Greetings from CMTI

We are pleased to inform you that we are conducting a 02 day Non-Residential Training programme on **"Collaborative Robots", course code 0780**

Target Participants:
Engineers / Managers from NVH Group, Product Development group, Maintenance & Quality Departments

Tentative Programme Schedule (Refer Page 2)
It is 02 day Non Residential Training Programme scheduled during **09th – 10th September 2024.** The Programme will be held at Central Manufacturing Technology Institute, Bangalore

Participation Fees
Rs. 7,800/- plus GST @ 18%*, per participant. This includes Course Kit, working veg lunch, midsession tea.**
Course Fee can be paid through **NEFT / RTGS / Demand Draft.** Demand Draft to be drawn in favor of "Central Manufacturing Technology Institute", payable at Bangalore and should reach CMTI one week before the actual date of commencement of the course.

Beneficiary for RTGS/NEFT
  a) **Name** : **Central Manufacturing Technology Institute**
  b) **GST No: 29AAATC2085K1ZJ**
  c) **Account No :10521862015**
  d) **Bank Name & Branch: State Bank of India, Yeshwanthpur Branch**
  e) **IFSC Code :SBIN0003297**
  f) **MICR Code : 560002055**

Additional Information:
1. A 10% rebate on course fee will be given to organizations nominating 3 or more participants for each programme, only if payment is made in advance, ten days before the commencement of the course.
2. Individuals/ Companies interested in participation are requested to fill in the enclosed Enrollment Form and submit at the earliest.
3. Participants are advised to proceed for the programme only after the nominations / Programme confirmed by us (by Fax / Letter / Phone / E-Mail).
4. Participants should report at CMTI on the day of commencement of the course. Participants are advised to reach Bangalore the previous day evening/ night.
5. Course will be conducted from 09:00 to17:00 hrs. Participants may plan their return journey accordingly.
6. Participants will be given Certificate after the completion of the Training Programme
7. Enclosed are the tentative programme contents for ready reference
8. GST No. to be shared while sending your nomination / Registration (If a company is exempted from GST they have to provide GST Exemption certificate).
9. Please note that Course fee once paid will not be refunded. However, change in nomination will be permitted.

Note: * Taxes and other levies will be charged as per the prevailing rates at the time of Billing**

For further enquiries / registration / nominations, please contact:
Mrs. Asha R Upadhyaya, Centre Head – AEAMT,
09449842686 / 78 Fax: (080) 2337 0428
E-mail– training@cmti.res.in, vinay@cmti.res.in

CENTRAL MANUFACTURING TECHNOLOGY INSTITUTE
Tumkur Road, Bangalore 560 022

Training Programme
On
"Collaborative Robots"
Tentative Programme Schedule

Day	Particulars
Day 1	**Fundamentals and Basics**
	Introduction to Collaborative Robots
	❖ Definition and benefits of collaborative robots
	❖ Collaborative robots vs. industrial robots.
	❖ Safety considerations and standards
	Overview of Hardware
	❖ Understanding Universal Robots (UR) and Doosan robots
	❖ Types and applications of pneumatic grippers
	❖ End effectors and camera systems for vision programming
	Robot Components and Programming Environment
	❖ Robot anatomy and components
	❖ Getting familiar with UR's Polyscope software and Doosan's programming interface
	❖ Creating and modifying programs.
	❖ Basic programming concepts (movement, actions, loops, conditionals)
	Gripper Setup and Control
	❖ Mounting and configuring pneumatic grippers
	❖ Writing code to control gripper actions
	❖ Coordinating gripper actions with robot movements
	Stacking and Pick & Place Applications
	❖ Introduction to stacking and pick & place tasks
	❖ Programming the robot for stacking and de-stacking boxes.
	❖ Hands-on practice: Stacking, Destacking, and pick & place programming
Day 2	**Advanced Topics and Practical Applications**
	Vision Programming (Python)
	❖ Introduction to vision systems and their applications
	❖ Setting up the camera system on the end effector
	❖ Image processing and object recognition using the camera
	Task Automation and Coordination
	❖ Collaborative programming: handling objects with human intervention
	❖ Coordinating multiple robots for synchronized tasks
	❖ Communication between robots and the PLC for seamless automation
	Safety Features and Considerations
	❖ Implementing safety features (force/torque sensing, emergency stops)
	❖ Understanding risk assessments and safety zones
	❖ Programming safe and collaborative workspaces
	Troubleshooting and Maintenance
	❖ Identifying common issues and error messages
	❖ Performing essential maintenance and calibration
	❖ Best practices for robot troubleshooting

PREREQUISITES:

❖ **Vision-Based Applications:**
While not mandatory, having a basic programming background in Python is recommended, especially for participants interested in delving into vision-based applications using the camera system.

❖ **Familiarity with Industrial Components:**
Prior knowledge of industrial hardware components, such as PLCs, grippers, and cameras, will provide an advantageous context for the training material.

❖ **Programming Logic:**
Familiarity with basic programming logic, including concepts like loops and conditionals, will enhance your ability to engage with the programming exercises effectively.

❖ **Engineering or Mechatronics Background:**
While not a prerequisite, participants with a background in engineering, mechatronics, or related fields will find the content more aligned with their expertise.

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