive cruise control and autonomous emergency braking. These features make it a strong contender in the subcompact SUV segment, competing with models like the Hyundai Venue, Kia Sonet, Tata Nexon, and Maruti Suzuki Brezza. The Mahindra XUV 3XO is available in multiple trims and color options, catering to a wide range of customer preferences. The prices range from approximately INR 7.49 lakh to INR 15.49 lakh, depending on the variant and features selected.

Written by: Piyush Saini (2102442), Sem IV

INS Vikramaditya

INS Arihant is India's first indigenously developed nuclear-powered ballistic missile submarine, symbolizing a significant advancement in the nation's defense capabilities. This submarine is a pivotal element of India's strategic nuclear deterrence triad, which also includes land-based missiles and air-delivered nuclear weapons. Launched as part of the Advanced Technology Vessel (ATV) project, which began in the 1980s, INS Arihant remained a closely guarded secret until its official introduction.

The submarine, inspired by the Russian Akula-1 class design, features modifications tailored to Indian requirements. It measures 112 meters in length and 15 meters in width, with a submerged displacement of approximately 6,000 tons. Powered by an 83 MW pressurized water reactor, INS Arihant can stay submerged for extended durations, a crucial capability for stealth operations. Its armament includes four vertical launch tubes that can carry either 12 K-15 Sagarika missiles with a 750-kilometer range or four K-4 missiles capable of striking targets up to 3,500 kilometers away. This arsenal significantly enhances India’s second-strike capability, ensuring a credible deterrence against potential first-strike scenarios.

The submarine's crew of about 100 personnel operates advanced navigation, communication, and sonar systems, enabling effective performance in diverse maritime conditions. The primary strategic role of INS Arihant is to serve as a deterrent, its underwater launch capabilities providing security against first-strike vulnerabilities and ensuring the robustness of India's nuclear strategy. INS Arihant's development marks a major milestone in India's self-reliance in defense technology, showcasing significant achievements by the Indian Navy and the Defence Research and Development Organisation (DRDO). Geopolitically, the submarine bolsters India's strategic presence in the Indian Ocean and beyond, enhancing its deterrence posture and strategic autonomy. However, the operational readiness of such advanced technology involves continuous training, maintenance, and upgrades. Future expansions of the Arihant-class fleet, including more advanced vessels like INS Arighat, aim to further strengthen India's underwater deterrent force.

Challenges and Future Prospects

Operational Readiness: While INS Arihant represents a significant leap forward, maintaining and operating a nuclear-powered submarine involves substantial logistical and technical challenges. Continuous training, maintenance, and upgrades are essential to ensure its operational readiness.

Fleet Expansion: INS Arihant is the first in a series of planned Arihant-class submarines. Future vessels, including INS Arighat, are expected to be more advanced, with enhanced capabilities and larger missile payloads. This fleet expansion is aimed at bolstering India's underwater strategic deterrent force.

International Reactions: The induction of INS Arihant has been closely watched by global powers. While it enhances India's security, it also necessitates careful diplomatic engagement to manage regional security dynamics and prevent an arms race in the Indian Ocean.

In summary, INS Arihant is a cornerstone of India's strategic defense, reflecting the nation's technological prowess and reinforcing its role as a key player in regional and global security

Written by: Piyush Saini (2102441), Sem VI

SIG716 Assault Rifle

The SIG716 Assault Rifle is a modern, battle-proven weapon that has been adopted by the Indian Army to enhance its infantry capabilities. Chambered in 7.62x51mm NATO ammunition, it offers significant stopping power and range suitable for various combat environments. The rifle is renowned for its reliability, thanks to its short-stroke gas piston system, which reduces fouling and enhances performance even in adverse conditions. This feature also contributes to reduced recoil, allowing for improved accuracy. One of the standout features of the SIG716 is its free-floating barrel, which helps to maintain accuracy by minimizing the effects of barrel heating and interference. This design element is crucial for sustained accuracy during prolonged engagements. The rifle's ergonomic design includes ambidextrous controls, making it equally user-friendly for both left-handed and right-handed shooters. This ambidextrous capability is particularly advantageous in combat situations where quick transitions and operations are necessary. The SIG716 is equipped with a full-length Picatinny rail on the upper receiver, offering ample space for attaching various optics, scopes, and accessories. Overall, the SIG716 Assault Rifle represents a significant upgrade for the Indian Army, providing soldiers with a versatile and dependable weapon system capable of meeting the demands of modern warfare. Its combination of firepower, accuracy, and adaptability makes it a valuable asset in the infantry's arsenal, supporting their missions across a range of operational scenarios from urban combat to open-field engagements.

Written by: Agraj Singh Pathania (2102420), Sem VI