VOL:07 ISSUE 2-2024

Dr. M.G.R.
EDUCATIONAL AND RESEARCH INSTITUTE
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Periyar E.V.R. High Road, Maduravoyal, Chennai-95. Tamilnadu, India.

FACULTY OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING

MESSAGE:

HOD
DEPUTY HOD

ARTICLES CORNER

- Space Exploration and Advancements in Aerospace
- Cyber security and Digital Safety: Protecting Yourself in the Digital Age
- Resume-Building and Interview Preparation Tips
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HOD-DESK

MESSAGE

by,
Dr.K.RAJAN,
HOD/Mech Engg.

HOD message:
Greetings!

I am delighted that Dr. MGR University has provided us with the opportunity and vision to support the release of the Newsletter series throughout all quarters of each academic year. This platform serves as a valuable forum to connect with all stakeholders.

I am especially pleased to see our department releasing the Newsletter for the period of July 2024 to September 2024. Wishing for many more successful editions ahead and a wonderful reading experience for all!

Vol:7 ISSUE 2-2024

MESSAGE

Message:

It gives us immense pleasure to be an integral part of this Newsletter—a powerful communication platform designed to meet the needs of the time. It serves as a bridge, delivering important messages about key events, achievements, and significant happenings to all concerned.

This initiative plays a vital role in fostering a sense of belonging among faculty, alumni, and students. Life does not offer rewinds, only flashbacks, and our talented alumni hold a wealth of experience and skills to share with current students through talks and newsletters.

We believe our efforts will be truly successful when, after reading these articles, you feel inspired and motivated to contribute even more to future editions. Let's continue this journey of knowledge sharing and collaboration!

EDITORIAL BOARD

Vol:7 ISSUE 2-2024

ACTION CORNER

SNIPPETS FROM PALS AND OUR UNIVERSITY

APRIL TO JUNE

DATE	EVENT TITLE	SPEAKERS	EVENT COORDINATE
22-Apr-2024	FDP on NBA accerdiation and teaching-learning in engineering (NATE0	Mr Praveen Pandian, CEO, Evolve.	

PALS: JUNE

EVENT : PALS 2023-24 VALEDICTION
SPEAKER : Suresh Raman
DATE : 21.06.2024
VENUE : IIT MADRAS

On 21st June 2024, PALS 2023-24 concluded with a valediction ceremony held at IIT Madras. The event featured a keynote address by Suresh Raman, Vice President and Region Head at Tata Consultancy Services (TCS). As a distinguished industry leader, Suresh Raman shared valuable insights on leadership, innovation, and the importance of continuous learning in the tech industry, leaving an inspiring message for all participants.

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ARTICLES CORNER

Space Exploration and Advancements in Aerospace

by,
Mr. Andrew Nallayan,
Asst. Professor/ Mech Engineering.

Introduction

Space exploration has been a driving force behind technological advancements and scientific discoveries. From the first satellite launch to the modern era of interplanetary missions, humanity's quest to explore the cosmos has led to groundbreaking innovations in aerospace technology.

Evolution of Space Exploration

Space exploration began with the launch of **Sputnik 1** by the Soviet Union in 1957, marking the beginning of the space age. This was followed by **human spaceflight** with **Yuri Gagarin** in 1961 and the historic **Apollo 11** Moon landing in 1969. The subsequent decades saw significant advancements such as the **Space Shuttle program**, **Mars rovers**, and the establishment of the **International Space Station (ISS)**.

Modern Space Missions

Today, space agencies like **NASA, ESA, Roscosmos, CNSA, and ISRO** are pioneering missions to explore deeper into space. Notable missions include:

- **Perseverance Rover (NASA)** – Studying Martian surface and searching for signs of life.
- **James Webb Space Telescope (NASA & ESA)** – Observing the universe with unprecedented detail.
- **Artemis Program (NASA)** – Aiming to return humans to the Moon and establish a lunar base.
- **Chandrayaan-3 (ISRO)** – India's continued exploration of the Moon.
- **Tianwen-1 (CNSA)** – China's Mars exploration mission.

Advancements in Aerospace Technology

The aerospace sector has seen remarkable technological advancements, making space travel more efficient and sustainable:

- **Reusable Rockets**: SpaceX's **Falcon 9 and Starship** have revolutionized space travel by reducing costs.
- **Ion Propulsion Systems**: Used in deep-space missions for extended propulsion efficiency.
- **3D Printing in Space**: Enables manufacturing of tools and structures in microgravity.
- **Artificial Intelligence (AI) in Spacecraft**: Helps in autonomous navigation and decision-making.
- **Hypersonic Flight**: Developing aircraft capable of traveling at speeds greater than Mach 5.

The Future of Space Exploration

The future of space exploration holds exciting possibilities, including:

- **Human Missions to Mars**: NASA and private companies like SpaceX are working towards a manned Mars mission.
- **Space Tourism**: Companies like Blue Origin and Virgin Galactic are making commercial space travel a reality.
- **Lunar Colonization**: Plans for a permanent lunar base to support deep-space exploration.
- **Asteroid Mining**: Extracting valuable resources from asteroids to support space industry growth.
- **Interstellar Travel Concepts**: Advancements in propulsion, such as nuclear and warp drive research, may pave the way for interstellar missions.

Conclusion

Space exploration continues to push the boundaries of human knowledge and technology. With advancements in aerospace engineering, sustainable space travel, and interplanetary exploration, the future promises an era where space becomes more accessible than ever before. As humanity ventures beyond Earth, the potential for scientific breakthroughs and economic opportunities in space is boundless.

Cybersecurity and Digital Safety: Protecting Yourself in the Digital Age

BY: MR.R.T.CHANDER, Asst Professor, Mech Engineering

Introduction

In today's interconnected world, cybersecurity and digital safety are more crucial than ever. With the rise of online transactions, social media, and cloud computing, individuals and organizations face an increasing number of cyber threats. This article explores key aspects of cybersecurity, common threats, and best practices to enhance digital safety.

Understanding Cybersecurity

Cybersecurity refers to the practice of protecting systems, networks, and data from cyberattacks. It encompasses various domains, including:

- **Network Security**: Protecting data as it is transmitted over networks.
- **Information Security**: Safeguarding sensitive information from unauthorized access.
- **Application Security**: Ensuring software and applications are secure against vulnerabilities.

Common Cyber Threats

1. Phishing Attacks

Phishing is a social engineering attack where hackers deceive users into revealing sensitive information, such as passwords and credit card numbers, by posing as a trusted entity.

2. Malware

Malware (malicious software) includes viruses, ransomware, spyware, and worms. It can damage devices, steal data, or take control of systems.

3. Ransomware

Ransomware encrypts a victim's data and demands payment for its release. It has become a major threat to businesses and individuals alike.

4. Man-in-the-Middle Attacks (MitM)

This attack occurs when a hacker intercepts communication between two parties to steal or manipulate data.

5. Denial-of-Service (DoS) Attacks

In a DoS attack, hackers overwhelm a network or server with traffic, causing disruptions in service.

Best Practices for Digital Safety

1. Use Strong Passwords and Multi-Factor Authentication (MFA)

A strong password consists of a mix of letters, numbers, and symbols. Enabling MFA adds an extra layer of security by requiring additional verification steps.

2. Keep Software and Systems Updated

Regularly updating operating systems, software, and antivirus programs helps protect against vulnerabilities that hackers exploit.

3. Be Cautious with Emails and Links

Avoid clicking on suspicious links or downloading attachments from unknown sources, as these could contain malware or phishing scams.

4. Secure Your Internet Connection

Use encrypted connections (HTTPS) and Virtual Private Networks (VPNs) to protect your online activities.

5. Enable Firewalls and Antivirus Protection

Firewalls monitor network traffic, while antivirus software detects and removes malware before it can cause harm.

6. Practice Safe Social Media Usage

Limit the personal information shared on social media platforms to reduce the risk of identity theft and cyberstalking.

7. Regularly Back Up Data

Maintain secure backups of important files to prevent data loss in case of ransomware attacks or hardware failures.

The Future of Cybersecurity

With the advancement of artificial intelligence (AI) and the Internet of Things (IoT), cybersecurity challenges will continue to evolve. Organizations and individuals must stay informed about emerging threats and adopt proactive measures to ensure digital safety.

Conclusion

Cybersecurity is not just a concern for businesses and governments; it is essential for everyone in the digital world. By adopting best practices such as strong passwords, regular software updates, and safe browsing habits, individuals can significantly reduce the risk of cyber threats. Staying vigilant and informed is the key to a safer online experience.

Resume-Building and Interview Preparation Tips

By: Aravinth.V,

3rd Yr, Mechanical Engg.

A well-crafted resume and solid interview preparation can make a significant difference in securing your dream job. Here are some essential tips to enhance your resume and ace your interview.

Resume-Building Tips

1. Keep It Concise and Relevant

Recruiters spend an average of six seconds scanning a resume. Ensure yours is clear, concise, and tailored to the job role. Limit it to one or two pages.

2. Use a Professional Format

Choose a clean and readable layout with standard fonts like Arial or Times New Roman. Use bullet points for easy readability and ensure consistent formatting.

3. Highlight Key Skills and Achievements

Instead of listing job duties, focus on accomplishments. Use quantifiable results, such as "Increased sales by 30%" or "Reduced processing time by 20%."

4. Customize for Each Job

Avoid sending the same resume for every application. Tailor your resume by including relevant skills and experience that match the job description.

5. Include Keywords

Many companies use Applicant Tracking Systems (ATS) to filter resumes. Incorporate keywords from the job posting to ensure your resume gets past these systems.

6. Proofread for Errors

Spelling and grammar mistakes can leave a negative impression. Double-check your resume and ask a friend or mentor to review it.

7. Add a Strong Summary

Begin with a brief professional summary that highlights your key strengths, experience, and career objectives.

Interview Preparation Tips

1. Research the Company

Understand the company's mission, values, products, and recent developments. This knowledge helps you tailor your responses and shows genuine interest.

2. Practice Common Interview Questions

Prepare for common questions like:

- Tell me about yourself.
- Why do you want to work here?
- What are your strengths and weaknesses?
- Describe a challenge you faced and how you handled it.

3. Use the STAR Method

For behavioural questions, use the STAR (Situation, Task, Action, Result) technique to provide structured and impactful responses.

4. Dress Professionally

First impressions matter. Dress appropriately according to the company's culture—formal for corporate roles, business casual for startups.

5. Arrive on Time

Punctuality demonstrates responsibility and respect for the interviewer's time. Aim to arrive 10-15 minutes early.

6. Maintain Positive Body Language

Good posture, a firm handshake, and eye contact convey confidence. Avoid fidgeting and maintain a pleasant demeanour.

7. Ask Thoughtful Questions

Prepare insightful questions about the role, team, or company culture. This demonstrates your enthusiasm and engagement.

8. Follow Up

Send a thank-you email within 24 hours, expressing appreciation for the opportunity and reiterating your interest in the role.

Conclusion

A strong resume and thorough interview preparation can greatly enhance your chances of landing a job. By showcasing your skills effectively and approaching interviews with confidence, you can stand out in a competitive job market.

INSPIRING PAPER CRAFT - A HOBBY

by, N.V.Parimala Sowmyaa, 3rd Yr, Mechanical Engg.

The Art of Paper Craft: A Journey of Creativity and Transformation

There is something deeply satisfying about the crisp, familiar feel of an old newspaper. Whether lost in thought, watching TV, or simply seeking a moment of calm, my hands instinctively reach for its pages—rolling, folding, and shaping them into miniature works of art. This readily available, unassuming material, so easy to transform into delicate shapes or fine cylindrical rolls, has become my favorite medium for crafting. With just a little creativity, even discarded paper can be reborn into something beautiful.

Origami—the enchanting art of folding a single sheet of paper into intricate forms—has long captivated me. With nothing but imagination and a few precise folds, an ordinary page transforms into a graceful swan, a playful fox, or a delicate butterfly. Each creation carries its own charm, proving that the possibilities of paper are as limitless as our creativity. It's a form of magic, where a flat surface can take on infinite dimensions, shaped only by patience and vision.

Like many, my journey began with the simple pleasure of folding a paper boat, watching it float, and marvelling at its simplicity. But curiosity soon took over, pushing me to explore beyond the basics. I found joy in crafting intricate butterflies, detailed dino baskets, and pop-up greeting cards—each piece reflecting a growing love for the art. The best part? The delight on the faces of those who received them, especially my mom, my first and most cherished audience.

Over time, my passion expanded beyond traditional folds into more complex, structured creations using rolled newspaper tubes. This shift opened an entirely new dimension to my craft. One of my proudest achievements is a fully crafted dining table, made entirely from meticulously rolled newspaper tubes. I have also experimented with flower vases, artistic lamp shades, and even an outdoor swing—all proving that paper, when handled with care and precision, can be transformed into something strong, functional, and stunning.

The process of crafting with paper is both meditative and deeply rewarding. With patience, a keen eye for detail, and a spark of creativity, even the most ordinary scraps can be shaped into extraordinary art. Best of all, this beautiful craft comes with almost no cost, proving that creativity thrives not in expensive materials but in the willingness to see potential where others see waste.

As I continue this artistic journey, I look forward to sharing my creations, techniques, and inspirations. If you, too, find joy in shaping paper into something extraordinary,

let's embark on this creative adventure together. After all, with a single fold, a new possibility is born.

Success Story of Phil Knight

by, Hari Krishnan D, 3rd Yr, Mechanical Engg

The Success Story of Phil Knight – The Man Behind Nike

Introduction

Phil Knight, the co-founder of **Nike**, transformed a small shoe-distribution company into a global sportswear giant. From humble beginnings as a track runner at the University of Oregon to building one of the most recognizable brands in the world, his journey is a testament to perseverance, innovation, and strategic risk-taking.

Early Life and the Birth of Nike

Phil Knight was born in 1938 in Portland, Oregon. He had a passion for running and was coached by the legendary Bill Bowerman at the University of Oregon. After earning an MBA from Stanford in 1962, he wrote a paper proposing that high-quality, low-cost Japanese shoes could challenge Germany's dominance in the athletic shoe industry.

Knight put his theory into action and traveled to Japan, where he secured a distribution deal with **Onitsuka Tiger** (now ASICS) to sell their shoes in the U.S. He started **Blue Ribbon Sports (BRS)** in 1964 with a $500 loan from his father, selling shoes from the trunk of his car.

The Birth of Nike

By the early 1970s, Phil Knight and Bill Bowerman saw the potential to create their own brand. In 1971, BRS rebranded as **Nike**, inspired by the Greek goddess of victory. The famous **swoosh logo**, designed by a student for just $35, became a symbol of speed and movement.

Breakthrough and Growth

Nike's breakthrough came in 1973 when they signed **Steve Prefontaine**, an emerging track star, as their first athlete endorser. However, it was the 1980s that truly cemented Nike's dominance. The company went public in 1980, and in 1984, they signed a then-rookie basketball player, **Michael Jordan**, to create the iconic **Air Jordan** line. This deal revolutionized sports marketing and made Nike a cultural icon.

Overcoming Challenges

Phil Knight faced multiple challenges, including fierce competition from Adidas and Reebok, supply chain issues, and labor controversies. However, his relentless focus on innovation, marketing, and athlete partnerships helped Nike stay ahead. The introduction of **Just Do It** in 1988 became one of the most successful advertising campaigns in history.

Nike Today & Knight's Legacy

Under Knight's leadership, Nike became the world's leading sportswear brand, expanding into apparel, technology-driven footwear, and sustainability initiatives. He stepped down as CEO in 2004 but remains an influential figure. His autobiography, **"Shoe Dog"**, offers a deep insight into his journey.

Key Takeaways from Phil Knight's Success

1. **Start Small, Think Big** – Nike started as a small distribution company before becoming a global powerhouse.
2. **Innovation is Key** – From air-cushioned shoes to Flyknit technology, Nike stayed ahead through innovation.
3. **Brand Power Matters** – Marketing and athlete endorsements played a crucial role in Nike's success.
4. **Resilience Through Challenges** – Overcoming financial struggles, legal battles, and competition was key to long-term success.

Conclusion

Phil Knight's story is an inspiring example of how passion, persistence, and strategic thinking can turn a small idea into a billion-dollar empire. His journey with Nike showcases the power of believing in a vision and working relentlessly to achieve it.

ALUMNI CORNER

My college journey

BY, John Benson Babu

Mechanical Engineering

May 2007 - May 2011

My College Journey at Dr. MGR University: A Story of Growth, Friendships, and Success

College isn't just about lectures, assignments, and exams—it's a life-changing experience that shapes who we become. My time at Dr. MGR University (May 2007 – May 2011) was an incredible rollercoaster of emotions, learning, and unforgettable memories. From the nervous first day to the thrill of landing my first job, every moment was a mix of challenges, discoveries, and personal growth. Looking back, these four years were not just about earning a degree but about building confidence, making lifelong friends, and finding my true path.

The Beginning: A New Chapter in Life

I still remember stepping through the gates of Dr. MGR University on my first day—excited, nervous, and clueless about what lay ahead. Coming from school, where everything was structured and familiar, college felt like an entirely different world. The campus was buzzing with students from different backgrounds, all carrying their own dreams and ambitions.

Figuring out my way around the massive buildings, lecture halls, and canteens was both thrilling and overwhelming. But soon, I realized that college wasn't just about academics—it was about making connections, stepping out of my comfort zone, and shaping myself for the future.

First-Year Challenges and Growth

The first year was a wake-up call. Managing my schedule, adapting to university-level studies, and making new friends wasn't as easy as I had imagined. Balancing lectures, assignments, and personal time was tough, and there were days when I felt completely lost.

Academically, the subjects were intense, pushing me to think differently. I spent long hours in the library, joined study groups, and slowly got the hang of things. Group projects and late-night exam revisions taught me teamwork, discipline, and perseverance. Even though it was challenging, the sense of accomplishment after each semester kept me going.

Beyond Books: Discovering Passion in Extracurricular Activities

College life wasn't just about textbooks—it was also about exploring new interests and finding what truly excited me. Extracurricular activities became a huge part of my journey, making my college life way more fun and meaningful.

- Joining the Society of Mechanical Engineering helped me understand real-world applications of my studies, attend workshops, and meet industry experts.
- Being part of the Event Management Club taught me leadership and organizational skills as we planned and executed college events.
- Volunteering for community service projects gave me a sense of fulfillment, reminding me of the importance of giving back to society.

Through these activities, I made amazing friends, built my confidence, and developed skills that would later help me in my career.

Memorable Moments and Achievements

One of the best experiences of my college life was participating in a national-level technical competition, where my team worked day and night to build an innovative project. The effort paid off when we secured second place, making all those sleepless nights worth it!

Another proud moment was presenting my research paper at a student conference. Standing on stage, explaining my ideas, and getting recognition from professors and peers was a confidence booster. These achievements weren't just about winning but about proving to myself that I could push my limits and succeed.

The Final Year: The Road to Success

By the time my final year (2010–2011) arrived, I was filled with mixed emotions—excitement for the future but also sadness knowing that my college journey was coming to an end. The pressure was real, with final projects, internships, and, of course, the much-anticipated campus placements.

The placement season was intense. I remember the nervousness before interviews and the endless preparations with my friends. Then came the best moment—getting the offer letter from a top energy company! That feeling of joy, relief, and pride was indescribable. After four years of hard work and struggles, this was the moment I had been waiting for.

Gratitude and Looking Ahead

As I stepped into the corporate world in May 2011, I realized how much I had grown during these years. I wouldn't have made it without:

- My professors, whose guidance and encouragement shaped my knowledge and confidence.
- My family and friends, who stood by me through all the ups and downs.
- Dr. MGR University, which gave me the platform to learn, explore, and become the person I am today.

College was more than just an education—it was a journey of self-discovery, filled with laughter, challenges, and unforgettable moments. As I move forward, I take with me the values, lessons, and friendships that will always remind me of my time at Dr. MGR University—a place that didn't just prepare me for a career but helped me find my purpose.

PUBLICATIONS

STAFF PUBLICATIONS JUL-SEP 2024

1. **Machine Learning Methodologies for Predicting Autism Spectrum Disorder across Generations**

F. Keren, Department of Biotechnology, Dr. MGR Educational and Research Institute, Chennai, India
F. Fredrick Gnanaraj, Department of Mechanical Engineering, Dr. MGR Educational and Research Institute, Chennai, India
F. Keziah, Department of Computer Science, Saveetha Engineering College, Chennai, India
T. Rubesh Kumar, Department of Biomedical Engineering, Rajalakshmi Engineering College, Chennai

Machine Learning Methodologies for Predicting Autism Spectrum Disorder across Generations

Publisher: IEEE Cite This PDF

F Keren ; F Keziah ; T Rubesh Kumar ; L Vanitha ; A R Venmathi ; F Fredrick Gnanaraj All Authors

2. PROCEEDINGS OF THE FOURTH INTERNATIONAL CONFERENCE ON ADVANCES IN MANUFACTURING TECHNOLOGY

M.D. Vijayakumar, Department of Mechanical Engineering, Dr. MGR Educational and Research Institute, Chennai, India
Siva Shanmugam, Department of Mechanical Engineering, Dr. MGR Educational and Research Institute, Chennai, India

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ABSTRACT

In this study, a single-cylinder CRDI engine running on 20MEWCO (20 % Methyl Esters of Waste Cooking Oil + 80 % diesel) fuel was used to test various pilot injection timing modifications, including 34°, 36°, and 38° bTDC with a dwell period of 15° and 10 % pilot mass at a pressure of 500 bar. The analysis focused on cylinder pressure, heat release rate, fuel consumption, brake thermal efficiency, and emissions of carbon monoxide (CO), hydrocarbons (HC), nitrogen oxides (NO_x), and smoke.

As a result of advanced pilot injection timings, at 38° bTDC, the cylinder pressure, heat release rate, and brake thermal efficiency were 63.73 bar, 34.04 J/°CA, and 30.74 %, respectively. Emissions of HC, CO, and smoke increased significantly, while NO_x emissions were significantly reduced. Advanced pilot injection timing at maximum load caused a decrease in ignition delay, while shorter combustion duration resulted in more efficient combustion.

Keywords: pilot injection timing, waste cooking oil, dwell period, CRDI engine, emissions, combustion, ignition delay.

OTHER EVENTS IN OUR UNIVERSITY