CENTRES OF EXCELLENCE:
Must For Shaping The Future

Educational institutions must seek the support of industries and research institutions to pave the way for an innovative learning environment through strategic alliances. This will help create facilities in the frontier areas of science and technology for world-class research. Read on to discover how this is being done at some centres of excellence

DEEPSHIKHA SHUKLA

Education, research and application of knowledge benefit the society and shape the usefulness of institutes. Collaboration with research organisations, industries and other institutions keeps the institutes updated with areas of technology development and curriculum.

The main objective of setting up a centre of excellence (CoE) is to bridge the gap between industry and academia. This enhances skills of students, faculty and practising engineers from various industries.

A CoE maintains close interactions with several institutions of higher learning and R&D organisations through collaborative research and institutional network programmes. It performs a continuous study of the latest developments and identifies areas that will be useful for students and are job-oriented. Various industries and organisations help identify the various areas of interest for research.

A CoE has the mission to bring industries and institutions together by providing technical services for industrial research and development. It supports training and research project needs of students and faculty members. This evolves into innovative

Centre of excellence for wireless at PSG College of Technology set up by Keysight Technologies

applications of technology, encourages entrepreneurship and empowers the youth to be leaders.

Objectives of an Industry Institute Partnership Cell (IIPC) are to deliver internship and counselling assistance in association with industry through workshops, seminars and other programmes. IIPC serves as a bridge between students and professors who are working on the same issues, as well as industries that are willing to collaborate in addressing these challenges.

Research centres set up at colleges

Several advanced centres of excellence have been set up with financial support from governments and various industries. These centres help research scholars pursuing research programmes that lead to various M.Tech, PhD and MS degrees. There are many ongoing government-funded projects in labs, of which many are sponsored by DST, AICTE, UGC, Nokia, Yahoo, government of India's

Ministry of Electronics and Information Technology (MeitY), and others.

Objectives of the CoE set up at PSG College of Technology, Coimbatore are to perform high-calibre R&D and to offer excellent training and education for students. The college also provides test facilities for students, researchers and startups from other institutes at a very nominal cost. Some centres established by PSG College of Technology are:

CoE for advanced wireless technology. Keysight Technologies collaborated with electronics and communication engineering (ECE) department of the college for setting up this lab. This lab provides training and knowledge to the new generation of wireless engineers. It includes precise high-frequency equipment for RF power measurement and analysis.

Computer-aided design centre. This provides OEMs with state-of-the-art computer-aided design (CAD), tooling and manufacturing technologies to develop cost-effective solutions for developing products of interna-

tional quality. It imparts trainings to engineers and product designers with the latest CAD, computer-aided manufacturing (CAM) and computer-aided engineering (CAE) tools for innovative product development.

VLSI design centre. It develops VLSI design-related activities by giving training to undergraduates, postgraduates and doctoral students of VLSI-related fields. It is built under special manpower development programme for chips-to-system designing. The programme has been implemented at 60 institutions across the country, PSG College of Technology being one of them. It broadens the base of application-specific integrated circuit (ASIC) designing and R&D of microelectronics.

Research centre for nanotechnology. It has advanced high-tech infrastructure and instruments for research in the field of nanoscience and nanotechnology, and includes a nano-biotechnology lab, nano-chemistry lab, and fuel cell research and electrospinning facility.

Some other centres. CoEs set up in the fields of electrical and electronics engineering, robotics and automation engineering, and ECE include CoE for low-voltage switchgear (set up by L&T), centre for climate and energy (set up by Danfoss), audio processing centre, centre for renewable energy and pro-sun CoE for solar power systems, national MEMS design centre (set up by Juniper Networking Lab), baseband communication & advanced embedded systems lab (set up by Keysight), embedded systems centre (set up by Infineon), virtual instrumentation centre (set up by National Instruments), CoE for automation (set up by Siemens), noise and vibration laboratory (CoE sponsored by DST-FIST), and centre for advanced CNC and robotics (set up by Fanuc).

Baseband communication and advanced embedded system lab at PSG College of Technology set up by Keysight Technologies

More industry-related initiatives

Technology Information, Forecasting and Assessment Council (TIFAC), an autonomous body under Department of Science and Technology (DST), has established a triangular linkage between academic institutions, industries and governments. It has selected PSG College to set up a centre of relevance and excellence in product design and optimisation.

PSG has also signed memoranda of understanding (MoUs) with research organisations and industries in the fields of automotive, textile, aerospace, robotics, electronics, consumer durables, measuring instruments, software development and more. This helps the college to be a recipient of government- and industry-funded projects and support.

The college has signed an MoU with the Indian Navy to provide expertise in academics, joint R&D projects, training infrastructure development and transfer of technology in areas of mutual interest. Other key highlights are unlimited seats for research and allocation of four seats to Indian Navy personnel for pursu-

ing post-graduation.

A metrology laboratory has also been set up with the aim of providing training and consulting services for industry and academia. It includes a PCB fabrication lab, and prototypes simulated in the RF lab can be fabricated in the PCB lab.

Benefits for students, researchers and startups

The research policies of a college should aim to create and support research culture among its teachers and students, and leverage it for enriching and enhancing the professional competence of faculty members. A forum should be created to discuss emerging research trends in various domains of engineering and to promote interdisciplinary research. A team of visiting professors and experts from India and abroad may serve as R&D advisors, and advise the faculty members on the field of research and also on the new proposals that are invited by different funding agencies.

PSG College of Technology supports students and faculty members financially, too, to help them file patents for their innovative ideas. A student research council has been established with the objective of using knowledge gained by students through their courses and by unconventional thinking for innovations.

A platform for joint research and student exchange has been provided through collaboration with international universities like University of Leeds, UK; Glasgow Caledonian

University, Scotland; University of South Australia, Australia; University of Arkansas Engineering Research Center and San Diego State University, USA.

The college incubation centre promotes technology-based start-ups in the areas of ICT, electronics, the Internet of Things (IoT), biotechnology and nanotechnology. It extends innovation funds, mentoring and networking support along with incubation support to tech startups.

Challenges and possible solutions

Calibration and maintenance of high-frequency equipment are very expensive, so it becomes difficult for an institute to manage without any funding. This can be made easy if industries offer calibration and maintenance support at affordable cost for an educational institution, especially for EMC.

Revalidation and upgradation of equipment should be offered freely or at minimum cost. Due to high price of proprietary software, everybody is moving towards open source. But as RF has no open source, lab facilities have to be set up.

Dr (Prof.) S. Subha Rani, head of ECE department at PSG College of Technology, says "We can be a hub for research. It will benefit students and researchers from all across the country. We cannot make a turnkey model to make students 100 per cent industry-ready, but we can make them adaptable. Industries should hire and give internships to students as they already have hands-on experience on instruments, such as Texas Instruments'. Until the industry comes forward to help academia, nothing can progress well."

The objective of setting up a CoE in different fields is to inculcate the spirit of enquiry among learners, thereby paving the way for an innovative learning environment through strategic alliances, and creating facilities in the frontier areas of science and technology for world-class research. **EFY**