PCCoE'S
Samvaad
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......Connecting Minds & Souls

Our Patrons : Pimpri Chinchwad Education Trust

Inside This Issue

Samvaad Editorial : Digital Manufacturing

The use of computer systems in manufacturing services, supply networks, goods, and processes is known as digital manufacturing. To establish an integrated approach to manufacturing, from design to production and on to the servicing of the finished products, digital manufacturing technologies connect systems and processes across all sectors of production.

It is possible to enhance the effectiveness of manufacturing decision-making while also enhancing the processes to generate cost savings, shorten the time to market, and establish a joined-up manufacturing process that integrates digital tools with the actual physical execution of manufacturing through modeling and simulating processes.

Manufacturers can integrate a digital thread into the production process to analyze data across the product lifecycle and develop techniques that can be put into practice by employing a process that is computer-centered. In order to offer products through manufacturing that is focused on customer needs, digital manufacturing systems also enable the transmission of customer data to product managers in order to forecast demand and any ongoing maintenance requirements.

The Three Aspects of Digital Manufacturing
- Product life cycle,
- Smart factory
- Value chain management.

The engineering design phase of the product life cycle is followed by sourcing, production, and service life. Digital data is used at every stage to enable design adjustments during the production process.

Smart machines, sensors, and tooling are used in the "smart factory" to provide real-time feedback on processes and production technology. This digital transformation makes it possible for better visibility, control, and performance optimization of production processes by combining operations technology with information technology.

In order and customer happiness, the value chain management focuses on minimizing resources to develop an optimal process with fewer inventories and preserve product quality.

What is the Future of Digital Manufacturing?

Future growth in digital manufacturing appears likely given the increasing automation of information-based production processes.

The development of Industry 4.0 appears to be continuing the trend of joined-up manufacturing in order to boost competition and enhance and expedite processes thanks to technologies that can communicate with one another.

3 D Concrete Printer Complete Unit
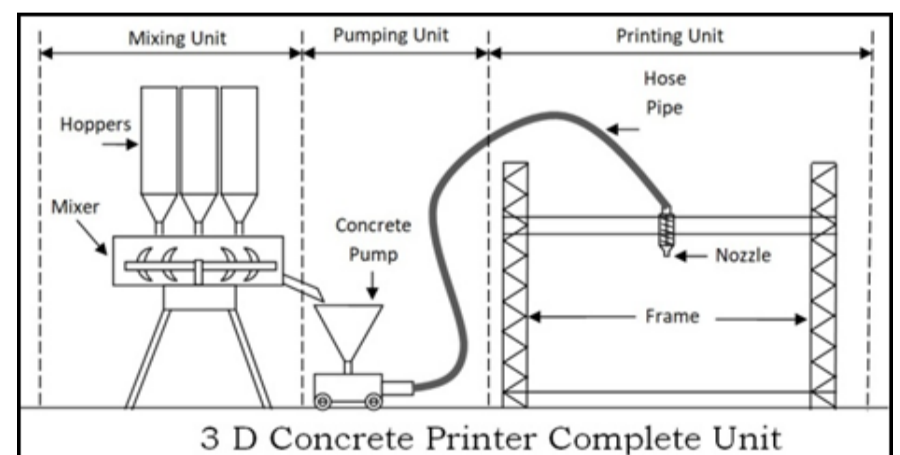
Dr. D. S. Lal
Associate Professor, Dept. of Civil Engineering and Associate Dean (R and D), PCCoE.

3D Concrete Printing Frames ……..Dr. D. S. Lal

3D printing or additive manufacturing (AM) is a process used in creating an object which is three-dimensional of practically any shape from a three-dimensional model or another digital data source primarily by using additive processes which lays down material continuously layer by layer under computer control. A 3D printer may be said to be a kind of commercial robot. Building a concrete structure is time-consuming and expensive.

Additive manufacturing appears to be a decent solution because it allows to save lots of labour costs and to build faster. 3D printing could facilitate the production of structures and alter the construction industry. With this manufacturing process, you'll be able to build resistant structures and avoid the waste of material.

A concrete 3D printer is a machine that can build houses by depositing concrete layer by layer. Concrete 3D printing use concrete which is pushed through a nozzle in layers to print buildings in 3D.The 3D printers available within the market are very costly so it's necessary to search out certain solutions and take a look at cutting the price of the printer and achieving low-cost homes. The frame mechanism is the prime factor in 3D Printing.

Gantry System and Robotic Arm are the two types of frame mechanisms. The Gantry type consists of 3 axes viz X, Y and Z. X and Y axis are used for the horizontal movement and Z Axis is used for the vertical movement of the extruder. The Robotic arm type consists of 6 axes, and it is a much more complex printer. Robotic Arm Printers are capable of printing more complex structure. The user needs to select a mechanism based on their requirement. The parameters such as Printing Speed, Object Finish Quality,

Type of object to be printed and Size of the Printer need to be considered by the user while selecting the printer type. The cost of the readily available printers in the market varies between 40 lacs to 4.6 crore which is a very high cost. So, it is necessary to find an alternative and develop a cost-effective 3D Concrete Printer. A 1:1 cement to sand mix is prepared and used for printing components. Admixtures can be added for increasing the flowability and cohesiveness of the prepared mix.

Work Details

There are many different categories of 3D printers available in the market so it is necessary to compare them by considering the different types of frames and find the ideal frame for the 3D concrete printer. Gantry type mechanism and Robotic Arm Mechanism are widely used in 3D Concrete Printing. It is necessary to identify the mechanism as per our requirement and design it. 3D Printer mechanisms were studied from the various available resources and Gantry Type was identified to be more feasible in our case.
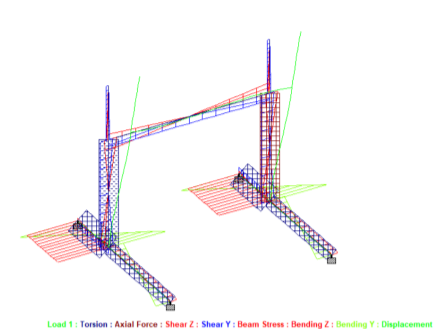

Concept Design
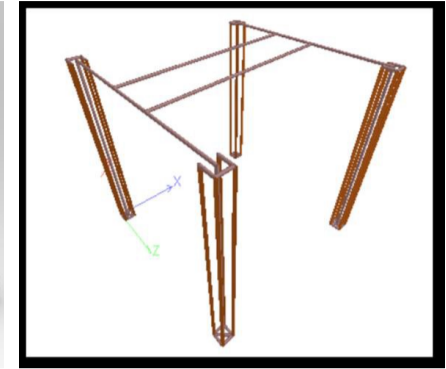
FrameAnalysis using STAAD.Pro
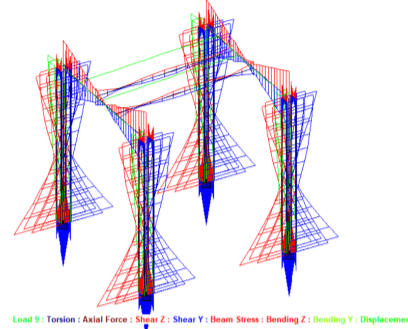
Various forces acing on the gantry frame and their effect

The Robotic Arm System and Gantry System are the most widely used 3D concrete printing mechanisms. In terms of how they operate, each system has its own set of benefits and drawbacks. The Gantry System is more affordable and operates with greater accuracy. Gantry System prints more quickly, is more powerful, and produces products with superb textures.

In comparison to a robotic arm system, a gantry frame is simpler to construct and less complicated. The Gantry System is therefore more appropriate in our instance than the Robotic Arm System after evaluating the various parameters of both frame types.

Nozzle Optimization for 3D Concrete Printer ……..Dr. D. S. Lal

A cutting-edge technique in the modern construction sector is 3D printing of concrete. With this style of construction, less concrete is wasted and no formwork is required to support the concrete. In isolated locations, 3D concrete printing can build a structure more quickly and affordably. The goal of this study is to locate and fix the many issues with the 3D concrete printer's nozzle that are crucial to the further advancement of this construction method. This article approaches the subject in two stages: first, creating the nozzle of a 3D concrete printer, and second, identifying difficulties related to the nozzle. Solid Works software was used to design the nozzle for a 3D concrete printer and simulate the flow of concrete inside the nozzle.
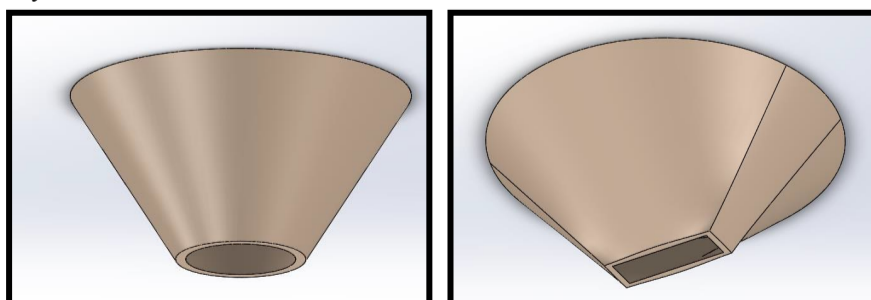
An extruder that extrudes cementitious material via a nozzle linked to a frame is used to print layered structures. The nozzle and pump of the 3D concrete printer are its most crucial parts. The homogeneity, flowability, and buildability of concrete mix are affected by various nozzle designs, including circular, rectangular, and square ones. Since a 3D concrete pump brings concrete up to the nozzle, the pressure required to pour the material should be coordinated with printer speed. Concrete mixture characteristics are directly impacted by pump pressure.

Work Details

There are certain nozzle and pump inputs needed to run a 3D concrete printer. The inputs required for 3DCP were researched and created in a way that aids in the construction of suitable concrete layers without layer failure.
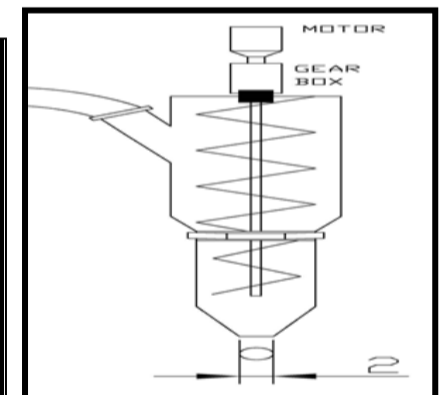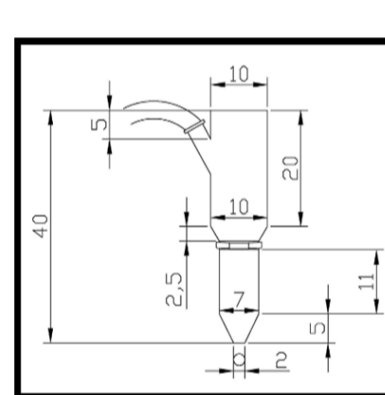
Shape of nozzle

Nozzle shapes include square, rectangular, and circular ones. Out of the three configurations, the circular shape has the most advantages in terms of the printing process, nozzle movement, layer thickness, etc., but it also exhibits more porosity and an uneven distribution of loading than the rectangular shape. Contrary to circular nozzles, rectangular and square shapes generate layers that are thinner but more stable and evenly distributed in terms of load.

Geometry and Section of Nozzle
3D Modelling

The software Soildworks is used to create 3D models. A user-friendly and accurate piece of software is used to produce 3D models of objects. After some modification, it can take input from AutoCAD and transform it to 3D modelling. For a certain shape to be taken into account from every viewpoint, 3D modeling is required.
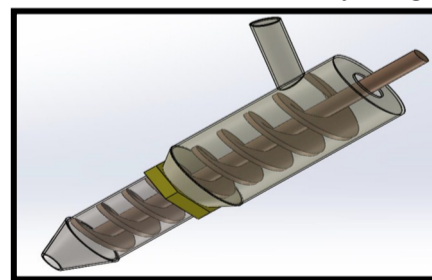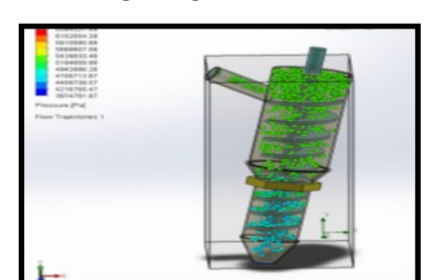
3D Model of nozzle   Flow Simulation
Flow Simulation

Solidworks is used to simulate flows. Concrete is being extruded for the purpose of forming layers as evidenced by the spheres present in the nozzle. Some pressure is building up on the cylinder walls as the concrete moves forward on the screw conveyor. Different colour coding on the left side of the Solidworks window shows the pressure that is developing in the nozzle.

The performance of the nozzle is reduced by several issues such aggregate clogging, material jamming, uneven concrete layer surfaces, post cleaning, etc. This increases the time needed for concrete printing. Through the optimization of the nozzle's geometry, issues that develop during operation can be reduced to some extent.

**Nozzle Shapes**
2D Modelling of nozzle

The geometry is such that a screw conveyor is inside the cylinder and moves the concrete forward by rotating in a circular motion with the aid of a motor. Concrete is produced by rotating a hose pipe via a screw conveyor and then extruding it through a nozzle.

In order to achieve continuity in the extruded layer at various speeds, it is required to determine the pump's optimal printing speed. For the layers being printed to take on the desired shape and stability, the speed of pumping and printing must be coordinated with an increase in pump pressure caused by an obstruction.

3

Smart Helmet for Working Professional ……..Dr. Rajesh Phursule

A hard hat is a type of helmet predominantly used in workplace environments such as industrial or construction sites to protect the head from injury due to falling objects, impact with other objects, debris, rain, and electric shock. Suspension bands inside the helmet spread the helmet's weight and the force of any impact over the top of the head. A suspension also provides space of approximately 30 mm (1.2 inches) between the helmet's shell and the wearer's head, so that if an object strikes the shell, the impact is less likely to be transmitted directly to the skull. Some helmet shells have a mid-line reinforcement ridge to improve impact resistance. The rock-climbing helmet fulfills a very similar role in a different context and has a very similar design.

Today, with the development of industrial technology, industrial sites (such as civil engineering or construction sites) become larger and more complex, field workers must be able to handle the electronic equipment and construction equipment devoted to construction, or to collaborate with other workers. In addition to wearing protective gear (helmets, belts, gloves, etc.), it is also necessary to use various extension tools used in construction sites, radio and mobile terminals for communication with remote workers and other advanced equipment.

The use of telecommunication and electronic equipment is very important in order to increase the safety and work expertise and efficiency of the workers in the industrial field. In addition, unexpected situations such as fire rescue, natural disaster or collapse of the construction site. If there is a dangerous working environment such as a high-altitude workplace or fire suppression that is difficult to cover up, the need for such equipment is higher, but in fact it is very difficult to carry and operate all of the equipment. In addition, even if the above-mentioned advanced equipment are possessed, communication with other workers or the central center is disconnected so that when the worker alone is in an isolated danger situation or emergency situation, the worker is escaped to the safety zone or the worker's situation (to be rescued by an external rescue team. However, in the past, when both of the protective equipment, the communication equipment and the emergency aid equipment are carried, the volume and weight are increased to such an extent that it is impossible to work, and there is a problem that a backpack or a separate portable pocket for attaching all the equipment to the body of the worker is required.

To solve the above- mentioned problems, smart helmet is necessary to prevent the workers from hazardous environment. With increasing use of automation devices, it is now possible to monitor the workers safety through means of cameras, sensors. Even though there are installed cameras in some premises, but it is not always possible to install them at construction sites. Supervisor cannot monitor all the workers at each time.

To avoid these, a smart helmet can be used to monitor the workers safety. It provides information about workers safety. While on construction site, if the worker has worn the helmet or not, it gets continuously monitored.

When worker puts on Helmet, the device sends the "Put ON" message to the supervisor. When worker removes the helmet, "Helmet Removed" message is sent. These messages are sent to supervisor or central monitoring number, where he can identify if particular worker has put on helmet or not. In another aspect, a mobile application is developed through which helmet wearing can be monitored at anytime from anywhere. This reduces the efforts of supervising as he can direct contact and carefully explains the purpose of smart helmet. It any damage or any unwanted event happened on construction site, it saves the life of human being. Also, overhead power lines are many times passed from construction sites, specifically the top of the construction buildings. Construction workers can die or severely injured many times due to contact with overhead power lines of low voltage to extra high voltage either.

Thus, the guiding system, in the form of smart helmet, is required which warn construction workers whenever they are close to such wires. Many times, construction workers are doing work at the edge of tall buildings and chances of fall are increased. Smart helmet will generate sound alarms for quick alert in such situations. A voice message in regional language will also generate in such situations.
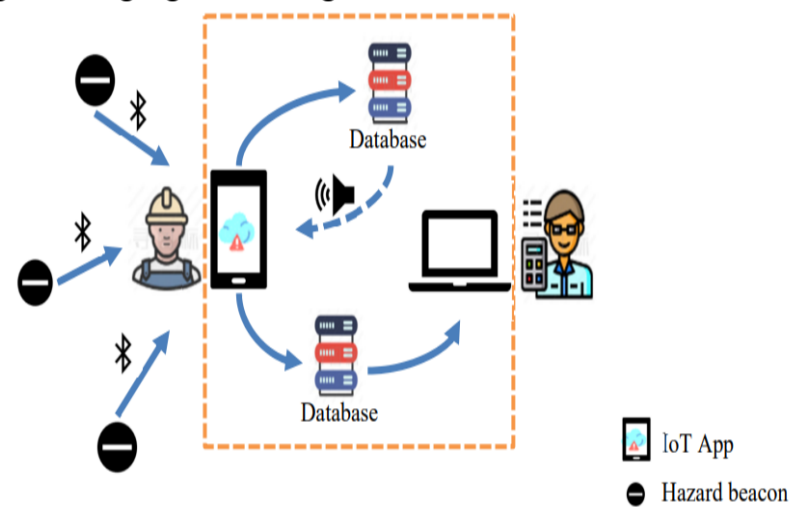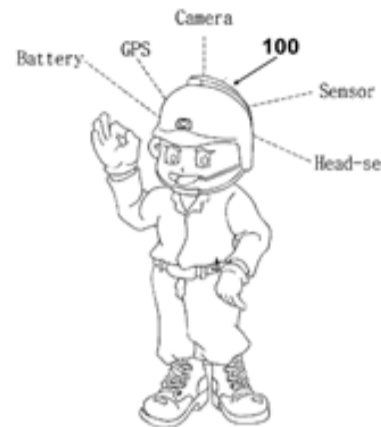
In another aspect, a structure core which is a sophisticated suit of optics plus as onboard inertial measurement unit (IMU) can be embedded in the helmet. It scans any object and converts it into 3D or 2D image. In case of construction industry, by scanning any object, it can be get converted into 3D CAD drawing. 3D CAD drawing can be used for many purposes such that area calculation, simulation etc.

PCCoE Technical Feat

1. Mr. Mahadev U. Madgule published paper titled, "**Determination of Porosity & Microstructure Studies of wax-based Aluminium Metal Foam**", in Internatinal Journal of Microstructure & Materials Properties on 20 Jan 2023.
2. Mrs. Vrushali Yogesh Bhalerao published paper titled, "**Enhancement of Tribological Properties of Cubic and Hex Boron nitride Nanoparticles Impregnated on Bearing Steel via Vacuum Heat Treatment Method**", in Journal -MDPI-Coatings, Special Issue on 9 Dec'2022.
3. Khairnar, Smita, Shilpa Gite, Ketan Kotecha, and Sudeep D. Thepade. 2023, "**Face Liveness Detection Using Artificial Intelligence Techniques: A Systematic Literature Review and Future Directions**" Big Data and Cognitive Computing 7, no. 1: 37. https://doi.org/10.3390/bdcc7010037.
4. Srinivas Ambala, "**Blockchain-enabled bioacoustics signal authentication for cloud-based electronic medical records, Measurement: Sensors**", Volume 26, 2023, 100706, ISSN 2665-9174, https://doi.org/10.1016/j.measen.2023.100706.
5. Nilam Upasani, Asmita Manna and Manjiri Ranjanikar, "Augmented, Virtual and Mixed Reality Research in Cultural Heritage: A Bibliometric Study" International Journal of Advanced Computer Science and Applications(IJACSA), 14(1), 2023. http://dx.doi.org/10.14569/IJACSA.2023.0140191.
6. Swati Jaiswal, 2022. "**Modeling of the Resonant Inverter for Wireless Power Transfer Systems Using the Novel MVLT Method**" Vehicles 4, 1277-1287.
7. Kachhoria, R., Jaiswal, S., Khairnar, S. et al., "**Lie group deep learning technique to identify the precision errors by map geometry functions in smart manufacturing.**", Int J Adv Manuf Technol (2023). https://doi.org/10.1007/s00170-023-10834-2
8. Twitter Sentiment analysis of Covid-19 vaccination using Deep Learning by Dr. K. Rajeswari, **Book Title :** Machine Learning Algorithms for Intelligent Data Analytics, **Editors** : Dr.S.Balamurugan, Dr.Ramasamy V, Mr. Radhey Shyam Meena, **ISBN:** 978-93-92104-07-7, Doi: 10.36647 MLAIDA/2022.12.01.Book1.
9. Ms. Anuja Jadhav and Dr. Roshani Raut, "Water and wastewater quality prediction: current trends and challenges in the implementation of **Artificial Neu-ral Network**", Environmental Monitoring and Assessment 2/1/2023.
10. Kharat, R.S. et al., "Cybersecurity enhancement to detect credit card frauds in health care using new machine learning strategies. Soft Comput (2023). **ISSN:** 1433-7479.
11. Kalbhor, Madhura, and Swati Shinde. 2023. "ColpoClassifier: A Hybrid Framework for Classification of the Cervigrams" Diagnostics 13, no. 6: 1103. **ISSN:** 2075-4418.

Faculty Achievements

1. Dr. Rajkumar B Patil, Invitation as a **resource person** for FDP on "Adanaces in Claen Energy Technologies for Sustainable Development", at Sharad Institute of Technology, Ichalkaranji on 28 Jan'2023.
2. Dr. C. L . Ladekar, Invited as as Sustainable Ecosystem track Session Chair for IEEE International Conference 'PuneCON-2022" and appointment as a subject expert for conducting Ph.D. interview in SPPU; appointed as external examiner for conducting M.Tech Dissertation Examination. Also worked as track chair and sessions chairs for for IEEE International Conference 'PuneCON-2022."
3. Mrs. Rita S. Pimpalkar Attendant, Workshop on Syllabus Implementation Workshop "*Computer Integrated Manufacturing*", at SNJB's Late Sau. K. B. Jian College od Engineering, Chandwad, Nashik 11-13 Jan 2023 also attended workshop on implementation of NEP2020 in G. H. Raisoni COE & Management, Pune 03-04 Feb 2023.
4. Dr. A. B. Lingayat and Dr. M. S. Nukulwar attended FDP on "*Autonomous Cars, Connected Car and Electric Vehicles*" , Government College of Engineering, Chandrapur On 16-20 Jan 2023
5. Mr. S. B. Gorade, invited as **resource person** for Five days FDP on " Best practices for successful completion of Research Project" organized by Ajeenkya D.Y.Patil college of Engineering, Pune on topic , "*Selection of Project Topics*" and "System of Monitoring and Evaluation".
6. Dr. S. T. Mali, invited as **resource person** for Five days FDP on " Best practices for successful completion of Research Project" organized by Ajeenkya D.Y.Patil college of Engineering, Pune on topic , "*How to collect and write literature review and summary of literature review*".
7. Dr. A. K. Gaikwad, invited as **resource person** for Five days FDP on " Best practices for successful completion of Research Project" organized by Ajeenkya D.Y.Patil college of Engineering, Pune on topic , "*Best Practices and Case Studies*".
8. Dr. S. T. Mali **attended International Workshop** on " *Energy and Environment in the Circularity Aspect* " in association with ALMINICA AB, Ulrika, Sweden and PCCOE on 31st January 2023 on "Anaerobic Bioreactor Landfill for Green Renewable Energy Generation from Municipal Solid Waste".
9. Mr. S. P. Banne **Received best paper** session award in International Conference on Advanced Technologies in Chemical, Construction and Mechanical Sciences (ICATCHCOME 2023) held at Coimbatore (9th and 10th Feb, 2023) .
10. Dr. K. Rajeswari completed the **three-day FDP** on Effective Teaching on 15th, 16th and 17th February 2022.
11. Dr. D. S. Lal, Dr. R. N. Phursule, Mr. M. M. Narkhede **received funding** for the proposal, "Development of 3D Concrete Printed Full Scale Civil Engineering Structure using Gantry Frame Mechanism", from Scientific and Industrial Research Organization (SIRO).
12. Ms. Anita L. Devkar (Shingade) **attended 2 Days FDP** on "Adoption of Guidelines on NHEQF and Curriculum Framework and Credit System for Four Year Undergraduate Program(FYUP)" from 23 and 24 Feb, 2023 organized by PES's Modern College of Engineering, Pune; **5 Days FDP** on "Data Science using Machine Learning" from 2nd Jan,2023 to 6th Jan 2023 organized by Pravara Rural Engineering College in collaboration with ExcelR; **5 Days FDP** on "Empirical Data Science and It's Implications" from 3rd Jan to 7th Jan, 2023 Organized by Dept of Computer science and Engineering (Data Science), SRIT, Ananthapuramu.
13. Mrs.Chhaya Nayak delivered an Expert Session on, "File copyright under Literary Work", in Christian Eminent College,Indore National level in Christian Eminent College,Indore on 27th March 2023.
14. Dr. Jyotsna Awari delivered an Awareness session on, "Menstrual problems and breast cancer check up camp", College Level program arranged under ACM-W, Computer Department, on 6th April 2023.
15. ISR and Art Circle cells of Computer Engineering Department have visited **Nachiket Balgram(Orphange and Slum area students) for awareness program and Drawing competition on Tree Plantation and save trees theme**, conducted by Mrs. Kavita Kolpe and Mrs. Madhuri Suryavanshi.

Students' Achievements

1.Pranav Kulkarni, Saurabh Asnare SY Computer Engineering, **Won Silver medal and the cash prize of Rs. 5000 in National level project competition organized by Pillai College of Engineering, Panvel.**

2. **Team Kratos Racing in Formula Bharat 2023 ,** "Team Kratos Racing secured **Overall Second Rank in Formula Bharat electric competition** held at Coimbatore in Jan 2023. Team also bagged awards in different categories as mentioned below:

Static Awards:	Dynamic Awards:
1. OVERALL STATICS AWARD: FIRST RANK	1. ACCELERATION EVENT: FIRST RANK
2. COST AND MANUFACTURING EVENT: FIRST RANK	2. SKIDPAD EVENT: FIRST RANK
3. ENGINEERING DESIGN EVENT:FIRST RANK	3. AUTOCROSS EVENT: FIRST RANK

Special Awards:
"Best Batter Design sponsored by Ather Energy Most Hospitable Team "

Other Initiatives

National Service Scheme (NSS) camp was jointly organized by Pimpri Chinchwad College of Engineering and Savitribai Phule Pune University (SPPU) during the period of 23rd January 2023 to 29th January 2023 Inglun-Parithewadi, Maval, Pune, under the guidance of Pror. Kute S., NSS Coordinator and team.

Team ISR (Computer Dept) has successfully conducted "**Free Health Checkup Camp**", for house keeping staff at PCCoE. Staff Co-ordinator were, Prof. Ganesh Deshmukh, Prof. Anagha Chaudhari and Prof. Rahul Pitale.

Dr. N. B. Chopade, panelist for NEP 2020 Conference and Startup Education for its implementation at PCETs Institutions.

PCCoE, Nigdi, Pune have celebrate **Worlds Radio Day** with PCETs INFINITY CR 90.4 FM on 13 Feb'2023

PCCoE Announcement

FIRST ANNOUNCEMENT AND CALL FOR PAPERS
7th International Conference on
Computing, Communication, Control and Automation
ICCUBEA-2023
18th and 19th August 2023
Jointly Organized by
Dept. of Computer Engg.,
Dept. of Electronics and Telecommunication Engg. and
Dept. of Information Technology
Pimpri Chinchwad College of Engineering,
Pune 411 044 (INDIA)

Conference Tracks

- Signal and Image Processing
- Robotics, Control and Automation
- Communication Technologies
- Energy and Power Electronics
- VLSI & Embedded Systems
- Electronics for Societal Applications
- Mathematical Modeling and simulation
- Internet of Things and Computer Networks
- Image Processing and Computer Vision
- Data Science and Big data Analytics
- Cognitive Computing and Machine Learning
- Information, Cyber and Network, Security
- Computer Applications and Business Management

IEEE Pune Section   SAEINDIA WESTERN SECTION   ISTE

Important Dates

- Paper Submission Starts — 08th April 2023
- Last Date for paper submission — 10th May 2023
- Intimation of Acceptance — 31st May 2023
- Final registration and Camera ready paper submission — 30th June 2023
- Conference Dates — 18th and 19th Aug 2023

Paper Submission Link:
https://cmt3.research.microsoft.com/ICCUBEA2023

Email : iccubea2023@gmail.com
PCET's Pimpri Chinchwad College of Engineering
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For more details, please visit   www.iccubea.pccoepune.com

PCCoE Announcement

FIRST ANNOUNCEMENT AND CALL FOR PAPERS
International Conference on Innovations in
Mechanical and Civil Engineering
(18th and 19th August 2023)

Jointly Organized by
Department of Mechanical Engineering and
Department of Civil Engineering
i-MACE 2023
Pimpri Chinchwad College of Engineering, Pune
411 044 (INDIA)
Conference Theme: "GREEN & SMART Systems"

Go-Green Regularly by Energy Efficient Novelties with Sustainable and Modern Alternative materials to Reuse/Reduce/Recycle and improve the Technology.

Conference Topics

Code	Topic	Code	Topic
M1	Modelling, Simulation & Optimization Techniques	M8	Industry 4.0
M2	Smart Materials	M9	Mobility, Inter-Disciplinary and Other Emerging Topics
M3	Biomedical Engineering & Technology	C1	Waste and Water Management plans for Sustainable Environment
M4	Thermal and Fluid Engineering	C2	Smart Cities and Construction Technologies,
M5	Alternative and Renewable Energy	C3	Alternative Structural Designs
M6	Smart Manufacturing	C4	Transportation and Environmental Geotechnics
M7	Sustainability in Design	C5	Automation & soft Computing in Civil Engineering

materialstoday: PROCEEDINGS   Publications of 1st i-MACE2022 were in journals as shown   AIP
*i-MACE 2023 All accepted papers will be published in SCOPUS indexed Conference Proceedings and Journals

Important Dates

- Submission of Full Length Paper by — 15th April 2023
- Notification of acceptance of Paper by — 15th May 2023
- Submission of Final Full Length Paper by — 15th June 2023
- Early bird Registration on or before — 31st May 2023

Please quote the topic code and submit soft copy of the full-length paper to www.i-mace.pccoepune.com

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- Dr. Sanjay B. Matekar, Co-Chair
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- Mr. Parag P. Ankad, Track Coordinator
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