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## **CERTIFICATE COURSE ON** **“ROBOTICS”**

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**Department of Electronics and Communication, IITE, Indus University**

Indus University, Rancharda, Via: Shilaj, Ahmedabad – 382115



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## **About the Indus University**

Indus University has been established with the objective of making a noteworthy contribution to the social, economic and cultural life of our country. Having faith in the power of education, the builders of this university intend to impart knowledge to youngsters of society. The three pillars on which this university firmly stands are – educational wisdom, professional brilliance, and research & innovation, all of which are aimed at nurturing a spirit of entrepreneurship and social responsibility. Indus University has 8 constituents institutes offering UG, PG and Doctoral degree programmes in diverse disciplines courses of Engineering, Management, Science and Humanities, Information communication technology, Design and Architecture, Aviation Technology and Indic Studies.

## **About Indus Institute of Technology and Engineering**

Indus Institute of Technology and Engineering is one of the flagship institutes of Indus University. It aims at providing innovative education on par with the industry needs and marshal the brightest minds as a global pool of professionals. At IITE, we offer UG, PG and PhD programmes in various streams of Engineering. Institute of Technology & Engineering provides work and play environment to boost students' persona and intellect quotient all through the academic period. While they are exposed to fieldwork, much weight is given to research and development in the fields of engineering. Students are encouraged and supported in a variety of ways to plan and execute startups. High-class laboratories and modern tools are available to ease the journey of booming startups and innovation. Faculty members at IITE play a significant role in building entrepreneurs par excellence.

- Computer Engineering
- Metallurgical Engineering
- Civil Engineering
- Automobile Engineering
- Mechanical Engineering
- Electrical Engineering
- Electronics and Communication Engineering

## **About Department**

The Department of Mechanical Engineering was started in the year 2006. The first batch consisted of 60 students who passed with a B.E in Mechanical Engineering from Gujarat University (GU). In 2012, the Department came under Indus University. A Master of Technology program was started in 2011 with specialization in CAD/CAM. Presently the department has an intake of 180 students. The department is committed to serve following objectives:

- To impart highest quality education to the students and excel their performance through meaningful and rewarding research and development activities as well as preparing them globally competitive mechanical engineers.
- To maintain state-of-art laboratory facilities to provide collaborative environment that stimulates faculty, staff and students with opportunities to create, analyze, apply and disseminate knowledge.
- To provide students with academic environment of excellence, leadership, ethical guidelines and lifelong learning needed for a long productive career.

## Background

Robotics is an interdisciplinary domain of engineering that includes mechanical engineering , electronic & communication engineering , information engineering , computer science , etc. Robotics deals with the design, construction, operation of autonomous system, and application of robots . The technology is used to develop systems that can substitute humans and replicate human actions. Robots can be used in many situations and for lots of purposes. There are many types of robots; they are used in different environments and for different uses. Although being very diverse in applications and forms, they all share three basic similarities when it comes to their construction.

First, all the robots have some kind of mechanical construction, a frame, form or shape designed to perform a particular task. For example, a robot designed to travel across heavy dirt or mud, might use caterpillar tracks . The mechanical aspect is mostly the creator's solution to complete the assigned task and deal with the physics of the environment around it. Second, robots have electrical & electronics components which provide power and control to the machinery. For example, the robot with caterpillar tracks would need some kind of power to move the tracker treads. The power comes in the form of electricity, which has to travel through a wire and originate from a battery, a basic electrical circuit . And third, all robots contain some level of computer programming code. A program is used to direct robot for perform a task.

## About the course

The course on 'Robotics' provides step by step foundation for building an autonomous and programmable machine which can perform several tasks for particular application in the field of engineering. The building blocks of robotics includes development of micro controller, applicability of different input and output devices and programming of robot for various tasks. The 'Robotics' is mainly a practice based course that includes two modules where the Fire Bird-V 2560 Robot is demonstrated with its theoretical and practical aspects. Both modules provide step by step solutions to build a robot for a specific articular application. The first module (Basics of Fire Bird V Atmega 2560 Robot) focuses on the basics of Robotics with different theoretical aspects of Fire Bird V Atmega 2560 Robot. It also covers case based study and hands on practice with available robotic kit. Second stage (Advanced Module) is a kind of task based training provided to the students to strengthen their understanding regarding the Fire Bird V Atmega 2560 Robot.

### Key Objectives of the course

- To understand the definition and significance of the Fire Bird V Atmega 2560 Robot and its architecture.
- To understand the basics of ATMega 2560 Micro-Controller used in the Fire Bird V Atmega 2560 Robot and develop skills for programming of Micro-controller for particular application.
- To develop skills of interfacing various input and output devices with Micro-Controller for different applications.

## Course Highlights

The course on 'Robotics' comprises of two stages. The details of each stages are as follows.

### Stage-1: Basic Module

The first stage is a four days' workshop wherein basics of Robotics will be covered by an introduction to AVR micro-controller and programming environment in which the basics of input/output(I/O) port programming of Fire Bird V ATMEGA 2560 robot is explained with ATTEL\_STUDIO\_6-6.0.1843 software. Also in this module the installation of software and programming environment will be explained. Introduction to LCD interfacing, Analog to Digital Conversation, Interrupt programming closed loop control of robot using position encoder will be demonstrated. The course also focuses hands on training on the Fire Bird V Atmega 2560 Robotic kit. The practical understanding will be provided to the students by incorporating various input and output devices available on Fire Bird V Atmega 2560 Robot.

### Stage-2: Advanced Module

Advanced module will be a theme based training where students will be assigned to complete different tasks. Student group has to complete all the given tasks and have to demonstrate the task performed by the robot. After completion of second stage, students will be capable to program the Robot for a given task and can prepare a robot for specific application.

### Eligibility Criteria

To become eligible for registering to certificate course on Robotics, you must be from the background of Science, Technology, Engineering and Mathematics. There is absolutely no pre-requisite for the courses.

### Registration Process

Individual student can register. During the program the student will be transfer in any one group consist of 3 to 4 student. For each group of students, a separate robotic kit will be given and students have to perform all the given task on allocated kit. After completion of the course students have to submit the robotic kit provided to them. Maximum number of students group will be allowed for each stage on the basis of availability of the robotic kit.

**Basic Module registration:** 31/08/2021 to 03/09/2021

**Advanced Module registration:** 04/10/2021 to 08/10/2021

**Registration for basic, intermediate and final stage please click on the link:**

[https://docs.google.com/forms/d/e/1FAIpQLSfEg0rHm6wpII7fiVi1qmb-T-AGZj5VF\\_kZ6qVWSrS3rAHbxA/viewform?usp=sf\\_link](https://docs.google.com/forms/d/e/1FAIpQLSfEg0rHm6wpII7fiVi1qmb-T-AGZj5VF_kZ6qVWSrS3rAHbxA/viewform?usp=sf_link)



## Course Fees

Course Fees	Indus University Students	Other University Students
<b>Basic Module</b>	Rs.500(Per Student)	Rs.750(Per Student)
<b>Advanced Module</b>	Rs.500(Per Student)	Rs.750(Per Student)

### Note:

Certificate of participation will be given after successful completion of basic module. Students who will complete basic and advanced module will be eligible for certificate of completion.

### Course coordinator:

#### 1) Dr. Mitesh J Mungla

(Department of Mechanical Engineering)  
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#### 2) Dr. Umang J Patdiwala

(Department of Mechanical Engineering)  
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#### 3) Asst. Prof. Darshan K Bhatt

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#### 4) Asst. Prof. Piyush Surani

(Department of Mechanical Engineering)  
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Itinerary			
August 31, 2021			
Sr. No.	Time	Particular	Resource person
1	10:30 to 12:00 am	Introduction to E -Yantra and R&AI laboratory. Basics of Robotics.	Asst. Prof. Darshan K. Bhatt
2	2:00 to 3:30 pm	Introduction to Fire Bird V Robot followed by demonstration.	Asst. Prof. Darshan K. Bhatt
September 01, 2021			
3	10:30 to 12:00 am	Introduction to AtMega 2560 Micro -Controller and Atmel Studio Software.	Asst. Prof. Piyush Surani
4	2:00 to 3:30 pm	Programming Environment and Practical Demonstration.	Asst. Prof. Piyush Surani
September 02, 2021			
5	10:30 to 12:00 am	Introduction to buzzer and Interrupt Switch interfacing.	Dr. Mitesh Mungla
6	2:00 to 3:30 pm	Program Structure and Practical Demonstration.	Dr. Mitesh Mungla
September 03, 2021			
7	10:30 to 12:00 am	Introduction to bar type LED and LCD interfacing.	Dr. Umang Patdiwala
8	2:00 to 3:30 pm	Program Structure and Practical Demonstration.	Dr. Umang Patdiwala

### **Chief Patrons**

#### **Dr. Ritu Bhandari**

Presidential Secretariat, Indus University

#### **Dr. Nagesh Bhandari**

Presidential Secretariat, Indus University

### **Patrons**

#### **Prof. (Dr.) V.K. Srivastava**

Executive President, Indus University

### **Chairperson**

#### **Prof. Dr-Ing Anupam Kumar Singh**

Director-IITE, Indus University

### **Convener**

#### **Dr. Vrushank Shah**

Head (EC), IITE, Indus University

