



# Department of Computer Science & Engineering &



## Malnad Enclave for Research, Innovation, Incubation, Startups & Entrepreneurship (ME-RIISE)

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# Micro Engineering Certification Program

## ADVANCEMENTS IN ROBOTICS, PLC & AUTOMATION

### Course Summary

Course Duration

~ 10 weeks (approximately 3-4hrs/week)

Resource Person

**Dr. K. R. Prakash**, Professor, Department of Mechanical Engineering, National Institute of Engineering, Mysuru.

**Mr. Adishesha Naik**, DGM (ETL), RINL, VIZAG STEEL

**Mrs. Ramya M. V.**, Assistant Professor, Department of Electronics and Communication Engineering, JSS Science & Technology University.

Purpose of the course

This course will provide a comprehensive educational environment and enable students to gain expertise in next generation robotics and automation systems.

By the end of the course, students will be able to understand the entire ecosystem of Robotics & Automation very well. They also be able to design solutions and solve problems of any complexity.

Pre-requisites

There are no pre-requisites to this course.

Note:

1. This course is completely done using online collaboration methods. A part of this can be done in classroom
2. This course can be further customized based on the requirements of NTT Data.
3. Idle participants strengths for this course is 20-50 students.

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Hassan – 573 202

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Week	Topic	Session head
1.	<b>Basics of MP / MC</b> <ul style="list-style-type: none"><li>• Evolutions of PLC</li><li>• Architecture of PLC</li><li>• Classification of PLC – Hardware and Software based</li></ul>	Mr. Adishesha Naik & Mrs. Ramya M V
2.	<ul style="list-style-type: none"><li>• PLC Hardware concept – Power supply, CPU, Memory, Communication, IOs etc...</li><li>• I/O System – Wiring, Concept of Local, Remote</li><li>• Addressing system (Hardware, software)</li><li>• Software / Programming details</li></ul>	Mr. Adishesha Naik & Mrs. Ramya M V
3.	<ul style="list-style-type: none"><li>• Communication system</li><li>• PLC Design basis -</li><li>• Power supply - Earthing system</li><li>• Levels of Automation</li><li>• HMI concepts</li><li>• Troubleshooting</li></ul>	Mr. Adishesha Naik
4.	Characteristics of sensors and its operation using open source controllers and PLC knowledge on various sensors and its integration to robotics -Inductive, capacitive, magnetic, photo sensors ultrasonic and microwave sensors.	Dr. K R Prakash
5.	PLC knowledge on various sensors and its integration to robotics - Limit switches, temperature Sensor, DHT Temperature and Humidity Sensor. Hall Effect Sensor, encoders Hydraulic and Pneumatic basics,	Dr. K R Prakash
6.	Circuit design concepts and actuation of actuators by using electrical and by using PLC. Methods of PLC Programming, Programming of simple problems using PLC	Dr. K R Prakash & Mrs. Ramya M V
7.	Timers, Counters applications, Arduino Mechatronics, range of Arduino products, coding of Arduino family of products for conducting few experiments, basics of robotics, building mobile robots	Dr. K R Prakash & Mrs. Ramya M V

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8.	Motors fundamentals (DC, AC Slip ring, AC Squirrel cage) <ul style="list-style-type: none"><li>• Speed and Torque characteristics</li><li>• Power industrial Electronics devices</li><li>• Control philosophy for – DC Drives, Phase control for AC SR motors, Vector control for AC SC motors</li></ul>	Mr. Adishesha Naik
9.	<ul style="list-style-type: none"><li>• Parts of Drive control system – speed and torque</li><li>• Power supply system</li><li>• Protection system</li><li>• Communication system</li><li>• Positions control system</li></ul>	Mr. Adishesha Naik
10.	<ul style="list-style-type: none"><li>• Interfacing system with automation</li><li>• Servo drives and applications</li><li>• Parameterization</li><li>• Earthing system</li><li>• Troubleshooting</li></ul>	Mr. Adishesha Naik