

## TWO-DAY WORKSHOP ON

# “ROBOTICS”

28<sup>TH</sup> & 29<sup>TH</sup> MARCH, 2025

Organized by: **DEPARTMENT OF PHYSICS & ELECTRONICS**

The Department of Physics & Electronics organized a Two day Workshop on “ROBOTICS” by the Resource person Sri S.Pradeep Kumar, Director & Tech Head, Smart Home & Industrial Solutions, and Vijayawada.

### Objectives:

- To introduce participants to the fundamentals of robotics, cultivate skills in STEM fields like engineering, coding, and problem-solving.
- Equip participants with a solid foundation in robotics principles and programming.
- Foster hands-on experience in designing and building robots.
- Encourage teamwork and problem-solving.
- Inspire interest in further exploring robotics and automation technologies.

### Day 1: Introduction to Robotics and Hands-on Experience

#### 1. Understanding the Basics of Robotics:

- Introduce participants to the field of robotics, its history, and its various applications in industries like manufacturing, healthcare, and entertainment.
- Explain the components of a robot (sensors, actuators, controllers) and how they work together.

#### 2. Overview of Robotics Systems

- Discuss different types of robots (autonomous robots, industrial robots, service robots, etc.).
- Provide an overview of robot design principles.

#### 3. Introduction to Robotics Programming

- Introduce the basics of programming for robotics (possibly using platforms like Arduino, Raspberry Pi, or simulation software like VEX Robotics).
- Teach basic coding concepts such as movement control, sensor integration, and real-time decision making.

#### 4. Hands-on Session with Simple Robots

- Allow participants to build a basic robot or robot components, with guidance on assembly.
- Introduce simple tasks such as basic movement, obstacle avoidance, or light-following behaviour.

#### 5. Group Discussion or Q&A Session

- Engage participants with a Q&A session or group discussion to clarify any doubts about the concepts introduced.

## Day 2: Advanced Robotics Concepts and Project Work

### 1. Advanced Topics in Robotics

- Introduce more complex concepts like machine learning in robotics, robot vision, artificial intelligence (AI), and autonomous navigation.
- Discuss sensors and actuators in greater detail (e.g., cameras, LIDAR, servos, motors).

### 2. Robot Control Systems

- Teach more advanced programming for controlling robots, including control algorithms, PID controllers, or motion planning.
- Show how feedback loops are used to improve robot performance.

### 3. Hands-on Robotics Project

- Let participants work in groups to design, build, and program a robot that performs a specific task (e.g., navigating a maze, picking up objects, or simulating a real-world task).
- Encourage problem-solving and teamwork.

### 4. Robot Simulation and Testing

- Introduce simulation tools for testing robot performance before physical execution.
- Allow participants to test their robots and troubleshoot real-world challenges.

### 5. Wrap-Up and Showcase

- Have each group present their robot project, discuss the challenges faced, and demonstrate the functionality of their designs.
- Provide feedback and suggestions for further learning.

### 6. Future Trends in Robotics

- Briefly discuss emerging trends such as soft robotics, autonomous vehicles, and human-robot collaboration.

### OUTCOME:

At the end of the workshop, participants should not only be able to build and program basic robots but also have the foundation to further explore more complex systems and technologies within robotics. Whether they choose to pursue robotics academically, professionally, or as a hobby, they will leave with the knowledge, skills, and inspiration to succeed.

In this workshop, the following individuals participated: Mr. R. Uday Kumar, HOD; Mr. A.H.D. Prakash, Lecturer in Physics; Ms. B. Sruthi, Lecturer in Electronics; and 50 students from I B.Sc. (Electronics), II B.Sc. (Electronics) in both Major and Minor groups, as well as III B.Sc. (MECS). have participated the programme.

## PHOTO GALLERY

### INAUGURAL SESSION:



**Lighting Lamp by Principal Madam Dr.G.Krishnaveni**



**Principal Madam Dr. G. KRISHNAVENI  
Addressing the students**



**A.O Sir Dr. V. Narayana Rao  
Addressing the students**



**Resource Person Sri S.Pradeep Kumar,  
Director  
Smart Home & Industrial Solutions,  
Vijayawada.**



**Theme of the Workshop by  
Sri R. Uday Kumar, Convenor  
HOD, Dept. of Physics & Electronics**

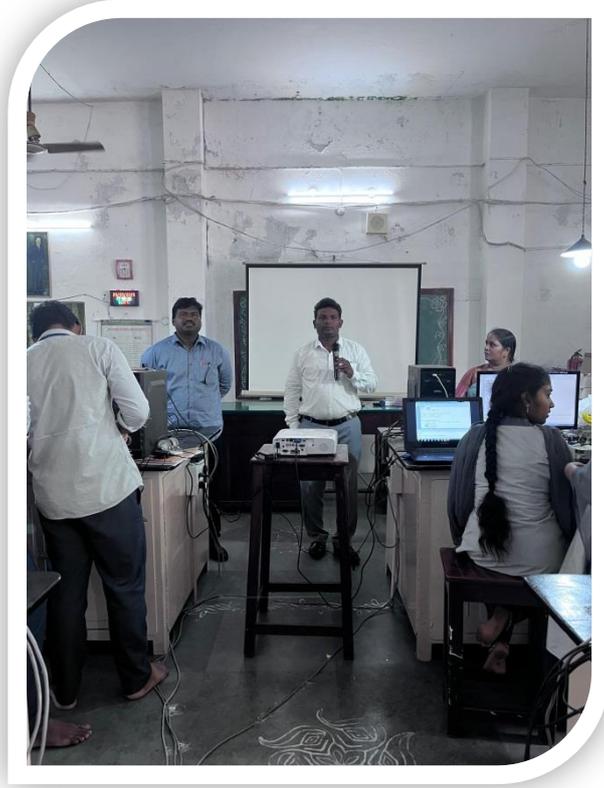


**Student Participants at the Programme**

Day-1 (i.e. 28-03-2025)



Day-2 (i.e. 29-03-2025)



## VALEDICTORY SESSION



Feedback from the Student Participants



**Felicitation to resource person Sri.S.Pradeep Kumar by beloved Vice- Principal Sri.P.L.Ramesh**



**Student participants from I, II, & III BSC Electronics group**



## INVITATION

ISO 9001:2015

NAAC 'A++' GRADE CYCLE 4

**KAKARAPARTI BHAVANARAYANA COLLEGE**  
(AUTONOMOUS)

Sponsored by S.K.P.V.V. Hindu High Schools' Committee,  
Kothapeta, Vijayawada - 520001

INSTITUTION'S INNOVATION COUNCIL  
(Ministry of HRD, Government of India)

*Invitation*

MHRD'S INNOVATION CELL  
(GOVT. OF INDIA)

You are Cordially invited to the Inaugural Session of  
Two-Day Workshop on

**ROBOTICS**  
(Under Autonomous Funds)  
(28<sup>th</sup> & 29<sup>th</sup> March, 2025)

**28<sup>th</sup> MARCH, 2025 @ 09:00 A.M.**

Venue: UG Seminar Hall.

**Resource Person**

**Sri S. Pradeep Kumar**  
Director, Smart Home & Industrial Solutions, Vijayawada.

**Presided by**

**Dr. G. Krishnaveni**  
Principal, K.B.N. College

Organized by  
**Department of Physics & Electronics**

# BROCHURE

**CHIEF PATRONS**

**Dr. T. Srinivasu,**  
Secretary & Correspondent,  
K.B.N. College (Autonomous)

**Dr. V. Narayana Rao,**  
Administrative Officer,  
SKPVV Hindu High Schools' Committee

**PATRON**

**Dr. G. Krishnaveni,**  
Principal,  
K.B.N. College (Autonomous)

**CONVENOR**

**Sri R. Uday Kumar,** Asst. Prof.  
HoD, Dept. of Physics & Electronics, K.B.N. College (Autonomous)

**ADVISORY COMMITTEE**

**Sri P. L. Ramesh,** Vice-Principal  
**Dr. M. Venkateswara Rao,** Vice-Principal  
**Dr. K. Ramalatha,** Vice-Principal, KBN college  
**Mrs. Shamin,** IQAC Coordinator  
**Sri P. Ravindra,** Head, Dept. of Computer Science

**ORGANISING COMMITTEE**

**Ms. B. Sruthi**  
**Sri. A.H.D. Prakash**  
**Dr. V. Ravi Kumar**

**For further Details Contact**

**Sri R. Uday Kumar,** Ph: 9491543772

ISO 9001:2015  
**KAKARAPARTI BHAVANARAYANA COLLEGE**  
(AUTONOMOUS)  
Sponsored by S.K.P.V.V. Hindu High Schools' Committee,  
Kothapeta, Vijayawada - 520008

INSTITUTE'S  
COUNCIL  
2019-2024

MAAC 'A++' GRADE COLLEGE 4

MOE'S  
INNOVATION CELL  
(2021-2024)

**Two-Day Workshop on  
ROBOTICS**  
(Under Autonomous Funds)  
(28<sup>th</sup> & 29<sup>th</sup> March, 2025)

**28<sup>th</sup> MARCH, 2025 @ 09:00 A.M.**  
Venue: UG Seminar Hall.

**Resource Person**  
**Sri S. Pradeep Kumar**  
Director, Smart Home & Industrial Solutions, Vijayawada.

**Organized by**  
**Department of Physics & Electronics**

**About the College:** Kakaraparti Bhavanarayana College is a vivacious outcome of a century old renowned charitable organization, SKPVV. Hindu High Schools' committee with "Tejashwina Vaidhaithamashu" as its motto. The foundation stone of the college was laid on 6th November, 1964 by Sri Kasu Brahmananda Reddy, the then Chief Minister of Andhra Pradesh. The college was constructed on 411 acres of land of the SKPVV. Hindu High Schools' Committee. It commenced functioning fully ever since July, 1965. The college had a humble beginning with 278 students and a devoted staff of just nineteen under the visionary leadership of the Founder Principal Sri S. Sundaram.

Ever since its inception in 1965, the College is known for its relentless striving towards transforming the student into an enlightened citizen. The college is ever vibrant and has evolved with the changing times. It has been adorned with Autonomy in the year 2010. As a college with state of art facilities and the accolades it received like the Best Laboratory, Best Academic achievement, Best Library, Best NSS Unit speaks volumes about its steadfast endeavour in trying to dispel ignorance from society by wielding the potential weapon of education.

The untiring efforts of the college eventually reflected in getting "NAAC A++" grade in 2024; with CPE in 2016 and All India 92nd Rank in NIRF by MHRD in 2017 which stands out to be the acme of academic achievement.

**About the Department:** The Department of Physics, KBN College, Vijayawada was established in the year 1965. It has a great reputation and distinction of producing many scholars, administrators, Scientists, Physicists, Mathematicians, Chemists and other illustrious personalities in various fields. The Department is having the pride possession of some rare and exclusive instruments. One of such instrument is Astronomical Telescope to observe celestial bodies. Another notable instrument is a working model of the Super Heterodyne Radio receiver which is used to have a clear view of the electronic components.

In recognition of its excellence, the department was designated as a Model Department by Andhra University. A major milestone in its history occurred in 2003 when the B.Sc. Electronics course was introduced. The Department of Electronics at KBN College, Vijayawada, was established to provide comprehensive education and training in the field of electronics. It offers programs that equip students with the theoretical knowledge and practical skills required to excel in the rapidly evolving electronics industry. The department is known for its high academic standards, state-of-the-art facilities, and hands-on learning experiences, including live projects and participation in national science events.

**Objective of Workshop:** The objective of a robotics workshop is to provide participants with hands-on experience in designing, building, and programming robots, allowing them to gain foundational knowledge in robotics concepts, develop technical skills, foster creativity, and often explore potential applications across different industries, all while promoting critical thinking and problem-solving abilities through practical projects. Understand how to utilize sensors (like distance sensors, light sensors) to enable robots to interact with their environment. Provide opportunities to design and build unique robot applications based on individual ideas.

**About the Workshop**

Robotics is a field of technology and engineering that involves the design, construction, operation, and use of robots. A robot is a programmable machine designed to carry out a series of actions automatically or semi-autonomously. Robotics combines elements of mechanical engineering, electrical engineering, computer science, and artificial intelligence (AI) to create machines that can perform tasks that may be too difficult, dangerous, or monotonous for humans to do. A Robotics Workshop is a structured learning event designed to introduce participants to the field of robotics, with a focus on both the theoretical and practical aspects of designing, building, and programming robots. These workshops typically combine lectures, demonstrations, and hands-on activities to engage participants and provide them with a comprehensive understanding of how robots are created and operated.

**Theme of the Workshop**

- 1. Introduction to Raspberry Pi Pico & Micro Python**
  - Basics of Electronics & Sensors (IR Sensors, Motors, Motor Drivers, Power Supply)
  - Serial Communication & Data Processing
  - Hands-on: Line Following Robot using IR Sensors
  - Hands-on: Line Following Robot using Computer Vision
- 2. Object Detection & Object Interaction Robots**
  - Object Detection Techniques & Implementation
  - Hands-on: Object Detection Robot
  - Hands-on: Object Following Robot
  - Hands-on: Object Sorting Robot
- 3. Advanced Robotics & Food Delivery Robot**
  - Navigation & Path Planning Techniques
  - Hands-on: Food Delivering Robot (Command-based navigation to tables)
  - Hands-on: Speaking Robot (Text-to-Speech Implementation)

# CERTIFICATE

ISO 9001-2015 CERTIFIED

NAAC "A++" GRADE CYCLE 4

**KAKARAPARTI BHAVANARAYANA COLLEGE**  
(Sponsored by S.K.P.V.V. Hindu High Schools' Committee) (AUTONOMOUS)  
Kothapeta, Vijayawada - 520 001.

SKPVP INSTITUTIONS  
Awarding by Government since 1981

ESTD. 1985

INSTITUTION'S INNOVATION COUNCIL  
K.P.V.V. H.S. COMMITTEE

*Certificate of Participation*

MHRD'S INNOVATION CELL (GOVT. OF INDIA)

This is to certify that Mr. /Ms. \_\_\_\_\_  
Class \_\_\_\_\_ of \_\_\_\_\_  
Vijayawada has participated in Two-Day Workshop on "ROBOTICS" (Under Autonomous Funds) organized by  
Department of Physics & Electronics, K.B.N. College (Autonomous), Vijayawada on 28<sup>th</sup> & 29<sup>th</sup> March, 2025.

Sri R. Uday Kumar  
Convener

Sri S. Pradeep Kumar  
Director, Smart Home & Industrial Solutions,  
Vijayawada.

Dr. G. Krishnaveni  
Principal