Detailed Module - Robotics

	Module	Session	Objectives	Methodology	Tools
1	Introduction	Overview of Automation	- To introduce the concept of automation - Differentiate between automation concepts - Industry 4.0, Industry 5.0, IoT, Machine Learning, Robotics - Automation in industry - Where is it? - Automation (Upside and downside) - Laws of robotics - How automation benefits (case study)	Trainer led discussion Case study	Trainer handbook
2	Introduction	Robotics	- To differentiate between Industrial Robots and Cobots - To understand working principal of robots - To understand the future of robotics in industry	Trainer led discussion	Trainer handbook Cobot

3	Introduction	Features and Terminology	- Hardware overview - Control Box - Protective stop - Teach Pendant - Free drive	**Practical** and trainer led discussion	Cobot
4	Introduction	Setting up a tool	- End effector configuration - Center of Gravity - Payload - Tool Center Point - Orientation	Trainer led discussion **Practical**: Each student will setup tool set its TCP, CG and Payload Multiple tool arrangements will enable students to correctly understand and setup the tool	Cobot and end effectors

6	Programming	Creating a program	- Motion types (j, l, p, c) - Waypoints	Trainer led discussion **Practical:** Each group of students will be given a task to program. They will need to use different motion types to generate the program. Objective will be to practice different strokes while using the correct motion type	Cobot
7	Programming	Interaction with external devices	- Operate gripper - Wait command - Change payload - Set command	Trainer led discussion **Practical**: Each group of students will opeate the grippers, and understand how and when to change the payload within the program.	Cobot

9	Programming	Packaging	- Pallet wizard - Pop up - Loop command	Trainer led discussion **Practical**: Each group of students to perform the palletizing operation. Add the loop command to run the program for N loops Enable a popup to inspect an element during the process	Cobot
10	Programming	Sensor Integration and Operation	- Connecting sensor - Integrating it within a program	Trainer led discussion Practical: Each group of students to connect the sensor and develop a program involving sensing workpiece, and program the cobot to do a certain task when the workpiece is sensed/not sensed	Cobot

11	Programming	Stacking	- Understand basic stacking program - Single point stacking - Stacking with pallet	Trainer led discussion **Practical**: Each group of students to perform the stacking operation. Combine it with pallet command and sensor.	Cobot
12	Programming	De-stacking	- Understand basic de-stacking program - Single point de-stacking - Stacking and de-stacking combined	Trainer led discussion **Practical**: Each group of students to perform de-stacking operation. Stacking and de-stacking along with sensor operation to be combined to generate a complete industrial application	Cobot

13	Programming	Machine Tending	- Create a program for machine tending	Trainer led discussion **Practical**: Each group of students will perform the machine tending practical.	Cobot
14	Programming	Case study	- Learning through case study - Calculate ROI of project - Learn management's point of view	Trainer led discussion	Trainer handbook
15	Programming	Final Practical and Viva	- Students will be divided into groups and made to do a final practical	Trainer led discussion	External viva and practical
16	Certification	Conclusion	- Certification - Future prospects of robotics	Training Head (Sam), Trainer (Sam)	