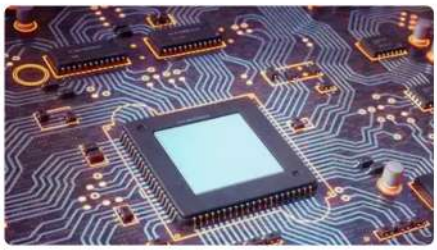
Indigenous semiconductor industry opens doors to international electronics arena

India is aiming to set up semiconductor fabrications in the country to fulfil the increasing demand for semiconductors in various industries. Semiconductor Technology course requires students to have a strong knowledge of mathematics, physics, electric circuits, and electronics fundamentalsThe Indian government is working to establish semiconductor fabrications in the country to meet the high demand for semiconductors. The Indian semiconductor industry has the potential to create 1.75 to 2 million jobs by 2025. The curriculum includes subjects such as semiconductor physics, devices, integrated circuits, and more. The course is receiving support from the government through various schemes.

Read Less



Keeping in view the high demand for semiconductors by various industries majorly in the electronics sector, the Indian government has been working to set up semiconductor fabrications in the country. As per the India Semiconductor Association (ISA), the Indian semiconductor industry has the potential to create 1.75 to 2 million direct and indirect jobs by 2025. The report claims that the industry has already created 4,00,000 direct and indirect employment as of 2018.

Specifications of the programme

Besides several other new-age courses, AICTE is encouraging specific courses on semiconductors. An AICTE directive says as many as 16,000 seats have been introduced at UG, PG and diploma levels in this technology. "Semiconductor Technology alone is expected to be at $1 trillion market by 2030 and with all the associated value-added applications, it could easily be equivalent to $ 3 to 4 trillion or half of the Indian expected GDP of $7 to 8 trillion by 2030," said BS Satyanarayana, vice chancellor, GD Goenka University, Sohna.

"India's goals for setting up semiconductor fabrication needs deep technical expertise in tens of thousands. Thankfully, India has excellent science and engineering graduates who need to be upskilled for the semiconductor fabrication workforce. The first step is familiarisation with the course to get engineers to know the magic of semiconductor technology," says Udayan Ganguly, faculty, Dept of Electrical Engineering, IIT Bombay.

Course curriculum

The Semiconductor Technology course requires students to have good background knowledge in mathematics, physics, electric circuits, and electronics fundamentals along with familiarity with materials science and computer programming.

"The curriculum includes subjects such as semiconductor physics, devices, integrated circuits, analogue and digital electronics, semiconductor materials and semiconductor manufacturing processes, semiconductor characterisation techniques and more. The course also entails practical laboratory sessions. In the lab students gain hands-on experience with semiconductor fabrication techniques, electronic circuit design, testing and characterisation of semiconductor devices, and working on software, equipment, and tools," says Pushpendar Singh, associate professor, Department of Electrical Engineering, JK Lakshmipat University, Jaipur.

"Throughout the course, students learn about the latest advancements in semiconductor technology, emerging markets, and the role of semiconductors in various industries like consumer electronics, telecommunications, automotive and healthcare," he adds.

Growing market and demand

The course on Semiconductor Technology is receiving a push from the Indian government through various schemes to strengthen the production and establishment of semiconductor fabrications (fabs) within the country. The Nanoelectronics Network for Research and Applications (NNetRA) is a flagship network project co-supported by the Ministry of Electronics and Information Technology (MeitY). NNetRA and IIT Bombay have a special focus on semiconductor technologies for strategic applications such as defence, aerospace, and critical infrastructure.

"This course was conducted under the Indian Nanoelectronics Users Program (INUP) by the Ministry of Electronics and IT which supports research and training in Nanoelectronics at IIT Bombay Nanofab, it is one of the biggest and oldest among other such centres across India. The course was a new initiative to support semiconductor manufacturing familiarisation and training. Based on this pilot, a scale-up is being planned with various interested companies and government agencies which will support a wider engagement of the student community through their colleges. Since this is a relatively new technology, we have introduced teacher training programmes," says Ganguly.

"The government is building a new semiconductor ecosystem that provides new college graduates high-quality employment opportunities," he adds.

The goal of NNetRA-IITB is to enable Make in India (manufacturing) for strategic semiconductor technologies – where external dependence spells vulnerability in terms of data security, technology access and pricing.

Meanwhile, the central government with the vision of positioning India as the global hub for Electronics System Design and Manufacturing (ESDM) launched some comprehensive schemes for the development of the manufacturing ecosystem such as National Policy on Electronics-2019, Hundred per cent FDI, Modified Special Incentive Package Scheme (M-SIPS), Electronics Manufacturing Clusters (EMC) scheme, Electronics Development Fund (EDF), Phased Manufacturing Programme (PMP) and more.

"Indian government is supporting the growth of the semiconductor industry. The government's focus is to bring the manufacturing sector to India and surpass China by 2032. For this, the demand to empower engineering colleges has increased. The government needs to fund various centres of excellence, incubation centres and laboratories to prepare the workforce which will be required for such a massive industrial transformation," says Puneet Sharma, Dean of Science, IILM University, Greater Noida.

"India aims to rapidly establish itself as a major player in the global semiconductor ecosystem. As a member of the ISM Talent Roadmap Committee, we are committed to the vision of skilling, re-skilling, and up-skilling people and this needs to start with tailored courses developed in collaboration between academia and industry. Courses provided at leading educational institutions in India will help enable the existing workforce and aspirants to develop the required skills and interact and learn from global industry leaders," Suraj Rengarajan, Chief Technology Officer at Applied Materials India.

"Under the Indian government's 'Semiconductor Mission' scheme, HEIs can receive various forms of support and benefits aimed at fostering the growth of semiconductor technology and the electronics industry in India. Helps as financial support for infrastructure, research and development grants, faculty and student training, industry collaboration opportunities, curriculum enhancement and skill development initiatives," says Pushpendar Singh.