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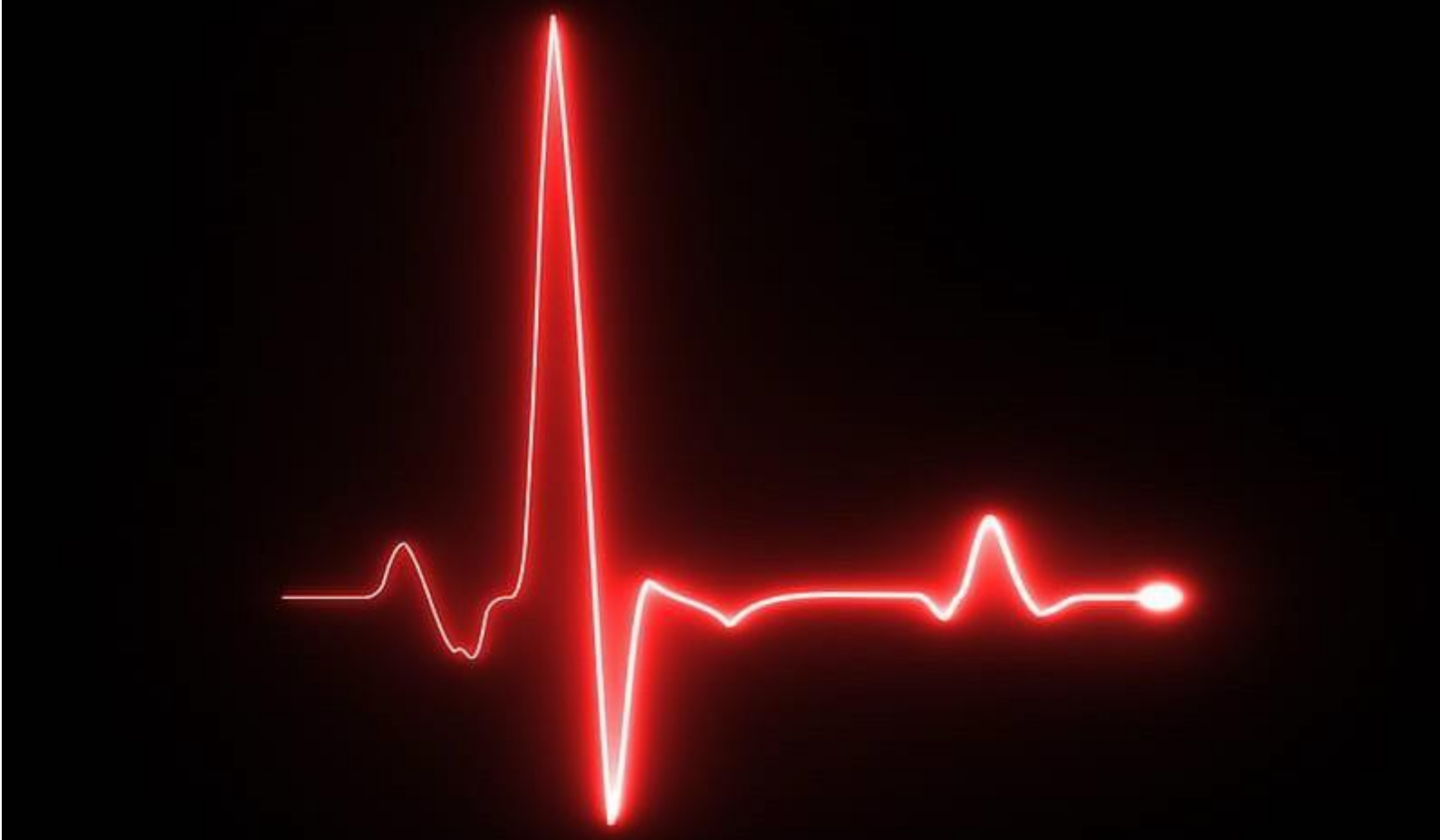
CHRIST
(DEEMED TO BE UNIVERSITY)
BANGALORE · INDIA

THE PULSE

NEWSLETTER
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING



Vision

To emerge as a centre of academic excellence in the field of Electronics & Communication Engineering to address the dynamic needs of the industry upholding moral values.

Mission

- Impart in-depth knowledge in Electronics & Communication Engineering to achieve academic excellence.
- Develop an environment of research to meet the demands of evolving technology.
- Inculcate ethical values to promote team work and leadership qualities befitting societal requirements.
- Provide adaptability skills for sustaining in the dynamic environment

MESSAGE FROM FACULTY

COSMOS and its Birth

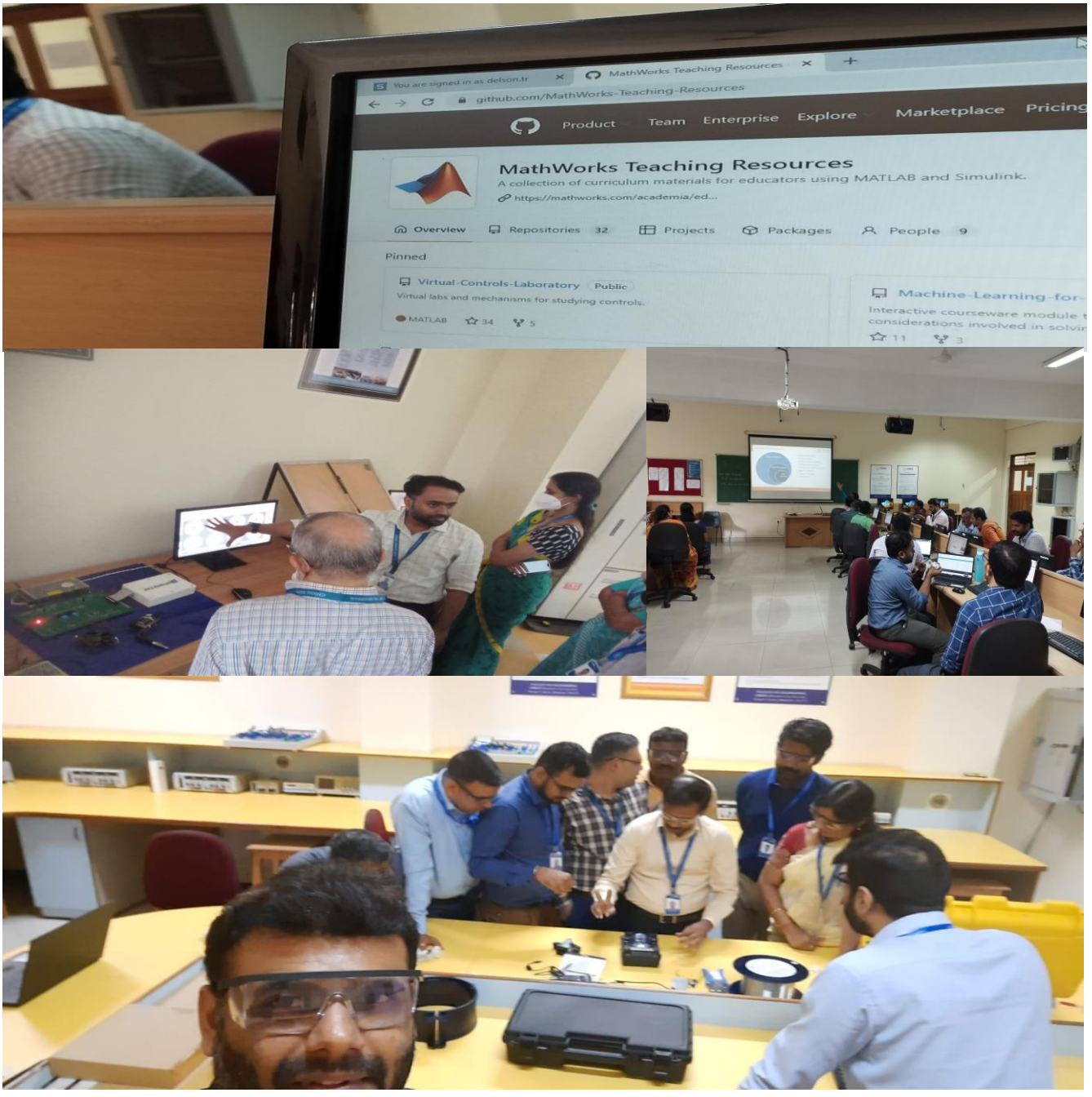
The unfathomably large space that is only constrained by its dotty body composition is referred to as the "universe." Everything that is abundant in space is referred to as the universe, and this includes particles as little as cosmic rays and as vast as galaxies. The universe is known to consist of a variety of relatively small and enormously dense objects, including galaxies, constellations (star groups), stars, planets, and other celestial bodies.

The grandeur of the cosmos, which is represented by all of the celestial bodies, from enormous galaxies to tiny particles of cosmic dust filling the void, is beyond our comprehension. On how the cosmos came to be, there are many different theories. The Big Bang and the Steady State are these two theories. According to the "Big Bang" theory, the universe had a finite beginning that involved a massive burst of extremely dense, highly compressed matter. The "steady state" hypothesis holds that the universe expands through a constant process of matter generation that doesn't alter over the course of time. A galaxy is a rotating stellar system, also known as a star system, that is composed of a swarm of stars that are gravitationally drawn to one another. In other words, a galaxy is a massive star cluster. Our galaxy, which contains around 100 billion stars, includes the sun and the families of planets that make up its surface. Because it resembles a discus when viewed through a big optical telescope, our galaxy is called the "Milky Way." It has a large rotating body with a pancake-like shape. The only galaxy that is nearly the same size as our Milky Way is the Andromeda galaxy, which is the closest.

-- S . CHIDAMBARAM

EVENTS

Organized Two Days Workshop on "Deep Learning and Machine Learning Onramp with MATLAB" in collaboration with MATLAB held during 30.05.2022 to 01.06.2022.



STUDENT CONNECT

IC MANUFACTURING

As we all know IC is an Integrated Circuit (chip or microchip), which is playing the crucial role in the present generation. There are more ICs on this planet than there are people, and most of these are single-chip microcontrollers that are the brains of an embedded system. We interact with hundreds of tiny ICs every day that are embedded into our houses, our cars, our bridges, our toys, and our work. Did you ever wondered that how these IC are manufactured and which companies manufacture them?

The chips are in order of 10 nano meters (nm: 10-9m), which is extremely small. The microchip manufacturing process involves hundreds of steps and can take up to four months from design to mass production. Integrated device manufacturers (IDMs) such as Intel and Samsung both design and manufacture chips. Foundries, on the other hand, are companies that manufacture chips under contract for other companies. In an IC, the various components are automatically part of a smaller semiconductor chip and the individual components cannot be removed or replaced. This is in contrast to discrete assembly in which individual components can be removed or replaced. So, it is necessary to make sure that every components are placed properly according to the dedicated purpose. There are different fabrication techniques based on manufacturing process; Monolithic ICs, Thin-film IC technique, Thick-film IC technique, and Hybrid IC technique. These different IC techniques use different Substrates like monolithic uses silicon; Thick-thin film uses glass, ceramic; Hybrid uses glass-ceramic and silicon. Mostly used technique in manufacturing process is Monolithic IC technique. So, let us discuss about How this manufacturing takes place?

A monolithic IC is one in which all circuit components and their inter-connections are formed on a single thin wafer called substrate, this substrate has to go through many steps to get the final required chip. Firstly, Preparation of P-substrate, in this step a cylindrical P-type silicon crystal (typically dimensions: 25cn long & 2.5cm diameter) is taken and cut into thin slices called wafers. The typical thickness of these wafers being 200 micro meters. One side of wafers is polished to get rid of surface imperfections. This wafer is called the P-substrate. Secondly, Epitaxial N-layer growth; The next step is to put the wafers in a diffusion furnace. A gas mixture of silicon atoms and pentavalent atoms is passed over the wafers. This form a thin layer of N-type semiconductor on the heated surface of substrate. This thin layer is called epitaxial N-layer and is about 10 micro meters thick. In this epitaxial layer all active and passive components of an IC ae formed.

Thirdly, Insulating layer growth; In order to prevent the contamination of the epitaxial layer, a thin SiO2 layer about 1micro meter is deposited over the entire surface. This is achieved by passing pure oxygen over the epitaxial layer. The oxygen atoms combine with silicon atoms to form a layer of silico dioxide(SiO2).Fourthly, photo etching; Before any impurity is added to the substrate, the oxide layer(i.e. SiO2 layer) is etched (or removed). The process of removing the epitaxial layer at the desires locations and diffuse the wanted materials to produce the desired components. The terminals are processed by etching the oxide layer at the desired locations. Finally, Chips; In practice, the wafer is divided into a large number of areas. Each of these areas will be a separate chip. The manufacture produces hundreds of alike ICs on the wafer over each areas. To separate the individual ICs, the wafers is divided into small chips by a process similar to glass cutting.

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Kindly share your thoughts and research experiences via e-mail to our team, and befeatured in next month's issue!