A Quarterly Newsletter

Department of Computer Science and Engineering	Volume 3, Issue 1
January – March, 2022	

What we have done in this quarter collectively as a TEAM!!

From the Desk of the Head of the Department

Technology can prove to be a friend or foe for the society. New innovations and developments in cutting-edge technologies can either be used to elevate the society to higher levels of comfort and efficiency or plunge it into an abyss of wreckage. In past years, technology has shown how wondrously it can help manage a deadly global pandemic, improve education by allowing access to information, dispense support to areas hit by natural disasters, provide advanced transportation for humans and shipment of goods across nations, supply communication for enhanced connectivity amongst citizens of the world and beyond, to name a few of its benefits. But, technology has also exhibited its dark side. Wars are examples of how it can contribute to mindless loss of human lives and property. Advanced weapons of mass destruction, fake news and misinformation on digital social platforms, ravaging of the environment in the name of non-sustainable development and growth. In the words of Elon Musk,

"An asteroid or a supervolcano could certainly destroy us, but we also face risks the dinosaurs never saw: An engineered virus, nuclear war, inadvertent creation of a micro black hole, or some as-yet-unknown technology could spell the end of us."

It becomes the moral responsibility of the society to support technology which can be used for social good only. The miracles of technology should serve to bring people together and solve their problems rather than creating newer ones. We as teachers can make our students aware of the burden they carry on their shoulders to choose to contribute to innovations and developments wisely.

Dr. Preety Singh
HoD, CSE

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Computer Science: Fact Check

(From the Desk of the Editor)

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History in Computing

- Apple Computer, Inc. was incorporated by Steven Jobs and Stephen Wozniak on January 3, 1977.
- On January 3, 1983, Time magazine altered its annual tradition of naming a "Man of the Year", choosing instead to name the computer its "Machine of the Year".
- Donald Ervin Knuth, best known for his ongoing multi-volume book series *The Art of Computer Programming*, took birth on January 10, 1938.
- On January 21, 1888, Babbage's Analytical Engine passed its first test when the machine produced a table from 1 to 44 and multiples of π to twenty-nine places of figures.
- Mike Sheridan, James Gosling, and Patrick Naughton of Sun Microsystems, Inc. started the development of Java technology on February 1, 1991.
- On February 4, 1948, Kenneth Thompson, who with Dennis Ritchie developed UNIX at AT&T Bell Laboratories, was born.
- In the first game of a six game match, IBM's Deep Blue chess computer defeated world champion Garry Kasparov on Fenruary 10, 1996.
- Apple Computer co-founder Steve Jobs took birth on February 24, 1955. Jobs was instrumental in developing the Macintosh, the computer that took Apple to unprecedented levels of success.
- On March 10, 1997, Netscape Communications Corp. announced the third generation of its World Wide Web browser software to compete with Microsoft Corp.
- Pixar won an Academy Award for *Tin Toy*, the first entirely computer-animated work to win in the best animated short film category on March 29, 1989. Pixar, now a division of Disney, continued its success with a string of shorts and the first entirely computer-animated feature-length film, the best-selling *Toy Story*.

Dr. Saurabh Kumar
Editor

New Faculty Members in the Department

- **Ms. Shweta Saharan, Assistant Professor**
  Research Area: Cloud Computing, Information Security and Privacy

  She has completed her master's degree (M.Tech) in Computer Science and Engineering (Information Security) from Central University of Rajasthan, India, in 2015 and received her Bachelor of Technology (B.Tech) from Rajasthan Technical University in 2012. At present, she has submitted her PhD in the Department of Computer Science and Engineering, Malaviya National Institute of Technology Jaipur, Rajasthan, India. Her research interests include Cloud Computing, Information Security and Privacy. She has published papers in various international conferences and journals viz. Journal of Parallel and Distributed Computing, Journal of Information Security and Applications etc. and served as a reviewer for many top journals and conferences. She has been a part of the publication committee of the ICISS 2016 conference and program committee member of ISEA-ISAP 2018, ISEA-ISAP 2019, ICCIPS 2021, MCWCN 2021 conferences. She is an active reviewer in various journals viz. Computer and Electrical Engineering, Journal of Supercomputing, IEEE Access, Engineering Reviews, and IETE Journal and conferences series viz. SIN, ISEA-ISAP, INDICON, GridCom, MCWCN 2021 etc

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New Courses Offered

1. **Title:** Introduction to Computational Thinking
   Instructor: Dr. Indra Deep Mastan
   Level: UG
   Course Description: Computational thinking is a timeless, transferable skill that enables one to think more clearly and logically, as well as a way to solve specific problems. Technically, computational thinking is a set of problem-solving methods that formulates real-world problems into algorithmic solutions that a computer can execute. Computational thinking has paved the way for the problem-solving methods developed in various areas of computer science that has led to state-of-the-art technological advancements. Beginning with the fundamentals of computational thinking, this course builds an understanding of the practical problem-solving approach and helps the students to apply the gained knowledge in addressing the upcoming complex problems faced by humanity.

2. **Title:** Introduction to Cyber Physical Systems
   Instructor: Dr. Nilotpal Chakraborty
   Level: UG
   Course Description: Cyber-physical systems are increasingly pervading their ways to all parts of our lives where applications range from agriculture and healthcare to energy, manufacturing and social networks. Advances in CPS will enable new capabilities and improved adaptability, scalability, and usability that will far exceed those current embedded systems. This course is intended to cover principles and foundations of modeling and analysis of cyber physical systems. This will begin with reviewing the concepts of embedded systems design and gradually transition towards advanced system modeling such as synchronous and asynchronous models,

modeling hybrid systems, etc., with primary focus on the top-level system design and in particular on the interplay between software components and physical dynamics. At the end of the course, the students should be able to model physical processes and systems and develop efficient computational solutions.

3. **Title:** Big Data Computing
   Instructor: Dr. Bharavi Mishra
   Level: UG
   Course Description: In the present era of fast-paced digital world, the incredible amount of data being generated every minute has grown tremendously from sensors used to gather climate information, posts to social media sites, digital pictures and videos, purchase transaction records, and GPS signals from cell phone to name a few. This amount of large data with different velocities and varieties is termed as big data and its analytics enables professionals to convert extensive data through statistical and quantitative analysis into powerful insights that can drive efficient decisions. This course provides an in-depth understanding of terminologies and the core concepts behind big data problems, applications, systems and the techniques, that underlie today's big data computing technologies.

4. **Title:** Communication Technologies for IoT
   Instructor: Dr. Rajbir Kaur
   Level: PG
   Course Description: This course explores the protocols and technologies essential to IoT communication mechanisms. The course is designed from the perspective of standard layered architecture with special focus on protocol interaction and functionality. The IoT protocols are presented and classified based on physical, link, network, transport and session/application layer functionality. The students will understand the impact of the IoT mechanisms on network and device performance with special emphasis on power consumption and computational complexity. The course will discuss use cases and examples of IoT protocol stacks. Hands-on exercises would allow students to implement the topics learnt.

5. **Title:** Advanced Social Network Analysis
   Instructor: Dr. Sakthi Balan Muthiah
   Level: PG
   Course Description: This course deals with modelling large social network graphs and study different characteristics of it. It presents various methods to build robust social network graphs. The course also explains different algorithms to find different communities in the large networks. The course also covers how information diffuses and propagates in the social network graphs. This course has self-reading component where students have to read research papers on information diffusion and write a report in addition to the presentation at the end of the course. It has a project component where students are required to implement the learned algorithms in the course.

6. **Title:** Digital Privacy and Information Ethics
   Instructor: Dr. Shweta Bhandari
   Level: PhD
   Course Description: This course is designed to introduce data privacy and security in the digital age. The course helps in conceptualizing the notion of privacy and information ethics. It will establish the relationship between privacy, security and risks. The course will let the students understand the price of privacy leakage through first-party data collection; third-party data collection, ad hoc networks, surveillance by ISPs, got tracked by cookies, etc. There will be discussions on

technology-related privacy concerns and mitigation, for example: social networks, smartphones, behavioral advertising (and tools to prevent targeted advertising and tracking), anonymous communication systems, tor, proton etc. The course will cover the privacy protections provided by laws and regulations, as well as will discuss the privacy related case studies of government data. This course will prepare students for careers and further course work in cybersecurity, computer science and information technology.

7. **Title:** Pattern Recognition and Image Processing
   Instructor: Dr. Aloke Datta
   Level: PhD
   Course Description: This course introduces fundamental concepts, theories and algorithms of image processing and pattern recognition. It discussed fundamentals of digital image processing, image segmentation, representation, description, object recognition and as well as fundamental concepts of supervised and unsupervised learning techniques. Student will learn to apply their understanding of pattern recognition and image processing techniques over different type of images for real time problem.

Research Publications

Book Chapter

- Vikas Bajpai and Anukriti Bansal, "*Analysis of Long Term Trends of Rainfall in Jaipur*", In: Isaac Woungang, Sanjay Kumar Dhurandher, Kiran Kumar Pattanaik, Anshul Verma, Pradeepika Verma (eds) Advanced Network Technologies and Intelligent Computing, Springer Communications in Computer and Information Science. Springer, Cham.

- Vikas Bajpai and Anukriti Bansal, "*Experiments in Online Teaching and Evaluation during COVID-19*", In: K. Ganesh, B. A. Lakhani, Ramesh Kumar, Pooja Kulkarni (eds) E-Learning Management – A Modern Approach to Digital India & Challenges in 21st Century, KAAV Publications, India.

Talks / FDPs / Symposium

(A) Expert lectures delivered by LNMIIT Colleagues

- Expert lecture by *Dr. Shweta Bhandari* during the AICTE-ISTE sponsored Induction/Orientation Programme on "*Cybersecurity*", organized by organized by the Center of Cryptography, Cyber Security and Digital Forensics, Department of Computer Science & Engineering, LNMIIT Jaipur, January 3 – 8, 2022.
      Area: *Cryptographic Primitives for Cybersecurity*
      Date: 06.01.2022

- Expert lecture by *Dr. Rajbir Kaur* during the Two Week Winter School on "Cyber Security and Threat Intelligence", organized by Department of Computer Applications, Cochin University of Science and Technology, January 17 – 28, 2021.
      Area: *MANET Attacks*
      Date: 17.01.2022

- Expert lecture by **Mr. Vikas Bajpai** during the AICTE-ISTE sponsored Refresher Programme on "Machine Learning", organized by University Institute of Engineering and Technology, CSJM University, Kanpur, February 18 – 24, 2022.
  > **Area:** *Introduction to Machine Learning*
  > **Date:** 18.02.2022

- Expert lecture by **Dr. Anukriti Bansal** during the AICTE-ISTE sponsored Refresher Programme on "Machine Learning", organized by University Institute of Engineering and Technology, CSJM University, Kanpur, February 18 – 24, 2022.
  > **Area:** *Artificial Neural Networks*
  > **Date:** 20.02.2022

- Expert lecture by **Dr. Saurabh Kumar** during the "*4th International Workshop on Multimedia Applications*", organized by InterMedia Research Group, LNMIIT, Jaipur, March 14 – 18, 2022.
  > **Area:** *Multiagent Systems: Learning Entities and Implementation*
  > **Date:** 14.03.2022

- Expert lecture by **Dr. Ramprakash Sharma** during the "*4th International Workshop on Multimedia Applications*", organized by InterMedia Research Group, LNMIIT, Jaipur, March 14 – 18, 2022.
  > **Area:** *Fingerprint Feature Extraction and Matching using NBIS*
  > **Date:** 15.03.2022

- Expert lecture by **Dr. Preety Singh** during the "*4th International Workshop on Multimedia Applications*", organized by InterMedia Research Group, LNMIIT, Jaipur, March 14 – 18, 2022.
  > **Area:** *Deep Neural Networks: Introduction and Implementation*
  > **Date:** 15.03.2022

- Expert lecture by **Dr. Indradeep Mastan** during the "*4th International Workshop on Multimedia Applications*", organized by InterMedia Research Group, LNMIIT, Jaipur, March 14 – 18, 2022.
  > **Area:** *Generative Adversarial Networks for Image Synthesis*
  > **Date:** 17.03.2022

- Expert lecture by **Dr. Sakthi Balan Muthiah** during the online research conference on "*Exploring the Recent Research Trends*", organized by Tumkur University, Tumakuru, Karnataka, March 21, 2022.
  > **Area:** *Exo-SIR: Model to Analyse the Impact of Exogenous Source of Infection*
  > **Date:** 21.03.2022

- Expert lecture by **Dr. Shweta Bhandari** during the AICTE sponsored Faculty Development Programme on "*Recent Trends and Future Directions in Information Security*", organized by L.D. College of Engineering, Ahmedabad, March 21 – 26, 2022.
  > **Area:** *Privacy and Security Challenges in Smartphones*
  > **Date:** 25.03.2022

(B) FDPs Attended

- **Dr. Nilotpal Chakraborty** attended AICTE – ATAL sponsored online elementary FDP on "*Computational Intelligence*", organized by NIT Agartala, during 3 – 7 January, 2022.

- **Dr. Nilotpal Chakraborty** attended AICTE – ATAL sponsored online elementary FDP on *"Cyber Physical Systems and Industrial IoT"*, organized by SRM Institute of Management Technology, during 17 – 21 January, 2022.

Organized Conferences / Seminars / Symposium / Workshops / FDPs

(A) CSE Seminar Series

Title of Talk: Multi-agent based collision handling in Railway Transport Network
Speaker: Dr. Poulami Dalapati
Date: 19.02.2022
Abstract: Advancement in intelligent transportation systems with complex operations requires autonomous planning and management to avoid collisions in day-to-day traffic. As failures and/or inadequacy in traffic safety systems are life-critical, such collisions must be detected and resolved in an efficient way to manage continuously rising traffic. This seminar focuses on different types of collision scenarios along with their early detection and resolution techniques in a complex railway system. In order to handle collisions dynamically, a novel agent based solution approach is proposed, where each agent communicates and cooperates with others to generate a good feasible solution that keeps the system safe, i.e. collision free.

(B) Faculty Development Programme

Title: AICTE-ISTE sponsored Induction/Refresher Programme on *"Cybersecurity"*, organized by the Center of Cryptography, Cyber Security and Digital Forensics, Department of Computer Science & Engineering, during January 3 – 8, 2022 in Virtual mode.

- **Organizing Committee:** Dr. Jayaprakash Kar, Dr. Shweta Bhandari

- **Level:** National | **Duration:** 6 days

- **Speakers:**
    - Prof. Somnath Tripathy, IIT Patna
    - Dr. Hemant Rath, TCS Research and Innovation
    - Dr. Shweta Bhandari, LNMIIT Jaipur
    - Prof. Ramesh Agrawal, Jawaharlal Nehru University
    - Prof. Vinod, CUSAT Cochin
    - Dr. Arinjita Paul, TCS Research Division
    - Dr. Vineeta Jain, LNMIIT Jaipur
    - Dr. Mayank Agrawal, IIT Patna
    - Dr. Sumit Kalra, IIT Jodhpur
    - Ms. Ipsita Rath, Cyber Law Practitioner
    - Dr. Prem Masand, Motivational Speaker: Brahma Kumaris, Mount Abu Holistic Wellness
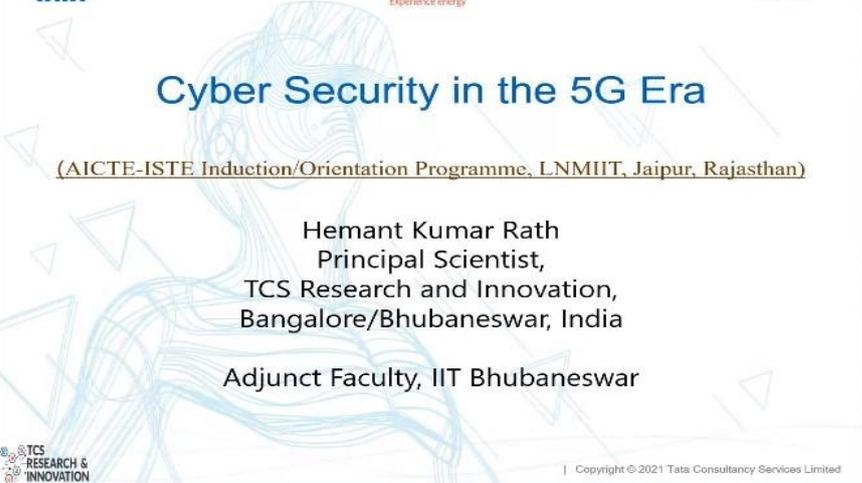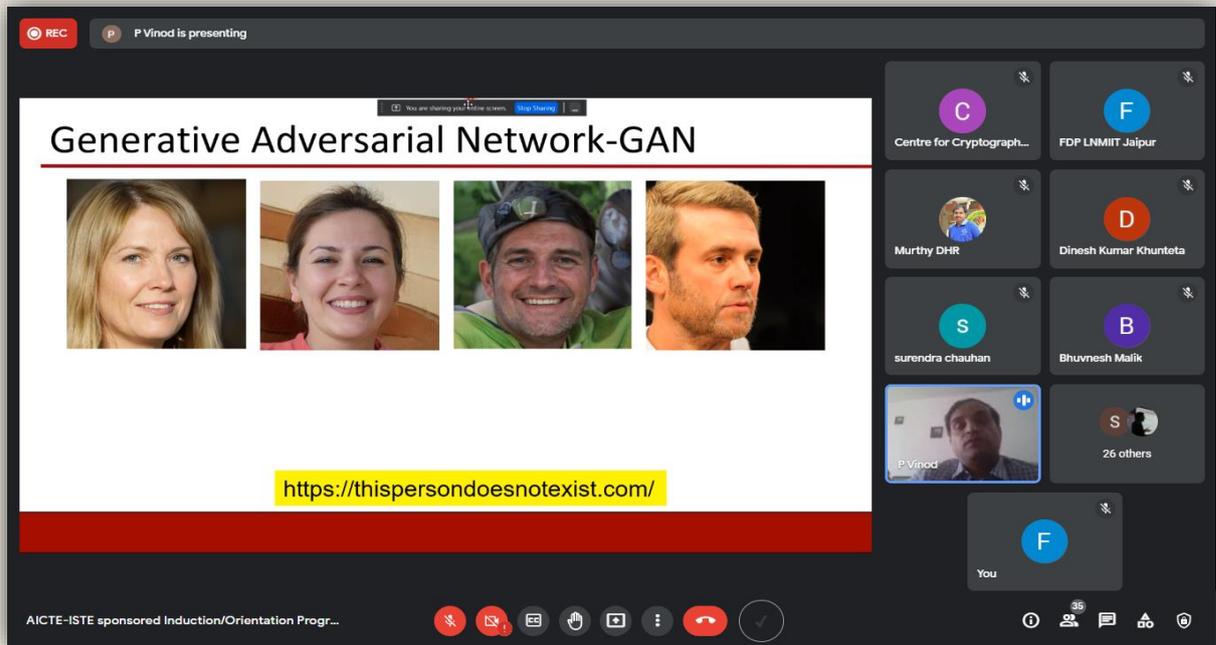
(C) Workshop

Title: 4th International Workshop on Multimedia Applications (IWMA 2022) was organized by the InterMedia Research Group and Department of Computer Science & Engineering, during March 14 – 18, 2022 in virtual mode.

- **Convenor**: Dr. Ram Prakash Sharma

- **Co-convenor**: Dr. Indradeep Mastan

- **Organizing Chairs:** Dr. Preety Singh, Dr. Rajbir Kaur, Dr. Vineeta Jain, Dr. Aloke Datta.

- **Publicity Chair**: Dr. Anugrah Jain

- **Level:** International **| Duration:** 5 days

- **Speakers:**
    - Prof. Narendra Ahuja, University of Illinois, USA
    - Prof. Santanu Chaudhury, Indian Institute of Technology Jodhpur, India
    - Prof. Mohan Kankanhali, National University of Singapore, Singapore
    - Prof. Raghavendra Ramachandra, NTNU, Norway
    - Prof. Sumantra Dutta Roy, Indian Institute of Technology Delhi, India
    - Dr. Somnath Dey, Indian Institute of Technology Indore, India
    - Dr. Rajib Kumar Jha, Indian Institute of Technology Patna, India
    - Dr. Bidisha Sharma, National University of Singapore, Singapore
    - Mr. Saneem Ahmed, IBM Research Bangalore, India
    - Dr. Saurabh Kumar, LNMIIT, Jaipur
    - Dr. Ram Prakash Sharma, LNMIIT, Jaipur
    - Dr. Preety Singh, LNMIIT, Jaipur
    - Dr. Indradeep Mastan, LNMIIT, Jaipur

Recent Collaborations/MoU

- *Dr. Sakthi Balan Muthiah* who is the Co-partner for Mozilla project with Dr. Sangeeta from GIGA Hamburg, Germany, submitted the 300 page project report findings to GIGA in January 2022. Project is done by two students Dev Ashish and Priyanshu Jain from the Department of CSE and Dr. Balan himself. This project is with German Institute for Global and Area Studies (GIGA) titled *"Digital Surveillance and Understanding its Chilling Effect on Journalists: Finding Strategies and Solutions to Safely Search and Share Information Online"*. Project was done for six months, from Aug 2021 to Jan 2022.

Faculty Achievements/Awards/Recognitions

- *Dr. Sakthi Balan Muthiah* is serving as a reviewer for International Journal of Social Network Analysis and Mining, Springer Publications. This journal comes under the Q1 ranking category for the list of journals.
- *Dr. Sakthi Balan Muthiah* is serving as a Programme Committee (PC) member for 14th ACM Web Science Conference (WebSci '22) to be held in Barcelona, Spain.

Student Achievements/Awards/Recognitions

- *Ms. Shweta Gupta (15PCS002)* received Doctor of Philosophy (PhD) degree for her thesis entitled *"Evolutionary Computing Approaches to Multi Criteria Recommender Systems"*, which she pursued under the supervision of Dr. Vibhor Kant.

- *Mr. Mohit Jindal (17UCS091) and Mr. Kumar Manas (17UCS081)* of Y17 Batch received Best BTP Award in the graduating batch of 2021, under the supervision of Dr. Preety Singh for the project entitled *"Low Complexity Video Compression for Fixed Focus Cameras"*.
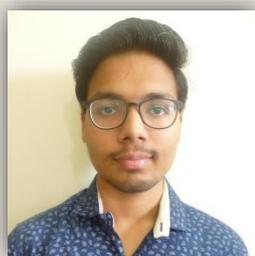
Mr. Mohit Jindal   Mr. Kumar Manas

Featured Faculty

Name of the Faculty: Dr. Rajbir Kaur

Designation: Assistant Professor and Deputy HoD,
Department of CSE

Faculty Speaks:

We have all heard someone say at one point or the other that *change is the only constant in life*. Yet, no matter how overused this may be, it was perhaps not as well experienced ever before as during the COVID-19 pandemic. The pandemic quickened the growth of certain technologies, including network technologies. The transition to remote work created conditions that led to higher adoption of virtual private networks (for secure and private connections), virtualization infrastructure (e.g. remote desktop) and unified communications and collaboration (e.g., video conferencing, team chat, project planning etc.). An increased demand for data insights and remote access was witnessed across businesses, industries and government organizations. This created the conditions for accelerated adoption of technologies and automation that rely on the Internet of Things (IoT), which has changed the way that the data is gathered, analysed and delivered to users *without any human involvement* at any level. The power of IoT can be realized by looking at some innovations in the fight against Covid-19.

Contact tracing: The applications addressed the challenging task of preventing pandemic spread by using built-in sensors and communication technologies (BLE, cellular) in mobiles. The high volume of data captured by the sensors were analyzed to identify risk exposure, anticipate hot-spots and predict community transmission.

Social distancing: The innovative technology alerted persons with a vibration buzzer noise and a warning signal if the social distancing protocols were not adhered to.

Occupancy Monitoring: Real-time data was collected from IoT enabled sensors to detect usage level of an area (e.g. footfall counting). This helped keep crowd and queue numbers under control.

Smart Mask: Integration of IoT enabled sensors helped to gather data and analyze it to prevent control and spread of respiratory viruses.

Remote health monitoring: Data and information of the patient was captured remotely to track any types of diseases and improve the safety of the patient. Medical staff was informed automatically in case of any emergency.

There are two lessons that we can take from the above: First, adversity creates opportunities and secondly, one must transform and evolve to offer innovative solutions for pressing demands.

Even though it seems that adapting to change requires one to keep learning, it is important to note that change in fundamentals of technology is very rare. **Fundamentals do not change**. If you take the time to identify, understand and practice the fundamentals / concepts of a technology, then you will find that lifelong learning is much easier. You must have experienced that it takes time to learn and master your first programming language.

Other languages of the same paradigm are easy to grasp. The new language also uses similar type of frameworks and structures.

To summarize, technological changes are constant and happen at a rapid pace. To keep abreast with the change, we need to keep learning. Learning gets easier over time if we are well versed with the fundamentals because they **repeat every time** we study / acquire new course / skill.

Here is wishing you the ability to embrace change and evolve continually to design innovative solutions that transform the lives of people.

Featured Department Staff

Name of the Staff: Mr. Shivam Maheshwari
Designation: Technical Superintendent, CSE
About: He is working as Technical Superintendent in the department. He has completed his B.Tech. degree from Government Engineering College, Bikaner, Rajasthan. He has an experience of 8 Years in academic institutions as a technical staff. He has expertise in computer networks, industrial automation and embedded systems, hardware and software platforms such as Raspberry Pi, Arduino Mega, NodeMCU, OmNet++, MySQL, Java, C++, Python 3.0, among others. He has been serving the department with his excellent knowledge in technical support, system administration and IT infrastructure services, and setting up and managing the laboratories of the department. Recently, he has served with his skills in website design and maintenance during the 22nd International Conference on Cryptology in India (Indocrypt 2021).

Featured Student

Name of the Student: Ms. Shruti Sharma

Batch: B.Tech. Y20 (20UCS189)

Achievement: Branch Topper

CGPA: 9.52

Student Speaks:

Hello, everyone. I am a penultimate year undergraduate student of B.Tech. in Computer Science and Engineering from the Y20 batch. I am thankful to the CSE department for providing me with an opportunity to share my experiences with everyone. My journey with LNMIIT has been amazing. Faculty members are supportive and ensure that the students understand well and gain the essence of subjects. They teach us in a way that makes the topic interesting to read and grasp. They also motivate us to excel in our respective fields of interest. Other students and my peers at LNMIIT are very helpful and

create a healthy environment. I learn many things from them on a day to day basis, and they are always there to clear my doubts. Our college's coding culture encouraged me to focus on constructive things from the start. The guidance provided by seniors made things easy as they let us know which topics to focus on more during different times.

I also appreciate that the institute provides merit scholarships to students, which was a significant motivating factor in my case. The institute keeps the curriculum up-to-date by introducing various new courses according to the industrial requirements, which helps the students to find their fit. The institute also contributes to the integrated development of its students. The curriculum provides us with quality education and allows students to prevail in their creative interests. Our needs were always heard by college authorities which helped to cope with everything during the times of pandemic. Until now, my entire experience has been very wholesome and satisfying and helped me develop holistically as well.

Featured Alumni

Distinguished Alumni: Mr. Somya Shekhar Jain

Batch: Y14 (2014 – 2018)

Current Organization and Profession: Product Manager, PhonePe

Previous Ventures:

- Software Developer, Acko General Insurance.
- Product Manager, Codeyoung India.

Achievements:

- He served as the co-organizer of Google Developers' Group for Jaipur chapter from April 2016 to March 2017.
- He was the recipient of second prize in the inter-college chess tournament during Desportivos' 2015.
- Worked in an early-stage startup named Codeyoung (Coding for Kids platform) as the first product manager. Awarded with *Best Employee award* in June 2021 for his role as an entrepreneur in product development. During his tenure as a team lead, the revenue was increased by 400% from $400k ARR to $2M ARR.
- Currently, he is serving in the Online Merchants team at PhonePe as the Product Manager. He has been handling the 10 million DAU paying via Phonepe across different online merchants such as Flipkart, Swiggy, Dream11, among other famous firms.