

# **KRISHNASAMY**

College of  
**ENGINEERING & TECHNOLOGY**

Approved by AICTE & Affiliated to Anna University  
Anand Nagar, Nellikuppam Main Road, S. Kumarapuram, Cuddalore - 607 109, Tamil Nadu.  
☎ (041-42) 285 601 - 604    🌐 www.kcet.in    ✉ info@kcet.in

## DEPARTMENT OF ECE

30.11.2022

### CIRCULAR

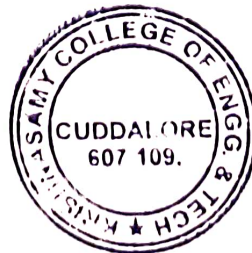
Ref.: KCET/ECE/VAC/CIRCULAR/2022-23/01.

The following Value Added Course will be conducted during the academic year 2022-2023. The course will be conducted from 23.01.2023 to 28.01.2023. Students are instructed to register their names in the course allotted to them.

**Note: Students are instructed to attend the program without fail.**

S.No.	Course Code	Name of the Course	Year	No. of Period	Course Coordinator
1	EC-VAC2201	MEMS DESIGN	IV	30	Er.V.Kokila ,AP-ECE
2	EC-VAC2202	DESIGN OF SENSORS	III	30	Er.S.R.Karthiga,AP-ECE

*[Signature]*  
30/11/22  
HOD/ECE



Copy to:

Class Room

Class In charge

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### SYLLABUS

**Subject Code/ Subject Name:** EC-VAC2201 - MEMS DESIGN

**Duration:** 30 Hours

#### **COURSE OBJECTIVES:**

- To understand the basic electrical and mechanical concepts of MEMS design
- To understand the design aspects of electrostatic sensors and actuators
- To understand the design aspects of thermal sensors and actuators
- To understand the design aspects of piezoelectric sensors and actuators
- To understand the design aspects of magnetic sensors and actuators

**MODULE I ESSENTIAL ELECTRIC AND MECHANICAL CONCEPTS** 6  
Conductivity of semiconductors, Crystal planes and orientations, stress and strain, flexural beam bending analysis under simple loading conditions, Dynamic system, resonant frequency and quality factor.

**MODULE II ELECTRO STATIC SENSING AND ACTUATION** 6  
Parallel plate capacitor, Applications of parallel plate capacitors- inertial sensor, pressure sensor, flow sensor, tactile sensor, parallel plate actuators, interdigitated finger capacitors, applications of comb drive devices.

**MODULE III THERMAL SENSING AND ACTUATION** 6  
Fundamentals of thermal transfer, Sensors and actuators based on thermal expansion, Thermal couples, Thermal resistors, Applications- Infrared sensors, flow sensors, Inertial sensors, other sensors.

**MODULE IV PIEZOELECTRIC SENSING AND ACTUATION** 6  
Mathematical description of piezoelectric effects, Cantilever piezoelectric actuator model, properties of piezoelectric materials – Quartz, PZT, PVDF, ZnO , Applications – Acoustic sensors, Tactile sensors.

**MODULE V MAGNETIC SENSING AND ACTUATION** 6  
Concepts and principles- magnetization and nomenclatures, principles of micro magnetic actuators, fabrication of micro magnetic components- deposition, design and fabrication of magnetic coil, MEMS magnetic actuators.

**30 PERIODS**

#### **COURSE OUTCOMES:**

Upon completion of this course, the students will be able to

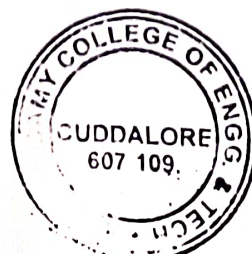
CO1: Understand the basics of MEMS design aspects.

CO2: Apply the knowledge in the development of electro static sensors and actuators.

CO3: Apply the knowledge in the development of thermal sensors and actuators.

CO4: Apply the knowledge in the development of piezoelectric sensors and actuators.

CO5: Apply the knowledge in the development of magnetic sensors and actuators.



*[Signature]*  
HOD/ECE 21/11/22