

**SANT HIRDARAM GIRLS COLLEGE, BHOPAL**  
**DEPARTMENT OF PHYSICS, COMPUTER SCIENCE & IIC**  
**SESSION 2025-2026**

**Proposal for Certificate Course Training**

**1. Course Overview:** Department of Physics, Computer Science & IIC associated with the Robonauts India is organizing certificate course to impart technical training to students. This certificate course helps them to overcome their doubt and prove to be a milestone in the journey of becoming professional. The use of autonomous systems in the world to perform relevant and delicate task is fast growing. This certificate presents an obstacle detection and avoidance system. The system consists of an Ultrasonic sensor, an Arduino microcontroller and a gear DC motor. The ultrasonic sensor is implemented to detect obstacles on the **Robot's path** by sending signals to an interfaced microcontroller. The micro-controller redirects the robot to move in an alternate direction by actuating the motors in order to avoid the detected obstacle. The certificate course consists of Fundamentals of Interactivity, Creative and hardware interfacing. Total duration of this workshop is schedule for five days with 6 hours daily. Entire session is divided into theory and hands on practical session. At the end of the course a competition is organized among the participating students where each participating student gets Certificate of Participation and the Winner gets the Certificate of Excellence.

**2. Course Details:**

|                            |   |
|----------------------------|---|
| <b>Course Title</b>        | Obstacle Avoidance and Bluetooth Operated Robot |
| <b>Course Duration</b>     | Five Days                                       |
| <b>Proposed Start Date</b> | 10 to 14 November 2025                          |
| <b>Location</b>            | Sant Hirdaram Girls College, Bhopal             |

### 3. Course Curriculum:

| S.No. | Days  | Topic                                     | Contents to be covered  |
|-------|-------|---|---|
| 1.    | Day 1 | Chapter-1<br>(Introduction & Electronics) | <p>Introduction of Robotics, Introduction of Arduino IDE platform for program, simulation, Programming fundamentals. Basic Circuit Designing with electronics Components.</p> <p>The Basics of Sensors &amp; Actuators, Simple LED Program for Arduino Blinking of EVEN and ODD states of LEDs.</p> <p>LED dice. Traffic light system. And many more projects Type of Motors, DC motor Specification, H Bridge Connection of DC motor, and Introduction of Motor driver L298D module, Connection of motor driver with Arduino and clockwise and anticlockwise rotation of dc motor via Arduino.</p> |
|       |       |   | <b>Doubt Session</b>  |
| 2.    | Day 2 | Chapter 2<br>(Motors & Sensor)            | <p>Introduction of Infra-red Sensor Module, use of IR sensor as Arduino input unit, Basic Circuit implementation of IR Sensor, DC motor control via IR sensor. Introduction of 3- &amp; 4-wheel robot structure design, construction of 3wheel robot body with DC motor and castor wheel, connection of Arduino with motor driver module, infrared sensor and power unit. Programming and implementation of IR based line follower robot.</p>   |
|       |       |   | <b>Doubt Session</b>  |
| 3.    | Day 3 | Chapter 3<br>(Construction)               | <p>Introduction of 3- &amp; 4-wheel robot structure design, construction of 3wheel robot body with DC motor and castor wheel, connection of Arduino with motor driver module, infrared sensor and power unit. Programming and implementation of IR based line follower robot.</p>   |
|       |       |   | <b>Doubt Session</b>  |
| 4.    | Day 4 | Guest Lecture                             | Guest Lecture On the topic of IoT   |
| 5.    | Day 5 | Result & Certification                    | <p>Participants of this course is finally able to create their own robot. Now we will organize competition among all participants to evaluate their skill set. All the participants will appear for the "Skill Test". Winner of the "Skill Test" will be awarded '<b>Certificate of Excellence</b>'.</p> <p>Physical <i>Certificate of Participation</i> for all the course participants. Physical <i>Certificate of Coordination</i> for the coordinators.</p>   |

**4. Training Methodology:** Entire session is divided into theory and hands on practical session. During practical the students will learn from the expert.

**5. Benefits for Participants:**

- Opportunity to get certified training under IIT Bombay association.
- Unparalleled experience from Robonauts India with personal one-on- one attention.
- Learn and interact with industry experts.
- Industry recognized certifications for participating students.
- Formation of groups consisting of 5-6 students per group.
- One kit per group to be shared and returned to organizing team at the end of workshop

**6. Target Audience:** All UG Students.

**7. Infrastructure and Facilities Required:**

- Seminar hall/classroom having a capacity enough to conduct hands-on-session for all participants.
- Good Quality public address system ideally two cordless mikes will be required.
- Projector/ Screen along with black/white board for teaching and presentation purposes.
- The workshop center can only be arranged for a minimum of 50 students.

**8. Course Fees:** Rs.500/-

**9. Collaboration and customization:** The Robonauts India is associated with Techfest, IIT Bombay for organizing workshops/seminars to impart technical training to students.

**10. Evaluation and Certificate:** At the end of the workshop a small competition will be organized & Winning team will get the certification of excellence. After the end of this certificate course all students will be able to design and modify the Robots using their own imagination for the Competition. Winner of the “Skill Test” will be awarded 'Certificate of Excellence'. Certificate of Participation for all the certificate course participants.