



INDIA2016

# WORLD ROBOT OLYMPIAD™ 2016

INTERNATIONAL ROBOTICS COMPETITION  
FOR SCHOOLS AND COLLEGES



ROBOTS FOR REDUCING, MANAGING AND RECYCLING WASTE



[WWW.WROINDIA.ORG](http://WWW.WROINDIA.ORG)

Jointly Organised by:

Supported By:



National Council of Science Museums  
Ministry of Culture, Govt. of India



INDIA STEM  
FOUNDATION  
Celebrating Science & Technology



विज्ञान एवं प्रौद्योगिकी विभाग  
DEPARTMENT OF  
SCIENCE & TECHNOLOGY

## WORLD ROBOT OLYMPIAD

The World Robot Olympiad is a competition for science, technology and education which brings together the young people (upto 25 years of age) all over the world to develop their creativity and problem solving skills through challenging and educational robotics competitions.

WRO 2016 is being organized by ISF and NCSM in collaboration to build scientific temperament and 21st century skills in students. The WRO would have teams from schools and universities across the globe.

## PAST COMPETITIONS OF WRO

QATAR 2015 | RUSSIA 2014 | INDONESIA 2013 | MALAYSIA 2012 | UAE 2011  
PHILIPPINES 2010 | KOREA 2009 | JAPAN 2008 | CHINESE TAIPEI 2007  
CHINA 2006 | THAILAND 2005 | SINGAPORE 2004

## WINNERS FROM INDIA IN WRO 2015

Indian participants won a number of medals and positions in the competition. The following prizes were won by India at the World Robot Olympiad held at Qatar, Doha.

I.Regular (Elementary Category)

Gold Medal: Team Storm Divers from Ahmedabad, Gujarat

Silver Medal: Team Thunder Divers from Ahmedabad, Gujarat

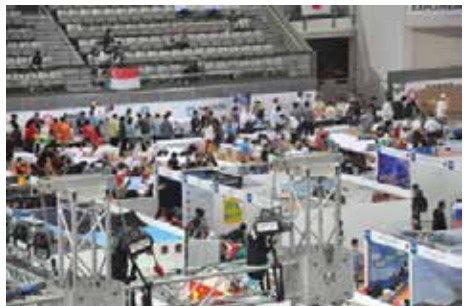
II.Open Category (Junior High)

Silver Medal: Team Shadow Bots from Gurgaon, Haryana

Eighth (8th) Position: Team Path Finders from Faridabad, Haryana

Flag Receiving Ceremony:

National Council of Science Museum and India STEM Foundation received the WRO Flag at the closing ceremony of WRO 2015. It is a matter of pride for every Indian as India is going to host WRO 2016 in India.



## WRO 2016 THEME: RAP THE SCRAP!

Over 6 billion people live on planet Earth today, generating an estimated 1.9 billion tons of domestic, industrial, medical, electronic, radioactive, toxic and hazardous waste every year.

Experts believe that the waste generated will double by 2025. That is in just 10 years from now!

Can you believe that 30% of the waste generated remains uncollected? And that a large part of the remaining 70% is dumped in oceans, landfills and dumpsites where it is polluting and clogging our ecosystem, causing numerous health and environmental challenges as only 19% is recycled?

We have to find ways to reduce, manage and recycle waste – and solutions for not generating waste in the first place – or we may be surrounded by mountains of waste. Or find ourselves sitting on top of one  
\*Source: [www.d-waste.com](http://www.d-waste.com)



This year students would come together to talk about (Rap) innovative solutions for reducing, managing and recycling waste with the use of Robotics and Technology share their ideas and research with educators, parents, peers, Governments and other stakeholders in our society. Students will also build Robots to solve Robot Challenges built around the theme, Rap the Scrap!

In order to have a nationwide representation and to ensure close proximity to regional teams as far as possible, a series of small and big regional competitions are proposed prior to the National and International Championship.

## SWACHH BHARAT MISSION

This is a national campaign by the Government of India, covering 4,041 statutory cities and towns, to clean the streets, roads and infrastructure of the country.

Our theme Rap the Scrap is a step towards involving educationists, teachers, parents, Mentors and Government and local bodies, NGOs, Waste Management Companies to come together and enable students to come out with innovative practical solutions using Robots and technologies to reduce, recycle and manage waste.



# WRO CHALLENGES 2016

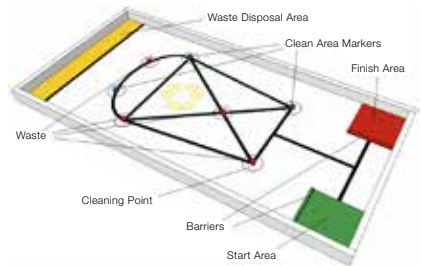
## CATEGORY: REGULAR CATEGORY

### Elementary School

up to 12 years old

CHALLENGE: Clean Road to School

The challenge is to make a robot help a child clean on the child's journey to school. The journey starts with making the bed and goes all the way to cleaning the school's playground.



### Regular Category: Junior High School

13-15 years old

CHALLENGE: Waste Sorting

The challenge is to make a robot that collect certain kinds of recyclable waste from a home into recycling waste bins to be picked up by Municipal Service.

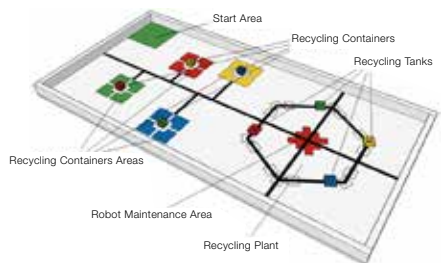


### Regular Category: Senior High School

16-19 years old

CHALLENGE: Recycling Plant

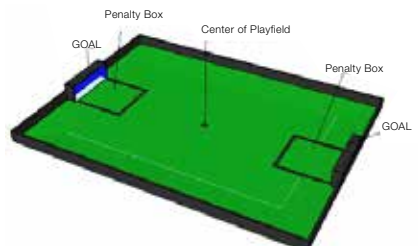
The challenge is to make a robot that brings sorted waste stored in recycling containers to the corresponding recycling tank at a waste recycling plant.



## CATEGORY: WRO FOOTBALL

10-19 years old

An exciting Robot soccer match that requires students to design and program two robots to compete against an opposing pair of robots by kicking an infra-red ball into opposing team's goal.



## CATEGORY: OPEN CATEGORY

This year students are expected to come up with innovative solutions using robotics technology to reduce, manage and recycle waste!

Teams are required to think of a real world problem related to the theme and come out with an innovative solution for the same. The research and projects should be well supported with all kinds of displays/prototypes/models/videos and presented in their 2m by 2m booth provided at the regional championship.



## BASIC GUIDELINES FOR PARTICIPATION

In order to participate in the World Robot Olympiad 2016 Regular category (<http://www.wroindia.org/regular-category/>) challenge successfully the following are required:

**Team and Coach:** We need min 2 and max 3 excited children of eligible age groups to form a team, design, build and program a Robot to solve the challenge. The team is mentored by an adult coach who could be their teacher, parent or an elder. The role of the coach is register the team, arrange the necessary logistics support for them. The coach doesn't program or build the Robot but helps the students to developing their own solution for the game. The coach is a source of inspiration and motivation for the team.

**Robot Set:** World Robot Olympiad supports a single platform policy globally, i.e. LEGO Mindstorms Education (LME) NXT or EV3 platform. Every team in the Regular Category should have their own LME Robot set to build and solve the challenges.

**Challenge set and Table:** Teams should build a tournament game table and procure/print the

game challenge mat. Log on to [www.wroindia.org](http://www.wroindia.org) and download table and challenge mat building instructions or order one online.

**Registration:** All teams must register online and input their correct information. Participating students and coaches would get participation certificates based on the information provided in the online registration system. Registration Fee for regular category is Rs. 5,500- per team. For more information, please visit [www.wroindia.org](http://www.wroindia.org)

**Sponsorship:** School or Parent supported teams may already have access to the Robot Set, Game table, playfield mat and other resources required for participating and successfully preparing for the challenge or will have to procure one.

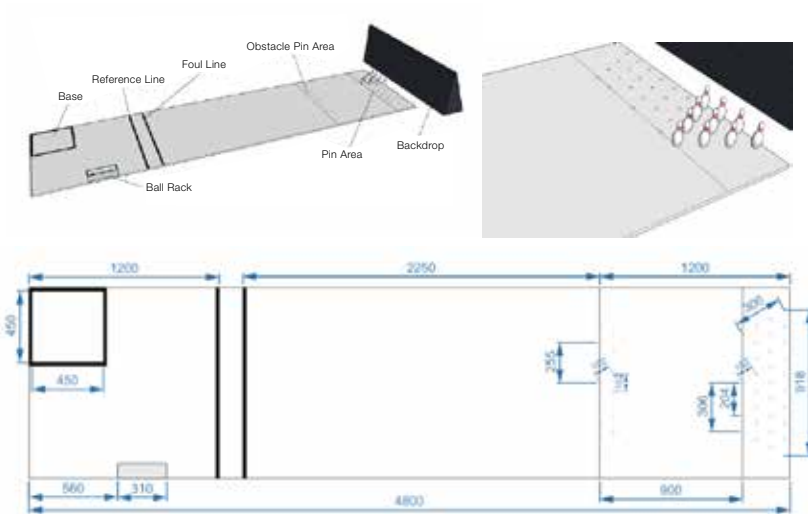
Part or full Sponsorships for procuring Robot sets, game table and playmat may be available for deserving teams. Log on to [www.indiastemfoundation.org/sponsorship](http://www.indiastemfoundation.org/sponsorship) to apply.

## WRO CHALLENGES 2016

CATEGORY: ADVANCED ROBOTICS CHALLENGE

17-25 years old

An engineering challenge for university students to build robots that can pick up a bowling ball from the ball rack, "see" where the target is and precisely aim to score points by knocking down as many bowling pins as possible.



CHALLENGE:

The challenge is to make a robot that can score as many points as possible in a robot version of the ten-pin bowling game. The task of the robot is to fetch a red ball from a ball rack, locate the pins at the end of the lane and to knock as many pins down as possible by rolling the ball towards the pins.

## BASIC GUIDELINES FOR PARTICIPATION

- Team Size: 2 to 3 members
- Building system: MATRIX or TETRIX only
- \*It is not permitted to make alterations to any materials from Matrix or TETRIX.
- Control software must be LabVIEW from National Instruments or any C language (like C, C++, C#, RobotC) software
- Teams can use any sensors, electrical motors and servos, battery of their choice – no restrictions on brand, function or number of sensors used.
- Teams may use only one controller if my RIO or KNR – and maximum two controllers if EV3.
- It is not permitted use any hydraulic pressure or barometric.

Regional Tournaments

20th August to 25th September 2016

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National Championship

For Schools: 22nd October to 23rd October 2016

For Colleges: 22nd October to 23rd October 2016

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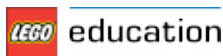
International Championship

25th November to 27th November 2016

\*Dates are subject to change, for all updates and latest schedules, please visit [www.wroindia.org](http://www.wroindia.org)

## WRO SPONSORS

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**FOR REGISTRATION, GAME DESCRIPTION,  
RULES, SCORING AND SCHEDULE**

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**CONTACT DETAILS:**

**GENERAL ENQUIRY:**

[wro@indiastemfoundation.org](mailto:wro@indiastemfoundation.org)

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**Jointly Organised by:**



**National Council of Science Museums**  
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National Council of Science Museums (NCSM) is India's premier body playing a key role in the growth of science and technology by organizing various science education programs, activities and trainings within and outside of Schools and Colleges at its science centres spread across the country in order to develop and inculcate scientific attitude, temper and general awareness amongst the people of the country.  
[www.ncsm.gov.in](http://www.ncsm.gov.in)



India STEM Foundation is a pioneer in promoting hands-on STEM (Science, Technology, Engineering and Maths) education in India with the intervention of Robotics and research based learning programs for school and college students. India STEM foundation is the affiliate partner of World Robot Olympiad Association in India.  
[www.indiastemfoundation.org](http://www.indiastemfoundation.org)

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