



### Availability of Centre for Excellence

The following are the centre of excellence available in TBI for promoting the innovation and entrepreneurship activities in MRCET. There are six Center of Excellence available in our college. The COE details have been discussed in the coming sections.

- 1. Center of Excellence in Robotics**
- 2. Center of Excellence in IOT**
- 3. Centre of Excellence in Mechanical Engineering**
- 4. Centre of Excellence in Aeronautical Engineering**
- 5. Centre of Excellence in Computer Science & Engineering**
- 6. Centre of Excellence in Electrical & Electronics Engineering**

The six COE with major equipment and its details have been discussed in the coming sections.

#### **1. Center of Excellence in Robotics**

S.No	Name of the Major Equipment	Softwares/ Details	Quantity
1	Black Line follower Robot	Arduino based	1
2	Infrared Obstacle Avoidance Robot	Arduino based	1
3	Ultrasonic Obstacle Avoidance Robot	Arduino based	1
4	Infrared Remote Controlled Robot Blue tooth controlled Robot	Arduino based	1
5	Wi-Fi Controlled Robot	Arduino based	1

6	IR sensor controlled Robot	Arduino based	1
7	Pick and Place Robot	--	1
8	Voice command robot (Christopher)	Arduino and Raspberry pi- based	1
9	Voice command robot (Ezra)	Arduino and Raspberry pi- based	1

**Black Line Follower:**

Line follower is an autonomous robot which follows black line in white area. Robot must be able to detect particular line and keep following it.

**Infrared Obstacle Avoidance Robot:**

It is an intelligent device which can automatically sense the obstacle in front of it and avoid them by turning itself in another direction.



This design allows the robot to navigate in unknown environment by avoiding collisions, which is a primary requirement for any autonomous mobile robot. The application of Obstacle Avoiding robot is not limited and it is used in most of the military organization now which helps carry out many risky jobs that cannot be done by any soldiers.

## Ultrasonic Obstacle Avoidance Robot :

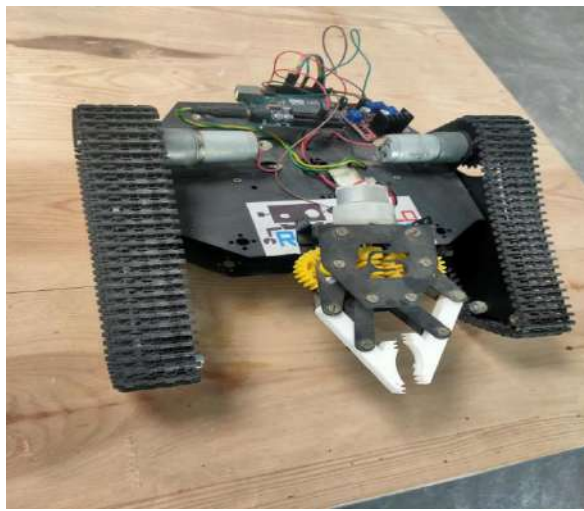
It is a long range ultrasonic echo based device which can automatically sense the obstacle in front of it and avoid them by turning itself in another direction. This method is most commonly used in Car Parking system where sensors are connected in all directions and which is connected to an alarm system.



## Infrared Remote Controlled Robot:

These remote controls use infrared light and photo receptors and different light frequencies for different functions. These remotes also use invisible light beams to send signals to electronic devices. Applicable for Distant Controlling cases where remote operation is required





### **Robotics Workbench :**

Hands on practice of designing different variety of robots such as free wheels, track belt , round shaped, pick and place arm etc.



### **Humanoid Robot:**

A humanoid robot is a robot with its body shape built to resemble the human body. The design may be for functional purposes, such as interacting with human tools and environments. Humanoid robots have a torso, a head, two arms which resembles as a human. It is mainly developed by using Raspberry Pi board and other important sensors,



different types of motor control driver units. The Movement of this robot is achieved with the help of stepper motor. This robot has the capability to monitor temperature, humidity etc.



## 2. Center of Excellence in IOT

S.No	Name of the Major Equipment	Softwares/ Details	Quantity
1	LORA IOT Kits	Frequency Range: □ Band 1 (HF): 862 ~ 1020 Mhz Band 2 (LF): 410 ~ 528 Mhz	6
2	LORA Sensor Node	Support 50~100 sensor nodes.	6
3	LORA IOT Controller with ST LINK	168 dB maximum link budget.	6
4	LORA mini Developing Board	FSK, GFSK, MSK, GMSK, modulation.	6
5	LORA GPS Trainer kit	UART interface for GPS	6
6	IOT Trainer kit10 Sensors	Inbuilt raspberry pi3 with all in one sensor platform	6
7	LORA Multichannel gateway 3G/4G	Processor: 400MHz, 24K MIPSFlash: 16MB ; RAM: 64MB	1
8	Outdoor gateway channel	--	1
9	Zigbee Development Kit	--	1
10	Actuator &Camera	--	1

**ETS IOT Kit:**

ETS IoT kit is an all-in-one prototyping platform for sensor based IoT applications. It's packed with state of the art sensor technology and ready-to-use software applications, capable of fulfilling all IoT application needs. It contains inbuilt raspberry pi3 with all in one sensor platform to enable infinite IoT application prototype possibilities.



**Dragino IOT Kit:**

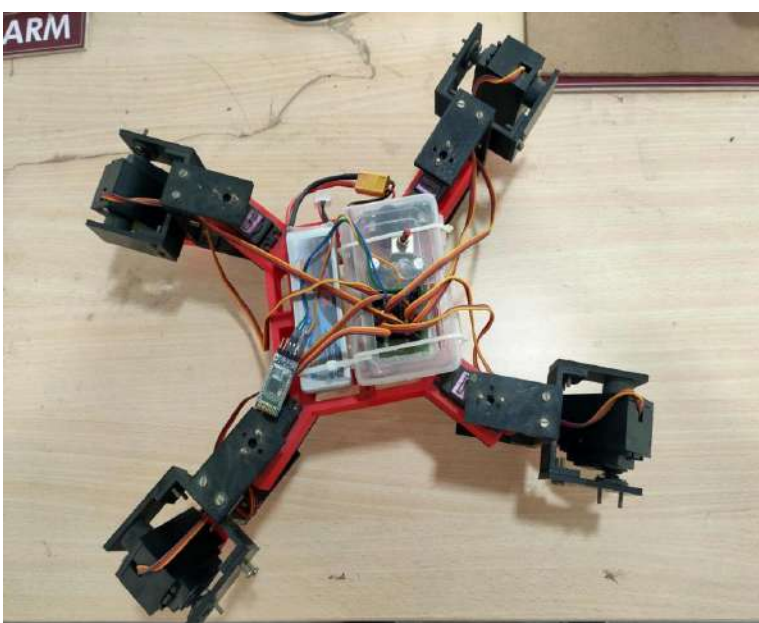
It is designed to facilitate beginners and developers to quickly learn LoRa and IoT technology. It helps users to turn the idea into a practical application and make the Internet of Things a reality. It is easy to program, create and connect your things everywhere. A number of telecom operators are currently rolling out networks, but because LoRa operates in the open spectrum in which any network can setup.



### 3. Centre of Excellence in Mechanical Engineering

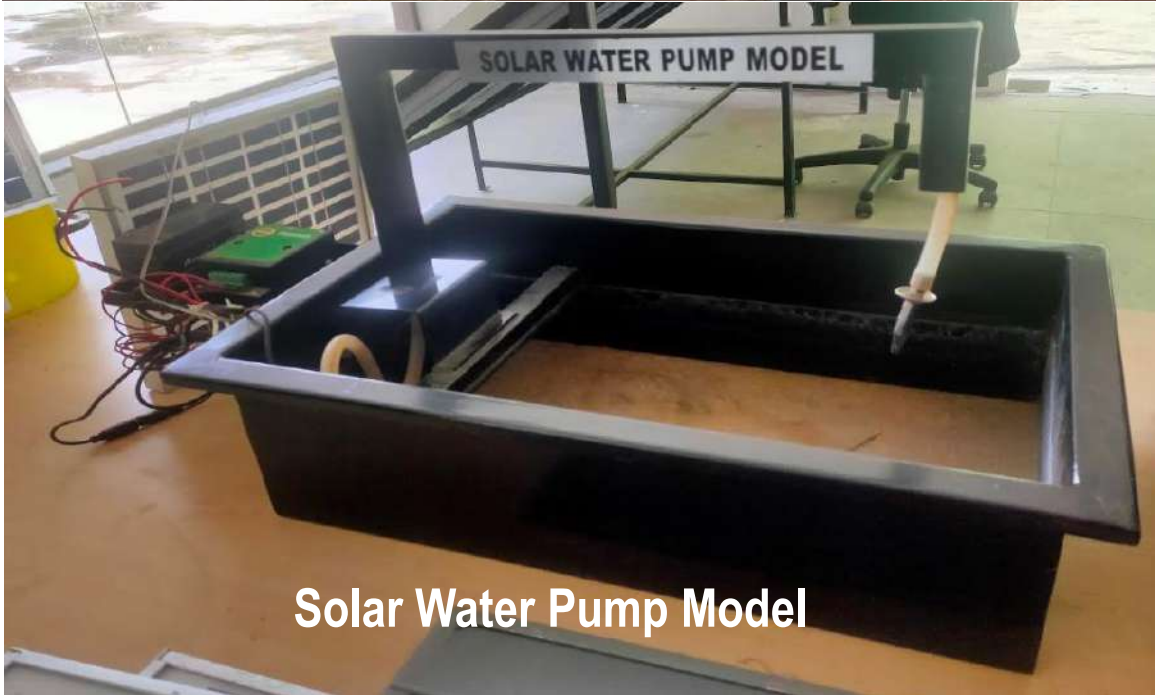
S.No	Name of the Major Equipment	Quantity
1	Robotic Arm	1
2	Quadra-Pod	1
3	Seed Planting Machine	1
4	Human Robot	1
5	3d-Printer Pick And Place Robotic Arm	1
6	Solar Powered Air Cooler	1
7	Solar Powered Sprayer	1
8	Parabolic Solar Collector	1
9	Solar Tree	1
10	Solar Cooker	1
11	PV Characteristics	1
12	Design, Analysis and prototype of Propeller shaft	1
13	Design, analysis and Prototype of Connecting Rod	1
14	Mono-Wheel	1
15	Design, analysis and Prototype of flanged coupling	1
16	Solar Grass Cutter	1
17	Segway	1
18	Electrically Operated Car Jack	1
19	Automatic Board Cleaner	1
20	Solar City	1







Solar City



Solar Water Pump Model

Seed Planting Machine



Solar Tree

Solar Water Sprayer



#### 4. Centre of Excellence in Aeronautical Engineering

S.No	Name of the Major Equipment	Softwares/ Details	Quantity
1	MIG R-11 Engine & Mount	Compressor: Axial compressor, 3-stage LP, 3-stage HP Turbine: one stage LP, one stage HP	1
2	Flight Simulator	Joystick based	1



#### 5. Centre of Excellence in Computer Science & Engineering

S.No	Name of the Major Equipment	Software / Details	Quantity
1	ALPHA-1Dell inc	Python 3.7,Anaconda 3.7,java1.8,eclipse IDE	1
	<b>Processor:</b> Intel core-i7,3.20GHz	Android Studio 3.5	
	<b>RAM:</b> 16 GB	MySQL 8.0	
	<b>Hard Disk:</b> 2 TB		
2	ALPHA-2		1
	<b>System model no:</b> Z390AORUSPRO	Python 3.7,Anaconda 3.7,java1.8,eclipse IDE	
	<b>Processor:</b> Intel core-i9	Android Studio 3.5	
	<b>RAM:</b> 16 GB	MySQL 8.0	
	<b>Hard Disk:</b> 8 TB,250 GB SSD		
	<b>Graphics Card:</b> 8 GB		



## 6. Centre of Excellence in Electrical & Electronics Engineering

S.No	Name of the Major Equipment	Software/ Details	Quantity
1	Working model of hydro power plant	Prototype setup	1
2	Working Model of 400KV Substation	Prototype setup	1

400 KV Substation...



Hydroelectric Power Plant...

