

Center of Excellence for Microsystems

Preamble

A Microsystem is a system that integrates, on chip or in a package, One or more of many things: Sensors, actuators, electronics, computation, control, power generation, chemical processing, biological reactions and more. The 'Center of Excellence in Design and Development of Microsystems' focus on the development of academic/research infrastructure to improve the programmes and activities in area of Microsystems for societal benefits. The objective of this center is to develop, fabricate and characterize new class devices and systems, sensors, energy scavenger, RF- MEMS for their potential applications in consumer, healthcare, environment and energy. The Microsystems touches every facet of our lives and expected to bring benefits to numerous application areas including industrial, healthcare and environmental monitoring.

The Microsystems Design and Development Centre is an integral part of the modern curriculum which allows multidisciplinary learning and research investigating a variety of emerging technologies. A workgroup of students and faculty will be involved in designing MEMS sensors, RF-MEMS Devices and Energy scavenger. The developed infrastructure will be extensively used in teaching at both UG and PG levels. Postgraduate curriculum includes subjects: VLSI Technology, Micro sensors and MEMS, Nano-electronics. The postgraduate students and research scholars are working in the areas of Microsystems for their major projects and the Microsystems design center will provide them a more professional experiment platform.

The students will get an opportunity to apply these technologies to tackle scenarios and implement their own idea, using an experimental platform for implementing prototypes and testing them as running applications. The educational experience includes familiarity with process design, simulation, fabrication and electrical characterization. Once these concepts are understood with the understanding of the Microsystems design flow, the students/researcher will then fabricate, characterize, and evaluate a variety of devices. Faculty members and research scholars registered for Ph.D. programmes are actively working in the areas of MEMS sensors, RF-MEMS and Energy Harvesting.

With the emergence of sensors technology and the advances in RF-MEMS comprehensive training and certification, programmes will be provided to faculty and students of technical institutions in the region and industry personals. The certificate courses will be offered by the center will have a good flair for design assignments along with in-depth study of the specific design functions that are currently not available in existing courses. To fulfill the above goals, we wish to develop Microsystems design and development center with the latest Industry standard tools, prototype fabrication facilities and test equipment, to initiate new activities.

The aim of this center is to bridge the technology gap between industry and academics with hands-on experience and providing with new pedagogical methods to students pursuing UG and PG programs in engineering thereby improving employability and entrepreneurship.

The center will put special emphasis on training, knowledge transfer, projects, application, research and innovation. The Centre can also double up as a nodal center for faculty training, projects to students, PG Programmes in Microsystems, Joint Certification Programmes with industries.

Objectives

The objective of this center is to fabricate and characterize materials, devices and systems based on Nano materials, semiconductors, polymers, and MEMS for sensor and systems development for communication, energy conversion & storage, agriculture, and health care. This will facilitate innovation, skill up-gradation of faculty and students.

Launch new and innovative academic, research and/or extension programmes activities in the field of Microsystems development. Take up this endeavor, to initiate major programmes/ activities of regional/national/international interest and importance. Benefit from their combined academic performance, research capabilities and overall achievements reach a leadership position in microsystems areas and become successful in gaining the confidence, respect and admiration of the society.

The other objectives of the centers are to:

- Strengthen the academic and research facilities and infrastructure to facilitate collaborative and multi-disciplinary research and educational activities with universities and industry in the focal area of micro-fabrication for achieving excellence in this field
- Enhance the quality and standard of UG/PG teaching-learning-evaluation processes, research work and extension activities in these areas by exposing graduate / post graduate students to industry standard MEMS-CAD tools and technology with the intention of making them more relevant to industry.
- Promote excellence in academic programmes relevant to the social, economic and other needs of the nation in general and the region in particular to undertake, aid, promote, guide and co-ordinate Research and Development in the field of Microsystems
- Take up networking and collaboration with other Institution of Higher Education/ National/ Laboratories/ Centers/ etc. to provide the platform for researchers and academicians of our region to develop microsystems and address the major challenges to develop smart solutions for society.
- The research work carried using these facilities will lead to the publications in reputed national and international conferences, journals, and patents. **(First initiative towards development of microsystems Development facility in the region).**
- Microsystems center will also educate students, researchers, and faculties in and around the Vidarbha region.