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Alumni Guest Lecture on
Sustainable Engineering: Challenges and Opportunities
20th September 2024
Organized by the Department of Computer Science & Engineering
Participants:
III Year B.Tech – Computer Science & Engineering Students – MITS

Resource Person: Ms. N. Pragathi (Alumnus of CSE 2020-2024 Batch), Working as Graduate Engineer Trainee, LTI MindTree, Bangalore.

A Guest Lecture on "Sustainable Engineering: Challenges and Opportunities" was organized by the Department of ComputerScience & Engineering for III B.Tech students.

The inauguration of the Guest Lecture started at 02:30 p.m. in the WB 308. The dignitaries were Dr. M. Sreedevi, HoD—CSE; Ms. N. Pragathi, Working as Graduate Engineer Trainee, LTI MindTree , Bangalore. Dr. R. Kiran Kumar, Alumni Relationship Officer; and Mrs. V. Geetha, Department Alumni Coordinator.

The lecture was started with opening remarks by, Dr. M. Sreedevi who thanked Managementfor this great initiation of creating an opportunity to invite the Alumni members of the institute and enabling them to interact with the students and enlightening them with the current developments in the corporate world. Dr. R. Kiran Kumar has shown pleasure and promised to conduct many more lectures in the future for the students' benefit.

Mrs. V. Geetha introduced the speaker and invited her to share her valuable experiences with the students.
The number of students who participated in the lecture was 30.

Introduction

- **Importance for Students**: As companies prioritize sustainability, job roles are evolving to require knowledge of green practices and energy-efficient technologies, presenting both challenges and new opportunities for graduates seeking placements in the IT sector.

Challenges for Students Seeking Placements in Sustainable IT

- **Limited Awareness of Sustainable IT Practices**

  Explanation: Many students are not fully aware of the growing focus on sustainability in the IT industry, and academic curriculums may not emphasize these concepts.
  Impact: Graduates might find themselves at a disadvantage if they are unfamiliar with sustainability principles and their applications in IT.

- **Skill Gap in Green Software Development**

  Explanation: Developing sustainable software requires specific skills, such as writing energy-efficient code, optimizing algorithms, and understanding green IT infrastructure.

  Impact: Students lacking these skills may face difficulty in securing roles that focus on sustainability, especially as more companies look for candidates with expertise in this area.

- **Rapidly Evolving Technology**

  Explanation: Technologies like cloud computing, artificial intelligence (AI), and blockchain are continuously evolving. Adapting these to sustainable practices requires constant learning.

  Impact: Graduates must stay updated with the latest tools and methodologies to meet industry demands and align with sustainable goals.

- **Demand for Green Software Developers**
  Opportunities: Many companies are seeking developers who can create energy-efficient software that reduces resource consumption. This involves writing optimized code and minimizing energy use in computing environments.
  Impact: Students with skills in optimizing algorithms and software performance for sustainability will be in high demand, especially as companies look to reduce their carbon footprints.
- **Roles in Cloud Computing and Data Center Optimization**
  Opportunities: As cloud computing becomes mainstream, there is growing demand for engineers who can design and manage sustainable cloud infrastructures, minimizing energy consumption in data centers.
  Impact: Graduates with knowledge of cloud-based solutions and green data center practices will find numerous job openings in organizations aiming for carbon-neutral IT operations.

- **Growth of AI and Machine Learning for Sustainability**

  Opportunities: AI and machine learning are being used to optimize energy use in IT systems, predict resource consumption, and create more sustainable infrastructures.

  Impact: Those specializing in AI and machine learning will find opportunities to apply their skills in areas like smart energy management and sustainability-driven data analysis.

- **Sustainable Product Design in IT**

  Opportunities: Roles in designing hardware and software systems that prioritize long-term sustainability are increasing, especially in fields like eco-friendly device design, IoT for sustainability, and energy-efficient software solutions.

  Impact: Product design engineers with a focus on sustainability can work on developing IT systems that use fewer resources, consume less power, and have a longer life cycle.

- **Sustainability in Cybersecurity**

  Opportunities: Efficient, secure IT systems that are optimized for energy use without sacrificing security are a growing focus. Students with an interest in cybersecurity and sustainability may find roles in creating secure yet energy-efficient infrastructures.

  Impact: Cybersecurity engineers who understand the sustainability implications of their work, such as minimizing the energy required to secure and monitor systems, will be highly valued.

  Skills and Knowledge Areas for Students to Focus on

- **Energy-Efficient Programming**
  Skills: Learn how to write energy-efficient code, focusing on reducing CPU, memory, and storage usage.
  Example Technologies: JavaScript and Python optimization, low-level programming, understanding the impact of code execution on hardware resources.
- **Green Cloud Technologies**
  Skills: Develop expertise in cloud computing platforms like AWS, Azure, or Google Cloud and learn how to optimize these platforms for energy efficiency.

Certifications: Cloud certifications from major providers focusing on sustainability (e.g., AWS Certified Solutions Architect – Associate with sustainability specializations).

- **AI and Machine Learning for Energy Optimization**
  Skills: Specialize in using AI/ML to reduce energy consumption in IT systems, like smart grids, autonomous systems, and data center management.
  Example Technologies: TensorFlow, PyTorch for AI; power management in smart systems.
- **Sustainable IT Infrastructure Design**
  Skills: Understanding how to design and implement IT infrastructures (servers, networks, storage) that prioritize energy efficiency and reduce environmental impact.
  Example Technologies: Data center virtualization, efficient server farm management, and the use of renewable energy sources for IT operations.
- **DevOps and Automation for Sustainability**
  Skills: Learn DevOps tools and processes that promote resource-efficient software deployment and maintenance, such as continuous integration and automated scaling in cloud environments.
  Example Tools: Docker, Kubernetes, Jenkins, Terraform for infrastructure automation with sustainability in mind.
- **Cybersecurity for Sustainable IT**
  Skills: Understanding how to secure IT systems while minimizing the energy and resources used in the process.
  Certifications: CISSP, CEH with a focus on optimizing energy use in secure environments.
- **Sustainability Certifications and Programs**
  Certifications: Green IT certifications like the Green Computing Initiative or those offered by professional organizations (e.g., IEEE's certifications for energy-efficient computing).
  Programs: Specialized training programs in green software engineering, offered through bootcamps or online learning platforms like Coursera, edX, or Udacity.
- **Companies and Sectors Leading Sustainable IT Initiatives**
  Big Tech Companies
  Google: Google's focus on carbon-neutral data centers and AI-driven energy optimization opens up many roles for graduates interested in sustainable cloud computing.
  Microsoft: Microsoft's Azure Sustainability program and Project Natick (underwater data centers) provide opportunities in sustainable cloud solutions.
  Amazon Web Services (AWS): AWS's green energy initiatives in cloud computing present a growing demand for professionals skilled in energy-efficient software deployment.
  Sustainability-Focused Startups
  Startups: Numerous startups focus on sustainability in areas like blockchain for energy-efficient data management, IoT solutions for smart grids, and green AI.
  Example Companies: Innovators like Ampd Energy, which is focused on sustainable energy storage, or Climavision, which uses AI for climate intelligence and energy-efficient forecasting.
  Consulting Firms
  Deloitte and Accenture: Both firms have green IT practices, advising companies on sustainability-focused digital transformations, offering roles in green software consulting and systems optimization.
  KPMG: Their advisory roles focus on helping companies achieve sustainability goals, presenting opportunities in the IT audit and consulting sectors.

Additional Resources

Certifications:

Google Cloud's Professional Cloud Architect with a focus on sustainability.
Green Computing Initiative (GCI) certification for sustainable IT skills.

Websites:

Green Software Foundation.
SustainableIT.org.
Professional networks like LinkedIn Learning for green IT skills training.

Conclusion

Sustainable engineering in the IT sector presents growing opportunities for students, particularly in fields like energy-efficient software development, cloud computing, and AI. Understanding green practices and building relevant skills will significantly enhance placement prospects.Students should actively seek out training, certifications, and internships that focus on sustainable IT practices to differentiate themselves in the competitive job market.

The outcome of the programme:

The program outcomes for students attending a guest lecture on " Sustainable Engineering: Challenges and Opportunities " could include enhancing your prospects in campus placements, providing a strong foundation for starting your professional journey, and opening opportunities for personal and professional growth.

- Improved Understanding of Recruitment Processes.
- Enhanced Soft Skills and Communication.
- Increased Awareness and Demand for Sustainability Skills.
- Greater Job Opportunities in Niche Sustainable Roles.
- Competitive Edge for Graduates with Green Certifications and Skills.
- Opportunities in Growing Sectors Like AI, IoT, and Cloud Computing for Sustainability.

The session was completed at 03:30 P.M., and he clarified the queries of enthusiastic young minds with a great zeal during the interaction time.

The resource person was honored by a token of respectable appreciation by Dr. M. Sreedevi CSE – HoD, Dr. R. Kiran Kumar, Alumni Relation Officer, and all department faculty members.

Vote of Thanks: **Mrs. V. Geetha** proposed a vote of thanks to the Resource person, HoD, and AlumniRelations Officer for attending the function. She extended her thanks to the Principal and the Management for their support in conducting the training.