

Government College of Engineering

Aurangabad

“Two Days TEQIP Workshop cum Certificate Course on MEMS (Design and Fabrication)”

(2nd – 3rd Jan 2020)

Sponsored by TEQIP Phase III Under FDP

REGISTRATION

Name: _____

Address For Communication:

Mobile No: _____

E-mail: _____

Educational Qualification:

Signature of Applicant

Signature of Head

PATRONS

Dr. Vijay Saurabh

Principal Secretary
Higher and technical education
Mantralaya , Mumbai

Dr. Abhay Wagh

Director , Directorate of Technical Education,
Maharashtra State , Mumbai

Dr. Mahesh Shivankar

Joint Director, Technical Education ,
Regional Office , Aurangabad.

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4. Dhiraj 9975441869

LEARNING OBJECTIVES

- Familiar with the fundamentals, fabrication process and application of MEMS
- Understand the basic principles of MEMS sensors and actuators (mechanical, electrical, piezo resistive, piezoelectric, thermal, microfluidic)
- Understand the design considerations of basic MEMS sensors and actuators
- Design a basic MEMS sensor and actuator device, such as an inertia sensor, and a pressure sensor
- Design the process flow of a basic MEMS device, such as an inertia sensor(accelerometer), given a fabrication process description.
- Understand and familiar with the fabrication process.

MEASURABLE OUTCOMES

- Design a basic MEMS device, such as a cantilever based actuator, pressure sensor, and accelerometer
- Design the fabrication process of a MEMS device, such as a capacitive pressure sensor or an inertia sensor
- Fabrication of a MEMS device, such as cantilever actuator

- Determine the fundamental trade-offs in a given basic MEMS device, and design with the suitable principles, materials, and structure
- Stablishment of Industry-Institute Partnership/interaction Cell.
- Organizing Workshop, conferences and symposia with joint participation of the faculty and the industries.
- Encouraging engineers from industry to visit Engineering Institution to deliver lectures.
- Participation of experts from industry in curriculum development.
- Arranging visits of staff members to CMTI industry

ABOUT WORKSHOP

The workshop is sponsored by TEQIP. Apart from brief theoretical design rules, the present Workshop is intended to give microfabrication exposure training to the scientists and reserchers who are interested in the field of MEMS. The fabrication of MEMS will include the design of simple MEMS structures, fabrication of MEMS structures using photoresists, Transfer of pattern into polymers using soft lithography, and wet etching to develop the suspended structures.

Expert

Expert for workshop

- 1.Shardul Pandit, Project Assistant TU Wien, Austria
2. Mayuresh Kagalkar, Researcher Center Manufacturing Technology, CMTI Bangalore

The course will be held during 2-3 Jan 2020 at ELECTRONICS DEPARTMENT SEMINAR HALL, DEPARTMENT OF ELECTRONICS, Govt.College of Engineering, Aurangabad.

Topics will be covered in the Lecture: 1. Introduction to MEMS 1) Introduction, 2) Importance 3) Market Share and future 4) Basic Theory: Scaling laws, advantages, and disadvantages, MEMS Materials: Semiconductors and Silicon 2. MEMS Fabrication Processes 1) Types, Standards, flow charts, basic chemicals 2) Lab types and requirements 3) Examples 3. MEMS Sensors 1) Theory: Types 2) Applications 3) Case Studies: examples 4. Design, Simulation and fabrication process flow of Pressure sensor Mr. Shardul Pandit Mr. Shardul Pandit is a research enthusiast by nature and has completed his undergraduate education i.e. B.E. in the Faculty of Instrumentation and Control engineering from University of Pune. He later pursued M.Tech in the field of Sensor system Technology from VIT, Vellore. His journey in the field of MEMS started by under taking course in the Masters' studies and later continued in his research internship (Master's Thesis) at Laboratory for Electro-Optics Systems, Indian Space Research Organisation (LEOS-ISRO). His thesis topic covered design, simulation and developing a fabrication process flow of MEMS

Vibratory Gyroscope for space application. Along with the Master's thesis he made significant contributions to the mission projects of ISRO like Chandrayaan-2 and GSAT-19. Further to empower his knowledge in this field, he was selected as a Senior Research Fellow in a DST funded project at IIT-Bombay. He worked in the state of the art Centre for Excellence in Nano electronics(CEN) Nano-fabrication facility at IIT Bombay. He worked on Polymer (SU-8) MEMS for developing a novel structure of MEMS accelerometer. At IIT Bombay he was an integral part of IndoTunisia project for the design and fabrication of the structure. Currently, he is working on his PhD at TU Wien (Vienna Institute of Technology), Austria, with Qualcomm R&D, Munich and Silicon Austria Labs (SAL), Villach on Piezoelectric MEMS Thin films for Bulk Acoustic Wave resonators for 5G application. During his academic career he has won several laurels in the technical and non-technical fields. Mr. Mayuresh Kagalkar Mr. Mayuresh Kagalkar is young and enthusiastic research professional from Central Manufacturing Technology Institute (CMTI), Bengaluru, India. His main areas of interest are MEMS based Sensors, Actuators, BioMEMS and thin film devices. He grew up in a small middle class family in Sangli city, Maharashtra. He has done his under-graduation in Electronics with distinction from Chhatrapati Shivaji University, Kolhapur. He has completed his Master of Technology from Vellore Institute of Technology, Vellore in Sensor System Technology. He entered into research field during his under-graduation. He worked in two national research laboratories before joining CMTI. During graduation, Mr. Mayuresh worked in CSIR-National Aerospace Laboratory

(NAL), Bengaluru on Giant Magnito-Resistance (GMR) based magnetic sensor. He has successfully developed angular speedometer for aerospace and automobile applications and applied for patent. Later he joined Laboratory for Electro-Optics Systems (LEOS) during his post graduation. LEOS is prominent sensor and optics laboratory belongs to ISRO, works on Lens, Sensors, HD Satellite Cameras, Critical Electronics control systems etc. With team of Scientist he successfully developed MEMS based pressure sensor for launch vehicle application. Simultaneously he was involved in India's most ambitious and visionary lunar mission "Chandrayaan-2" for the development of Instrument for Lunar Seismic Activities (ILSA). He also has done basic design study on Chip Scale Atomic Clock (CSAC) and proposed a design for further fabrication. After completion of post graduation he joined CMTI as a research engineer. CMTI is an Indian Government R & D organization focusing its efforts mainly on harnessing know-how in the manufacturing technology sector to practical purposes and assisting technological growth in the country. Smart Manufacturing, Additive Manufacturing, Sensors and Vision Technology, Nano manufacturing and Characterization and Special purpose machines are the key R&D verticals in CMTI. Mr. Mayuresh is enthusiastically working on MEMS and thin film based microsensors. He also has designed and modelled world class cleanroom layout for new laboratory building which is now under construction. Currently he is developing thinfilm based Platinum temperature sensor for industrial and defence applications. He is also working on Polymer MEMS device development for Micro fluidic, Lab on Chip

applications. Awards: 1. Best Project award during under-graduation, 2014 2. Best Alumni Award, 2015 and 2016 3. Best Paper award during Post graduation, 2016 4. Best Academic performance award and University Ranker during Post graduation, 2017

Candidates should complete the enclosed registration form and send it by mail to the coordinator. Confirmation of eligible candidates will be on FIRST-COME-FIRST-SERVE basis upto a maximum of 30 candidates(APPROX).

There is no Registration fees for this workshop:

Who should Apply: UG,PG(for all branches) students/Reserch Scholar, Academician: faculty,Industry Person:

Important Dates

Last Date of Receipt of Registration From: 1st Jan, 2020 through google form <https://forms.gle/w6KfteGohzJs1cWRA>

ADDRESS FOR CORRESPONDANCE

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