



**Lok Jagruti Kendra University**  
University with a Difference

# **Diploma in Automobile Engineering**



**Course Code: 025010512**  
**Robotics & Automation**

Programme / Branch Name			Diploma in Automobile Engineering			
Course Name	Robotics & Automation				Course Code	025010512
Course Type	HSSC	BSC	ESC	PCC	OEC	PEC

**Legends:** HSSC: Humanities and Social Sciences Courses BSC: Basic Science Courses  
ESC: Engineering Science Courses PCC: Program Core Courses  
OEC: Open Elective Courses PEC: Program Elective Courses

## 1. Teaching and Evaluation Scheme

Teaching Hours / Week					Evaluation Scheme				
L	T	P	Total Teaching Hours	Total Credit	CA	CCE	SEE (TH)	SEE (PR)	Total
3	2	0	5	5	10	40	50	-	100

**Legends:** L: Lectures T: Tutorial P: Practical  
CA: Continuous Assessment (Attendance + Activity)  
CCE: Continuous & Comprehensive Evaluation  
SEE (Th): Semester End Evaluation (Theory)  
SEE (Pr): Semester End Evaluation (Practical)

## 2. Prerequisites

- ✓ Engineering Physics
- ✓ Fundamental of Electrical and Electronics Engineering

## 3. Rationale

This subject will give depth knowledge of automation which is the process of using physical machines, computer software and other technologies to perform tasks that are usually done by humans and in robotics a process of designing, creating and using robots to perform a particular task. By learning this subject student will understand about connection of automation and robotics with different industries.

## 4. Objectives

- ✓ Students can understand the basic types, levels, strategies of automation.
- ✓ Students can do analyzing and understand the industrial automation needs.
- ✓ Students will learn about selection of sensors which are used in automation.
- ✓ They can select different transducers which are connected with industrial automation.
- ✓ Students will understand that what is the connection of PLC with automation and how it is useful in industry.
- ✓ Students will understand about different terminologies which are used in robotics and also different types of robots which are used in automation.
- ✓ This course provides the student with an introduction to industrial robotics and automation from the viewpoint of mechanical technology.

## 5. Contents

Unit No.	Unit Name	Topics	Learning Outcome	% Weightage	Hours
1.	<b>Introduction to Automation</b>	1.1. Definition of automation 1.2. Reasons for automation 1.3. Advantages of automation 1.4. Goals of automation 1.5. Low cost of automation 1.6. Types of automation 1.7. Strategies for automation	<ul style="list-style-type: none"> <li>To understand about concept of automation.</li> <li>Know about need of automation in industry.</li> </ul>	14	6
2.	<b>Hardware components for Automation</b>	2.1. Sensors 2.2. Actuators 2.2.1. Electric Motors 2.2.2. Other Types of Actuators 2.3. Analog – Digital converters 2.4. Input/ output Devices for Discrete Data 2.4.1. Contact Input /output Interfaces 2.4.2. Pulse Counters and Generators 2.5. Transducers	<ul style="list-style-type: none"> <li>To get information about different sensors and actuators.</li> <li>Can understand about analog and digital conversation.</li> <li>To understand about transducers</li> </ul>	19	8
3.	<b>Introduction to Programmable Logic Controllers (PLCs)</b>	3.1. Programmable Logic Control Overview 3.2. Industrial Process Control. 3.3. PLC Terminology 3.3.1. Programmable Logic Controller 3.3.2. Work Cycle Program 3.3.3. Operating Cycle and Scan Time 3.4. PLC Applications 3.5. Implementing Automation with PLCs 3.5.1. PLC Selection Considerations 3.6. Discrete process logic control	<ul style="list-style-type: none"> <li>To study about various terminologies which are used in PLC.</li> <li>Can implements different applications of PLC.</li> <li>To understand about connection of automation with PLC.</li> </ul>	24	10
4.	<b>Robot Technology</b>	4.1. Introduction 4.2. Types of robots 4.3. Robot drives	To understand basics of robot	24	10

		4.4. Toolong or end effectors. 4.5. Robot applications 4.6. Robot joints and degrees of freedom 4.7. Robot Axes and configuration 4.8. Robot sensors 4.9. Parameter in robot selection	<ul style="list-style-type: none"> <li>Can learn about different types of robots.</li> <li>To understand about degree of freedom and different sensors which are used in robot.</li> </ul>		
5.	<b>Supervisory Control and Data Acquisition System (SCADA)</b>	5.1. Defination of SCADA 5.2. Applicable Processes 5.3. Elements of a SCADA system 5.4. A limited two-way system 5.5. SCADA economics 5.5.1. The time value of money by SCADA.	<ul style="list-style-type: none"> <li>Have a general understanding of how SCADA is used</li> <li>Know the elements of a SCADA system.</li> <li>Can understand cost benefits by using SCADA system.</li> </ul>	19	8

**Total Hours 42**

## 6. Suggested Specification Table for Evalaution Scheme

Unit No.	Unit Name	Distribution of Topics According to Bloom's Taxonomy					
		R %	U %	Ap %	C %	E %	An %
1.	Introduction to automation	60	25	15	0	0	0
2.	Hardware components for automation	15	30	30	0	5	20
3.	Introduction to Programmable Logic Controllers (PLCs)	20	30	25	10	10	5
4.	Robot technology	15	25	25	15	5	15
5.	Supervisory Control and Data Acquisition System (SCADA)	15	35	25	15	0	10

**Legends:** R: Remembering U: Understanding  
 App: Applying C: Creating  
 E: Evaluating An: Analyzing

## 7. Reference Books

- 1) Automation, Production Systems, and Computer-Integrated Manufacturing-4thEdition. By- Mikell P. Groover
- 2) Programmable automation technologies- By Daniel E. Kandray.
- 3) CAD/CAM and automation by Farazdak Haideri (4th Edition)
- 4) Industrial automation and robotics by (A.K.Gupta- S.K.Arora-J.R.Westcott)
- 5) Boyar, S. A., Supervisory Control and Data Acquisition, ISA Publication, USA, ISBN: 978-1936007097



## 8. Open Sources (Website, Video, Movie)

- 1) <https://www.youtube.com/watch?v=a4ca04wG-cA>
- 2) <https://www.youtube.com/watch?v=Mwgze2pxkfo>
- 3) <https://www.youtube.com/watch?v=8wuuaiQ0Ohc&list=PLjVLYmrlmjGfeCd-DHo9NhELuBfL73GxF>
- 4) <https://www.youtube.com/watch?v=br-ezdmEq7A>
- 5) <https://www.youtube.com/watch?v=v-3TmN4HhLc&list=PLwdnzlV3ogoW31clPN6Dn6c8Ia-n36vXk>
- 6) <https://nptel.ac.in/courses/108105063>
- 7) <https://nptel.ac.in/courses/112101098>
- 8) <https://nptel.ac.in/courses/108105088>
- 9) <https://nptel.ac.in/courses/112105249>
- 10) [https://www.youtube.com/watch?v=zno8BYcdQzk&list=PLj\\_Alq7xw30mbL8RTojUTYt-nrfrGIDw0](https://www.youtube.com/watch?v=zno8BYcdQzk&list=PLj_Alq7xw30mbL8RTojUTYt-nrfrGIDw0)
- 11) <https://www.youtube.com/watch?v=vcrae3LJEGU>