ELECTRICAL DIGEST

HALF YEARLY MAGAZINE

THE TECH ISSUE

The electric light did not come from continuous improvement of candles.

Nikola Tesla **Michael Faraday** **Thomas Edison** **James Clerk Maxwell**

JAN-JUN 2022 VOLUME 1

GEETHANJALI INSTITUTE OF SCIENCE AND TECHNOLOGY

HALF YEARLY ELECTRICAL MAGAZINE

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VISION-MISSION

VISION

To emerge as a competent learning centre producing prospective Engineers

MISSION

DM1: Provide conceptual and practical education through effective teaching-Learning strategies
DM2: Establish adequate Infrastructural support for enhanced learning
DM3: Interact with industry for upgrading professional skills including smart grid.
DM4: Organise personality development activities for imbibing life skills and ethical values

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

Graduates of B.Tech., in Electrical and Electronics Engineering program shall able to

PEO1: Analyse and solve real world Electrical and Electronics Engineering problems by applying modern engineering concepts.

PEO2: Pursue professional career or research.

PEO3: Demonstrate Excellence in multi-disciplinary teams through effective inter personal skills and ethical behaviour.

PEO4: Engage in continuous learning and adapt to the ever-evolving requirements of profession & society.

THIS ISSUE

05-06 **VLSI DESIGN**

07-08 **SUPERCONDUCTIVITY**

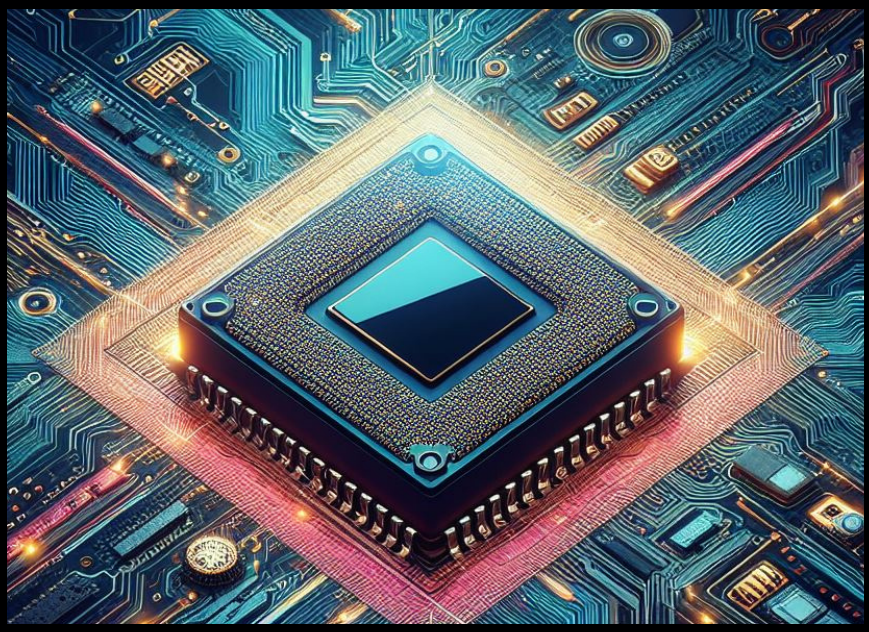
09-11 **DO YOU KNOW ?**

12-14 **MINI PROJECTS**

15-16 **STORY BEHIND !**

17-20 **EVENTS**

VLSI DESIGN



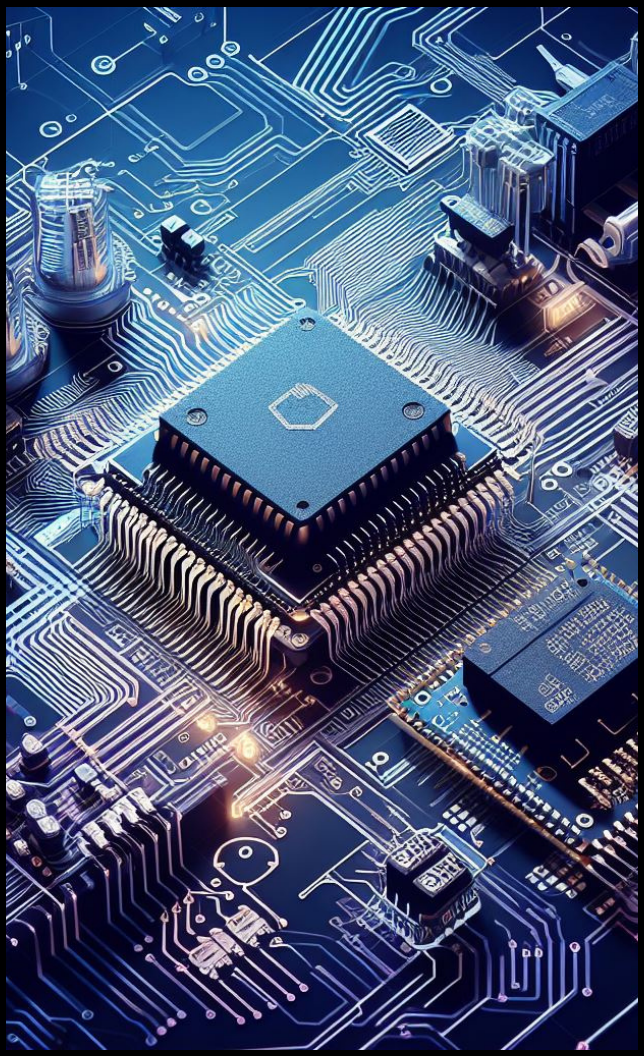
Very large-scale integration (VLSI) is the process of creating an integrated circuit (IC) by combining millions or billions of MOS transistors onto a single chip. VLSI began in the 1970s when MOS integrated circuit (Metal Oxide Semiconductor) chips were developed and then widely adopted, enabling complex semiconductor and telecommunication technologies. The microprocessor and memory chips are VLSI devices. Before the introduction of VLSI technology, most ICs had a limited set of functions they could perform. An electronic circuit might consist of a CPU, ROM, RAM and other glue logic. VLSI enables IC designers to add all of these into one chip.

General Microelectronics introduced the first commercial MOS integrated circuit in 1964.[2] In the early 1970s, MOS integrated circuit technology allowed the integration of more than 10,000 transistors in a single chip.[3] This paved the way for VLSI in the 1970s and 1980s, with tens of thousands of MOS transistors on a single chip (later hundreds of thousands, then millions, and now billions). The first semiconductor chips held two transistors each. Subsequent advances added more transistors, and as a consequence, more individual functions or systems were integrated over time. The first integrated circuits held only a few devices, perhaps as many as ten diodes, transistors, resistors and capacitors, making it possible to fabricate one or more logic gates on a single device.

STRUCTURED DESIGN

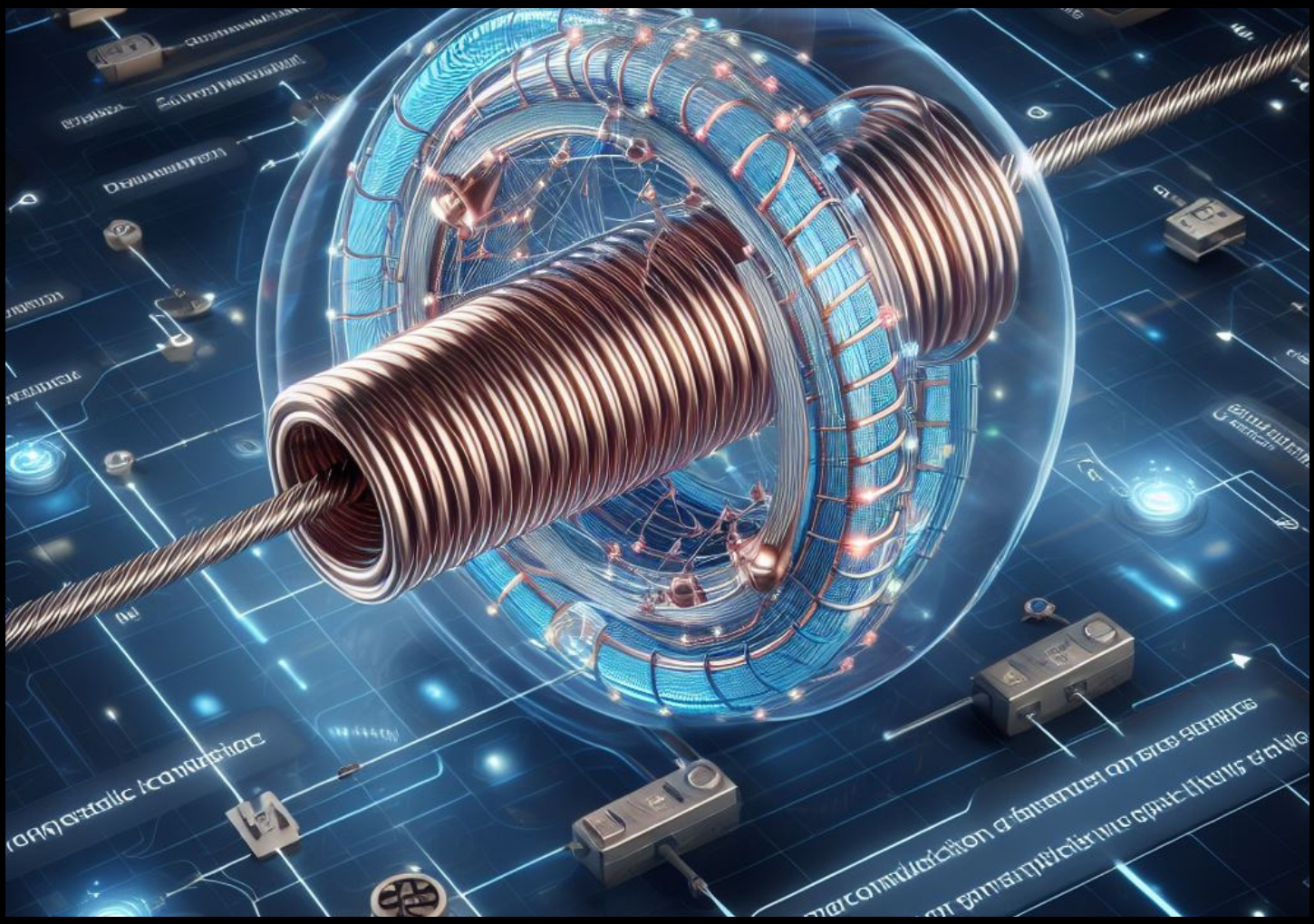
DIFFICULTIES

- PROCESS VARIATION
- STRICTER DESIGN RULES
- FIRST-PASS SUCCESS



Structured VLSI design is a modular methodology originated by Carver Mead and Lynn Conway for saving microchip area by minimizing the interconnect fabric area. This is obtained by repetitive arrangement of rectangular macro blocks which can be interconnected using wiring by abutment. An example is partitioning the layout of an adder into a row of equal bit slices cells. In complex designs this structuring may be achieved by hierarchical nesting.
Structured VLSI design had been popular in the early 1980s, but lost its popularity later[citation needed] because of the advent of placement and routing tools wasting a lot of area by routing, which is tolerated because of the progress of Moore's Law. When introducing the hardware description language KARL in the mid-1970s, Reiner Hartenstein coined the term "structured VLSI design" (originally as "structured LSI design"), echoing Edsger Dijkstra's structured programming approach by procedure nesting to avoid chaotic spaghetti-structured programs.

-SK. SAAQHIB



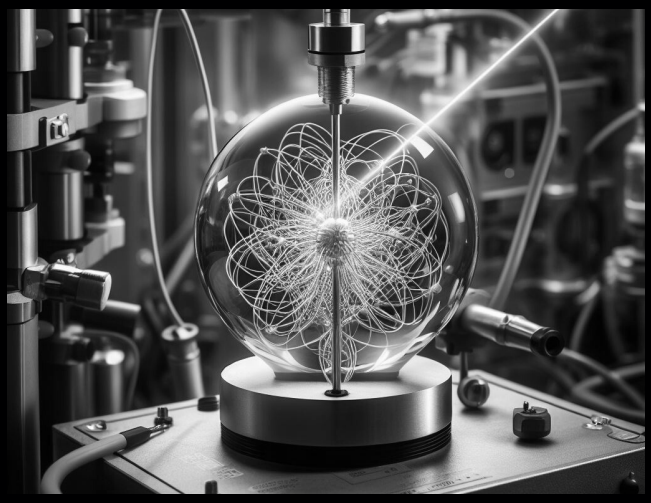
SUPERCONDUCTIVITY

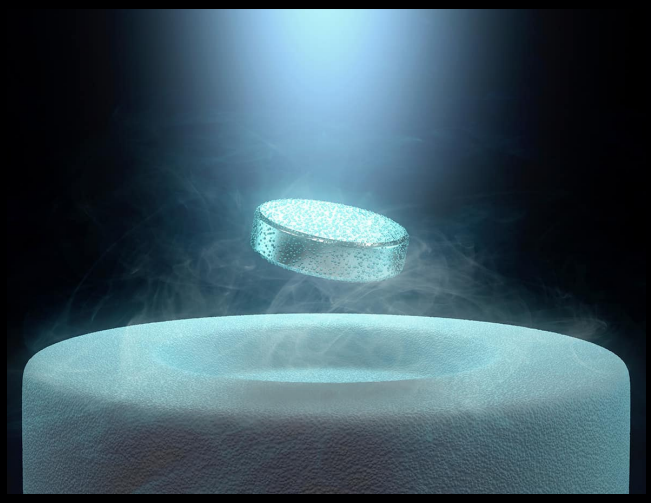
A SET OF PHYSICAL PROPERTIES OBSERVED IN CERTAIN MATERIALS WHERE ELECTRICAL RESISTANCE VANISHES AND MAGNETIC FIELDS ARE EXPELLED FROM THE MATERIAL.

-CH.SIVASHANKER

Unlike an ordinary metallic conductor, whose resistance decreases gradually as its temperature is lowered, even down to near absolute zero, a superconductor has a characteristic critical temperature below which the resistance drops abruptly to zero. An electric current through a loop of superconducting wire can persist indefinitely with no power source.

The superconductivity phenomenon was discovered in 1911 by Dutch physicist Heike Kamerlingh Onnes. Like ferromagnetism and atomic spectral lines, superconductivity is a phenomenon which can only be explained by quantum mechanics. It is characterized by the Meissner effect, the complete cancelation of the magnetic field in the interior of the superconductor during its transitions into the superconducting state. The occurrence of the Meissner effect indicates that superconductivity cannot be understood simply as the idealization of perfect conductivity in classical physics. In 1986, it was discovered that some cuprate-perovskite ceramic materials have a critical temperature above 90 K (−183 °C).





Such a high transition temperature is theoretically impossible for a conventional superconductor, leading the materials to be termed high-temperature superconductors. The cheaply available coolant liquid nitrogen boils at 77 K (−196 °C) and thus the existence of superconductivity at higher temperatures than this facilitates many experiments and applications that are less practical at lower temperatures.

DO YOU KNOW ?

WI-FI IS A WIRELESS NETWORKING TECHNOLOGY THAT USES RADIO WAVES TO PROVIDE WIRELESS HIGH-SPEED INTERNET ACCESS.

Wi-Fi is a family of wireless network protocols based on the IEEE 802.11 family of standards, which are commonly used for local area networking of devices and Internet access, allowing nearby digital devices to exchange data by radio waves. These are the most widely used computer networks, used globally in home and small office networks to link devices and to provide Internet access with wireless routers and wireless access points in public places such as coffee shops, hotels, libraries, and airports to provide visitors.
Wi-Fi is a trademark of the Wi-Fi Alliance, which restricts the use of the term "Wi-Fi Certified" to products that successfully complete interoperability certification testing. As of 2017, the Wi-Fi Alliance consisted of more than 800 companies from around the world. As of 2019, over 3.05 billion Wi-Fi-enabled devices are shipped globally each year. Wi-Fi uses multiple parts of the IEEE 802 protocol family and is designed to work seamlessly with its wired sibling, Ethernet.

Compatible devices can network through wireless access points with each other as well as with wired devices and the Internet. Different versions of Wi-Fi are specified by various IEEE 802.11 protocol standards, with different radio technologies determining radio bands, maximum ranges, and speeds that may be achieved. Wi-Fi most commonly uses the 2.4 gigahertz (120 mm) UHF and 5 gigahertz (60 mm) SHF radio bands; these bands are subdivided into multiple channels. Channels can be shared between networks, but, within range, only one transmitter can transmit on a channel at a time.

A newly installed home Wi-Fi network in April 2022

Wi-Fi's radio bands work best for line-of-sight use. Many common obstructions such as walls, pillars, home appliances, etc. may greatly reduce range, but this also helps minimize interference between different networks in crowded environments. The range of an access point is about 20 m (66 ft) indoors, while some access points claim up to a 150 m (490 ft) range outdoors. Hotspot coverage can be as small as a single room with walls that block radio waves or as large as many square kilometres using many overlapping access points with roaming permitted between them. Over time, the speed and spectral efficiency of Wi-Fi have increased. As of 2019, some versions of Wi-Fi, running on suitable hardware at close range, can achieve speeds of 9.6 Gbit/s (gigabit per second). he name Wi-Fi, commercially used at least as early as August 1999,[28] was coined by the brand-consulting firm Interbrand. The Wi-Fi Alliance had hired Interbrand to create a name that was "a little catchier than 'IEEE 802.11b Direct Sequence'."[29][30] According to Phil Belanger, a founding member of the Wi-Fi Alliance, the term Wi-Fi was chosen from a list of ten names that Interbrand proposed.[29] Interbrand also created the Wi-Fi logo. The yin-yang Wi-Fi logo indicates the certification of a product for interoperability.

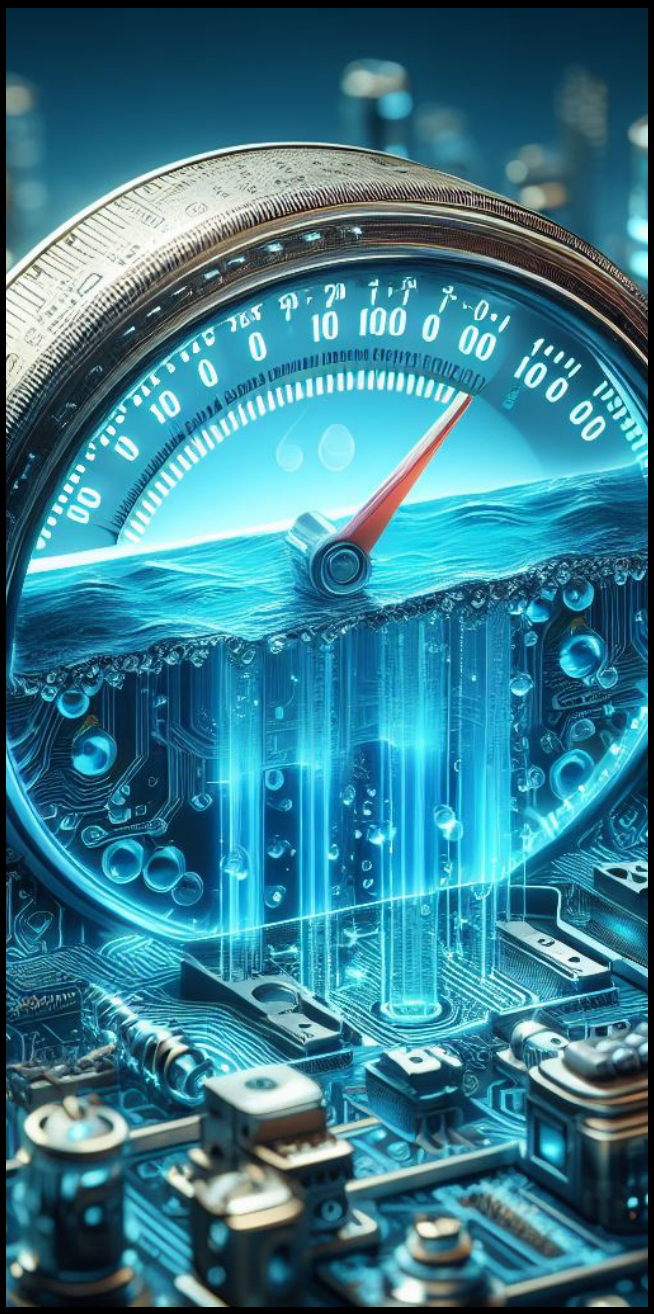
ELECTRICITY IS THE LANGUAGE OF INNOVATION AND PROGRESS.

MINI PROJECTS

ELECTRICITY IS REALLY JUST ORGANIZED LIGHTNING.

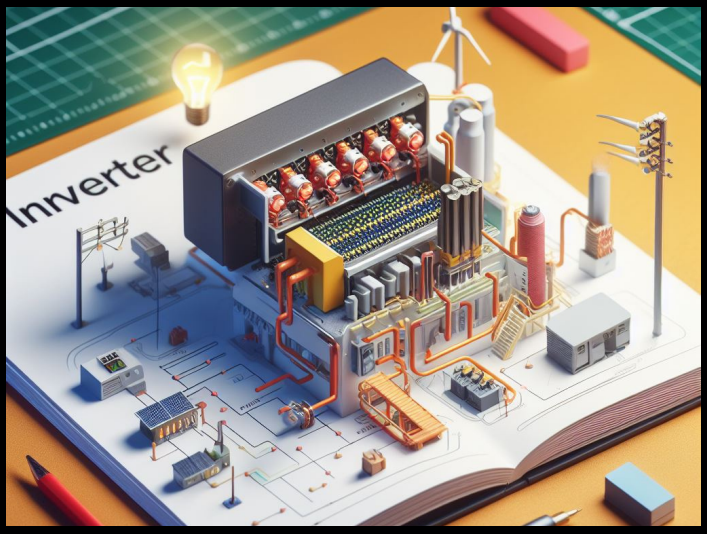
-P.POOJITHA

WATER LEVEL INDICATOR



The Water Level Indicator employs a simple mechanism to detect and indicate the water level in an overhead tank or any other water container. The sensing is done by using a set of nine probes that are placed at nine different levels on the wall of the tank (with probe1 to probe8 placed in ascending order of height, common probe (i.e. a supply carrying probe) is placed at the base of the tank). Level 8 represents the “tank full” condition while level 1 represents the “tank empty” condition. It can be used in automatic ON and OFF of the motor depending on the water level. It can also be used as a fuel level indicator in vehicles

MICRO INVERTER 02



A simple low-power inverter circuit is described here, which converts 12V DC into 230V AC. It can be used to power very light loads like night lamps and cordless telephones but can be modified into a powerful inverter by adding more MOSFETs.

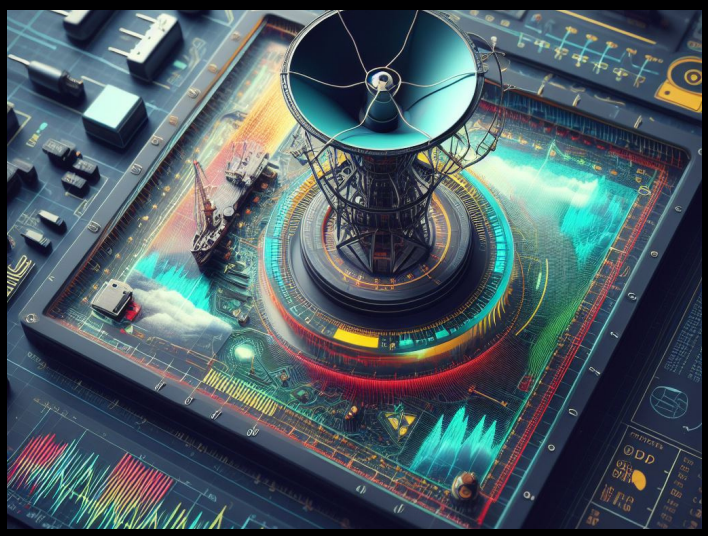
AUTOMATIC PLANT WATERING 03

This one of the most useful projects in real life. It helps us in watering plants automatically without any human interference. We may also call it an Automatic plant irrigation system. We know that people do not pour the water onto the plants in their gardens when they go on vacation or often forget to water plants.

BREAK FAILURE INDICATOR 04

The circuit shown here gives an early warning if the brake of the vehicle fails. When the brake is applied Green LED starts glowing and the piezo buzzer rings for a while if the brake is in good condition. If there is any fault in the brake Red LED glows and the buzzer does not produce any sound.

RADAR ULTRASONIC 05



Here is the project showing radar that can detect the range of an object. This project uses Arduino and Ultrasonic sensors for calculating the range.

STORY BEHIND !

Development of the automobile started in 1672 with the invention of the first steam-powered vehicle, which led to the creation of the first steam-powered automobile capable of human transportation, built by Nicolas-Joseph Cugnot in 1769. Inventors began to branch out at the start of the 19th century, creating the de Rivaz engine, one of the first internal combustion engines, and an early electric motor. Samuel Brown later tested the first industrially applied internal combustion engine in 1826.

Development was hindered in the mid-19th century by a backlash against large vehicles, yet progress continued on some internal combustion engines. The engine evolved as engineers created two- and four-cycle combustion engines and began using gasoline as fuel. The first modern car—a practical, marketable automobile for everyday use—and the first car put into series production appeared in 1886, when Carl Benz developed a gasoline-powered automobile and made several identical copies. Later automobile production was marked by the Ford Model T, created by the Ford Motor Company in 1908, which became the first automobile to be mass-produced on a moving assembly line. Ferdinand Verbiest, a member of a Jesuit mission in China, built a steam-powered vehicle around 1672 as a toy for the Kangxi Emperor. It was small-scale and could not carry a driver but it was, quite possibly, the first working steam-powered vehicle ('auto-mobile').
Steam-powered self-propelled vehicles large enough to transport people and cargo were first devised in the late 18th century. Nicolas-Joseph Cugnot demonstrated his fardier à vapeur ("steam dray"), an experimental steam-driven artillery tractor, in 1770 and 1771. As Cugnot's design proved to be impractical, his invention was not developed in his native France. The center of innovation shifted to Great Britain. By 1784, William Murdoch had built a working model of a steam carriage in Redruth[11] and in 1801 Richard Trevithick was running a full-sized vehicle on the roads in Camborne. During the 19th century, attempts were made to introduce steam-powered vehicles. Innovations such as hand brakes, multispeed transmissions and better steering developed. Some successful vehicles provided mass transit until a backlash against these large vehicles resulted in the passage of legislation such as the UK Locomotives Act 1865, which required many self-propelled vehicles on public roads to be preceded by a man on foot waving a red flag and blowing a horn.

EVENTS

- INDUSTRIAL VISIT
- NATIONAL LEVEL QUIZ
- ARDUINO WORKSHOP

INDUSTRIAL VISIT

Dr.T.N.V.L.N.Kumar Sir & Mr.V.Anjaneyulu Sir had played a precious role on the time of industrial visit. Along with 3 faculty members 62 members of students (III EEE) visited “Weber India infra power”(pvt.limited) located in venkatachelam. With the guidance of Mr.Mahidhar.T (General Manager of the industry).

On 9th April 2022 we along with 3 faculty members went to “Weber India Infra Power” industry by 9:00 AM and had reached 10:30 AM, there we had gained lot of information regarding manufacturing of transformers. Mr T. Mahidher had delivered brief information about transformers. Before going to application, we have certain steps

Mr T.Mahidher sir had explained all the parameters of manufacturing& testing.

NATIONAL LEVEL QUIZ PROGRAME

Geethanjali Institute of Science and Technology, Nellore (Dt.), Accredited with NAAC "A" grade, Andhra Pradesh under The Department of Electrical Engineering conducted 5 Day National Level online Quiz "Sparky – 2021" on various domains under Electrical Engineering. The objective of these quizzes was to keep the students, faculty, and staff of Engineering institutions in touch with the subject knowledge during the pandemic when the entire nation was in lockdown. It's well received not only by students community but also by faculty. It included

1. 14-06-2021 (Day 1) – Electric Circuit Analysis & Synthesis
2. 15-06-2021 (Day 2) – Electrical Machines
3. 16-06-2021 (Day 3) – Control Systems Engineering
4. 17-06-2021 (Day 4) – Power Electronics and Drives
5. 18-06-2021 (Day 5) – Electrical Power systems and Engineering

Every Google Quiz comprised of 20 Multiple Choice Questions (MCQs) and was conducted from 14th June 2021 to 18th June 2021. The registration and certification were free of cost and the participants, scoring more than 50% were awarded the E-certificates.

ARDUINO WORKSHOP

The department of Electrical and Electronics Engineering organized a five day Workshop on “Arduino Programming and Applications for Electrical Engineering” from 28-02-2021 to 05-03-2021 by Mr. Suresh. S, Assistant Professor, S.A Engineering College, Chennai. The workshop provides skills on basic concepts related to programming of Arduinoand make the students gain the practical knowledge of building some real time applications like traffic control, automatic water filling tank, mobile app interface etc. Around 26 numbers of students from our department have registered for this program. The Principal of GIST, Prof. Dr. G.SubbaRao in the inaugural address mentioned the importance of real time use of Arudino programming that is needed of theApplications for Electrical Engineering. Prof .TNVLN Kumar, Director felicitated the event and the certificates were distributed to the students. Dr.P. Vinoth Kumar, Associate Professor coordinated the workshop along with Dr.JaffarSadiq Ali, HoD EEEand Mr.M.Rajesh.