



ALAGAPPA UNIVERSITY
[A State University Reaccredited with "A" Grade by NAAC]
KARAIKUDI – 630 003.
TAMIL NADU

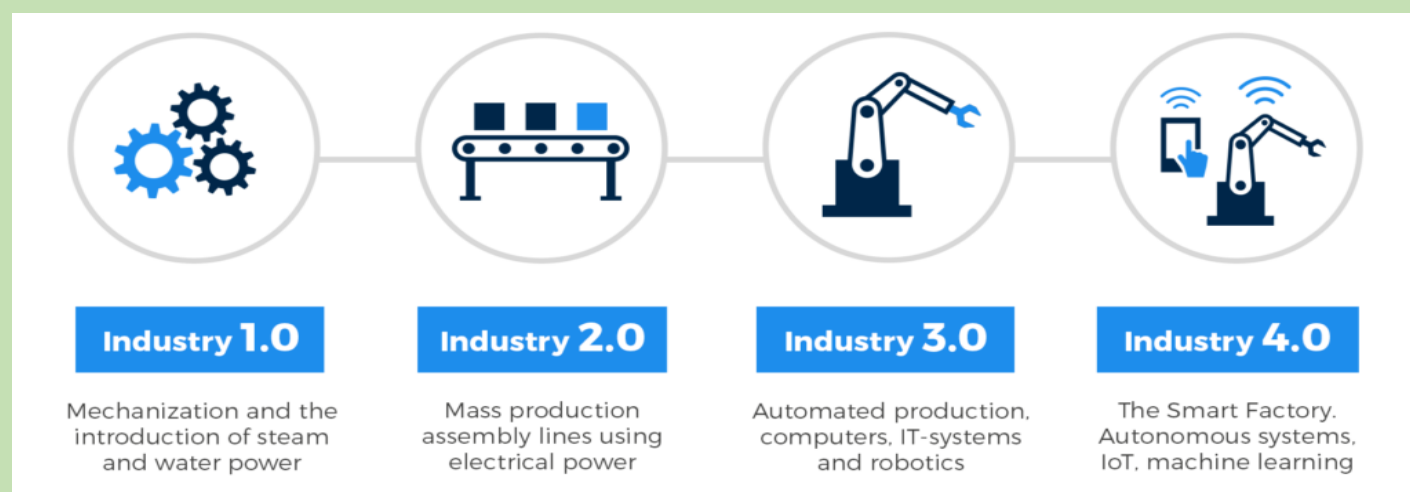


ROLE OF SENSORS IN INDUSTRIALIZATION

(A Value Added course)

OFFERED BY
DEPARTMENT OF BIOELECTRONICS AND BIOSENSORS

High-speed and inexpensive electronic circuits, revolutionary signal processing techniques, and innovative developments in manufacturing processes have all contributed to recent advancements in sensor technology. New breakthroughs in these fields work together synergistically to enable utterly unique ways that improve the performance of technical goods. Sophisticated sensor structures have been created to enable self-monitoring. The development of systems and components with a high cost-to-performance ratio is now possible because to the quick advancement of sensor manufacturing technology. The main objective of this course is to make aware of various sensors used in industries to get the students acquainted with the advanced technology used for analysis and actuating the systems in this modern world. This course includes the live demo sessions as well.



Course Benefits

- 😊 Students will learn many important sensors widely being used in Industries.
- 😊 They will learn about the usefulness, modernization and time saver sensor modules.
- 😊 It will be very helpful while going for designing a sensor, higher studies, research and getting a job in VLSI based industries.

Offered during Holidays/Weekends

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ROLE OF SENSORS IN INDUSTRIALIZATION	
Objectives	The main objective of this paper is to provide basics of biosensors and its role in industrialization
Outcome	On successful completion of the course, a student will be able to <ul style="list-style-type: none"> • Understanding the principles, working and types of industries • Understanding the role of biosensors in various industrial sectors • Basic ideas on robotics and the role of sensors behind it along with the sensors in motor vehicles • Understanding the advancement in sensors for various industries in terms of risk management
Schedule	Teaching Hours: 6 hours per week
Prerequisite	Basic knowledge on industries and its working along with the common ideology on biosensors, basic chemistry and physics are prerequisite.
UNIT I	INTRODUCTION TO INDUSTRY
	Context, General framework, Application areas, Dissemination of Industry 4.0 and the disciplines that contribute to its development, Artificial intelligence, The Internet of Things and Industrial Internet of Things, Additive manufacturing, Robotization and automation, Current situation of Industry 4.0. Introduction to Industry 4.0 to Industry 5.0 Advances
UNIT II	SENSORS IN ROBOTICS
	Classification, Characteristics, Internal Sensors – position, velocity, acceleration sensors, Force sensors, External sensors – proximity, touch and slip sensors. Robotic vision, Process of Imaging, Architecture of Robotic Vision Systems, Image Acquisition, Components of Vision System, Image Representation, Image Processing.
UNIT-III	SENSORS IN MOTOR VEHICLES
	Temperature/humidity sensor, keyless entering sensor, radar sensors. Tire pressure monitoring, parking, anti-lock braking system, Vehicle diagnostics and health monitoring, Accelerators and tilt sensors for sensing skidding and anti-collision, Anti-collision techniques using ultrasonic Doppler sensors.
UNIT IV	SENSORS FOR ENVIRONMENT
	Exhaust sensors and Engine control, Emission test cycles, On-board diagnose (OBD): Exhaust sensors for OBD, Hydro-Carbon Sensors, NOx-Sensors, Temperature Sensors, and Oxygen Sensors. Measurement techniques for air quality on various oxides and carbons.
UNIT-V	APPLICATIONS OF FIBER OPTIC SENSORS LARGE COMPOSITE AND CONCRETE STRUCTURES
	Mines, Dams, Aircraft etc. Applications to electric power industry load monitoring of power transmission lines, winding temperature measurement, electric current measurement. Applications to medicine- Temperature, ultrasound, chemicals, oil and gas industries.
Reference Books	
<ol style="list-style-type: none"> 1. Automotive Sensors Handbook, 8th Edition, 2011, BOSCH. 2. Florinel-Gabriel Banica “Chemical Sensors and Biosensors: Fundamentals and Applications” 2012, 1st edition, Wiley-Blackwell, New Jersey. 3. M. Campbell, "Sensor Systems for Environmental Monitoring: VolumeTwo: Environmental Monitoring", 2011, 1st Edition, Springer, New York 4. Wojtek J Bock, Israel Gannot, Stoyan Tanev “ Optical waveguide sensing and Imaging, Springer, 2006 	
Mode of Evaluation	Assignment/Seminar/Written Examination