

## TITLE: INDUSTRIAL AUTOMATION (SENSOR, PLC, ARDUINO)

(We shape your career)

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Course fee	10,000 BDT
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Class #	Course title	Lecture details
01	Course overview	<p><b><u>Overview</u></b></p> <ul style="list-style-type: none"> <li>○ What does it mean Industrial automation?</li> <li>○ What is sensor?</li> <li>○ What is PLC?</li> <li>○ What is the fourth-generation industry?</li> <li>○ Basic concept of electrical engineering (Current and voltage divider rule, ohms law, series and parallel ckt, single line diagram)</li> </ul>
02	Proximity sensor (inductive, capacitive, photoelectric, magnetic, hall)	<p><b><u>Proximity sensor</u></b></p> <ul style="list-style-type: none"> <li>○ What is proximity sensor?</li> <li>○ Types of proximity sensors</li> <li>○ How to choose a right proximity sensor</li> <li>○ Industrial Applications</li> <li>○ How to connection</li> <li>○ Practical Project</li> </ul>
03	Level sensor (Capacitive, ultrasonic)	<p><b><u>Level sensor</u></b></p> <ul style="list-style-type: none"> <li>○ Working principle of the level sensor</li> <li>○ How to connect level sensor?</li> <li>○ Capacitive Vs Ultrasonic level sensor</li> <li>○ How to install level sensor?</li> <li>○ Application in the industry</li> <li>○ Practical experiment</li> </ul>
04	PIR and Presence sensor (PIR, Presence and photocell)	<p><b><u>PIR sensor</u></b></p> <ul style="list-style-type: none"> <li>○ Working principle of a PIR sensor</li> <li>○ PIR Vs Presence sensor</li> <li>○ PIR Vs Photocell</li> <li>○ Connection and application</li> <li>○ Practical project</li> </ul>
05	Pneumatic system (Cylinder, Solenoid Valve, Directional valve, Filter, Digital pressure switch)	<p><b><u>Pneumatic system</u></b></p> <ul style="list-style-type: none"> <li>○ Working principle of Pneumatic system</li> <li>○ How to choose right cylinder</li> <li>○ Types of cylinder</li> <li>○ Solenoid valve details</li> <li>○ Connection and application of the pneumatic system</li> <li>○ Air compressor details</li> <li>○ Arduino based control system</li> </ul>
06	Temperature and air quality sensor (CO <sub>2</sub> sensor, Humidity sensor, PID controller)	<p><b><u>Air quality sensor</u></b></p> <ul style="list-style-type: none"> <li>○ Temperature vs Humidity</li> <li>○ Absolute and relative humidity</li> <li>○ Working principle of CO<sub>2</sub> sensor</li> <li>○ What does it mean “PPM and PPB”?</li> <li>○ How to choose right air quality sensor</li> <li>○ Practical connection</li> <li>○ Principle and application of PID controller</li> <li>○ Installation of the CO<sub>2</sub> sensor</li> </ul>

07	RTD VS Thermocouple (PT100, RTD)	<b><u>RTD and Thermocouple</u></b> <ul style="list-style-type: none"> <li>○ RTD Vs Thermocouple?</li> <li>○ Why do you choose RTD or Thermocouple?</li> <li>○ Connection and project</li> </ul>
08	Electrochemical sensors (O <sub>2</sub> , SO <sub>2</sub> , CO <sub>2</sub> , CO, VOC)	<b><u>Electrochemical sensor</u></b> <ul style="list-style-type: none"> <li>○ Definition of the electrochemical sensor</li> <li>○ Amperometric and galvanometric sensor</li> <li>○ Gas detection principle</li> <li>○ Industrial application</li> </ul>
09	Relay and switch (Relay: MC, Ac & Dc Limit switch, micro switch, toggle switch, foot switch, push switch)	<b><u>Relay and switch</u></b> <ul style="list-style-type: none"> <li>○ Definition and principle of relay and switch</li> <li>○ Magnetic contactor basic</li> <li>○ Practical project</li> <li>○ Magnetic contactor and timer</li> </ul>
10	Introduction to PLC	<b><u>Introduction</u></b> <ul style="list-style-type: none"> <li>○ What is PLC?</li> <li>○ Functional block diagram of PLC.</li> <li>○ How PLC is work?</li> <li>○ What is the ladder logic diagram?</li> <li>○ Why PLC is used?</li> <li>○ What is the application of PLC?</li> </ul>
11	Ladder Logic Concept & PLC Wiring Procedure	<b><u>Ladder Logic</u></b> <ul style="list-style-type: none"> <li>○ What is the ladder logic of PLC?</li> <li>○ Ladder logic diagram of PLC.</li> <li>○ Power connection &amp; I/O connection diagram.</li> <li>○ Practical of connection diagram.</li> </ul>
12	Timer Operation of PLC	<b><u>Timer Operation</u></b> <ul style="list-style-type: none"> <li>○ ON delay timer operation with program.</li> <li>○ OFF delay timer operation with program.</li> <li>○ ON/OFF delay timer operation with program.</li> <li>○ Weekly timer operation with program.</li> <li>○ Application of timer</li> </ul>
13	Counter Operation of PLC	<b><u>Counter Operation</u></b> <ul style="list-style-type: none"> <li>○ Up counter operation with program.</li> <li>○ Down counter operation with program.</li> <li>○ Up/Down counter operation with program.</li> <li>○ Application of counter.</li> </ul>
14	PLC Program with Practice	<b><u>PLC Program</u></b> <ul style="list-style-type: none"> <li>○ Program of load control using PLC, switch &amp; sensor.</li> <li>○ Physical practice of load control using PLC, switch &amp; sensor.</li> <li>○ Program of star-delta operation by using PLC.</li> <li>○ Star-delta operation using PLC.</li> <li>○ Sensor based project</li> </ul>

15	PLC Based project	<p><b><u>PLC Program</u></b></p> <ul style="list-style-type: none"> <li>○ Program of motor speed control by using inverter.</li> <li>○ Physical practice of motor speed control.</li> <li>○ Analog operation of PLC</li> <li>○ Proximity sensor based project</li> </ul>
16	Introducing Arduino IDE and LED blinking Program	<p><b><u>Introducing Arduino IDE</u></b></p> <ul style="list-style-type: none"> <li>○ What is Arduino IDE.</li> <li>○ How to use Arduino IDE</li> <li>○ IDE Settings</li> <li>○ PC to Arduino Communication</li> <li>○ Basic circuit diagram design with Proteus LED blinking Program</li> </ul>
17	Basic C Programming	<ul style="list-style-type: none"> <li>○ Data type</li> <li>○ Variable, Keywords</li> <li>○ Operator and Expressions.</li> <li>○ Conditional and looping statements</li> <li>○ Switch, Case.</li> <li>○ Function</li> </ul>
18	LED Display Design	<p><b><u>LED Display Design</u></b></p> <ul style="list-style-type: none"> <li>○ What is LED display</li> <li>○ Schematic design, with help of Proteus</li> <li>○ LED display programming with help of Arduino IDE</li> <li>○ Circuit Connection</li> <li>○ Practical project</li> </ul>
19	Introducing and Application Different types of robotics Sensor.	<p><b><u>Different types of robotics Sensor</u></b></p> <ul style="list-style-type: none"> <li>○ Light sensor.</li> <li>○ IR sensor.</li> <li>○ Temperature sensor.</li> <li>○ Proximate sensor.</li> <li>○ Ultrasonic sensor.</li> <li>○ Water sensor</li> <li>○ Weight sensor.</li> <li>○ Air quality sensor.</li> <li>○ Color detect sensor</li> </ul>
20	<b>Exam (Theory and practical)</b>	