



Program on

## MANUFACTURING AUTOMATION-ROBOTICS AND PROCESS INTEGRATION

Dec 17-22, 2018

by

International Faculty

**Dr. Subramaniam Balakrishnan**

**Professor**

**Department of Mechanical Engineering**

**University of Manitoba, Winnipeg, Manitoba, Canada**

### Course Coordinators

**Dr. Joseph Anand Vaz**

Professor, Department of Mechanical Engineering

&

**Dr Vishal Santosh Sharma**

Professor, Dept of Industrial and Production Engineering



Organized by

**DEPARTMENT OF INDUSTRIAL AND PRODUCTION ENGINEERING**

&

**DEPARTMENT OF MECHANICAL ENGINEERING**

**Dr B R Ambedkar National Institute of Technology Jalandhar- 144011**

**Punjab, INDIA**

Institute Website: [www.nitj.ac.in](http://www.nitj.ac.in)

### OVERVIEW OF THE PROGRAM

Automated manufacturing has found widespread application in modern industries. Although it has the potential to replace all the humans in the loop, for many socio-economic reasons, it will not be advisable. This course will provide an insight into application of robotics in manufacturing and a few specialized applications. Integrating robotics as a manufacturing automation solution can help in achieving maximum flexibility in the manufacturing processes. Robots can be developed, installed, and applied to many facets of the manufacturing process including precision part handling, assembly, coating, dispensing, material cutting (laser, plasma, and waterjet), material handling (diecast, machine loading, packaging, palletizing, part transfer, and press tending), and material removal (deburring, polishing, and sanding). If there is an area that needs to be automated robots can probably do it. These facts throw light on the importance of this course to industry as well as the entire mankind.

### COURSE CONTENTS

- Principles of robotics.
- Discussing the classifications of robotics.
- The Kinematics and dynamics modelling of different robots.
- Use of logic based control for process integration/control.
- Manufacturing application of robotics.
- Modelling issues.
- Several case studies.

### ORGANIZATION

- *Lectures for introduction of Robotic concepts, demonstrations of case study applications, and overview of research topics and directions*
- *Tutorials & Case studies and Laboratory Demonstrations*
- *Evaluations through an examination and a course project presentation*

## TEACHING FACULTY:



### **SUBRAMANIAM (BALA) BALAKRISHNAN**

Professor,  
Department of Mechanical Engineering  
University of Manitoba, Winnipeg, Manitoba, Canada,  
M.Tech. (IIT, Madras), Ph.D. (M.E.) (Manitoba)  
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**Dr Subramaniam Balakrishnan** is a Professor in the Department of Mechanical engineering in the University of Manitoba, Canada. He received his Masters degree from IIT, Madras and his PhD from the University of Manitoba, Canada. His keen areas of interest lie in the field of Computer Assisted Industrial Engineering, Computer Integrated Manufacturing and Robotics.

## COURSE COORDINATORS:

### **Dr. Joseph Anand Vaz**

Professor, Department of Mechanical Engineering  
Dr. B. R. Ambedkar National Institute of Technology  
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Punjab 144 011, India  
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### **Dr. Vishal Santosh Sharma**

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Email: [sharmavs@nitj.ac.in](mailto:sharmavs@nitj.ac.in)

## WHO CAN ATTEND

- Executives, engineers and researchers from industry, services, government organizations, research organizations
- Students (BTech/MTech /MSc/PhD) and Faculty of any branch from academic institutions

## REGISTRATION FEES

**Participants from abroad:** US \$500

**Industry/ Research Organizations:** Rs. 10,000/-

**Academic Institutions:** Rs. 2,000/-

**Students:** Rs. 1,000

## DIRECTOR OF THE INSTITUTE

**Prof Lalit Kumar Awasthi**

## HEAD OF DEPARTMENTS

**DR AJAY GUPTA**

**Department of Industrial and Production Engineering**

**DR RAJEEV KUKREJA**

**Department of Mechanical Engineering**

## LOCAL GIAN Coordinator

**DR S. BAJPAI**

**Department of Chemical Engineering**

Dr B R Ambedkar National Institute of Technology Jalandhar 144011, India

Email: bajpais@nitj.ac.in

## ABOUT NIT, JALANDHAR

Dr B R Ambedkar National Institute of Technology was established in the year 1987 as Regional Engineering College and was given the status of National Institute of Technology (Deemed University) by the Government of India on October 17, 2002 under the aegis of Ministry of Human Resource Development, New Delhi. The Government of India has declared the Institute as an "Institute of

National Importance” under an act of Parliament in 2007. A large number of reputed industrial houses in the country visit the Institute and select the final year students as Engineers/ Management Trainees. As one of the National Institutes of Technology (NIT), the Institute has the responsibility of providing high quality education in Engineering, Technology and Sciences to produce competent technical and scientific manpower for the country. The Institute offers B Tech, M Tech, M Sc, MBA and PhD programmes in several disciplines of Engineering, Technology and Sciences.

**How to reach us:** The Institute is located on the G.T. Road Amritsar bye-pass at a distance of 15 km from the Jalandhar Bus Stand, 12 km from Jalandhar City Railway Station, and 18 km from Jalandhar Cantt Railway Station.

This GIAN course is a collaborative effort by the Departments of Industrial and Production Engineering & Department of Computer Science and Engineering.

#### **ABOUT DEPARTMENT OF INDUSTRIAL & PRODUCTION ENGINEERING**

The Department of Industrial & Production Engineering, Dr. B R Ambedkar NIT Jalandhar has been offering B. Tech in Industrial Engineering since 1989, B. Tech in Industrial and Production Engineering with effect from the batch admitted in 2008, Post- graduate Programme in Industrial Engineering and Manufacturing Technology from year 2001 and 2006 respectively, and Ph. D programme. The research areas of the IPE department are Supply Chain Management, Reliability and Maintenance, Ergonomics, Simulation and Modelling, Quality Management, Energy Management, Renewable Energy, Fracture Mechanics, Non-Traditional Machining, Tools and Metal Cutting, CAD/CAM, Industrial Automation & Robotics.

#### **ABOUT THE DEPARTMENT OF MECHANICAL ENGINEERING**

The Department of Mechanical engineering offers B. Tech, M. Tech and PhD programmes. The B. Tech programme is accredited by the NBA. The Department has experienced and enthusiastic faculty members. The department has good facilities for CAD, Simulation, material testing (DMA, UTM, etc.). The Department pursues

research in the areas of Mechatronics, Robotics, System Dynamics & Control, Modeling and Simulation of Physical Systems, Biomechanics, Alternate Fuel for IC Engines, Synthesis and Application of Carbon Nanotubes, Renewable Energy, Welding Technology, Simulation and Modeling, Industrial & Production Engineering, Heat Transfer, Fluid Dynamics, Combustion, Computational Fluid Dynamics, Friction Stir Welding, Vibration, Heat Exchangers, Alternative Refrigerants, Flow Condensation & boiling, Thermal System Simulation, Emission Control, Fuel Efficient Engines.

#### **HOW TO REGISTER**

Stage – 1: One time Web (Portal) Registration: Visit GIAN Website at the link: <http://www.gian.iitkgp.ac.in/GREGN/index> and create login User ID and Password. Fill up the blank registration form and do web registration by paying Rs. 500/- online through Net Banking/Debit/Credit card. This provides him/her with life time registration to enroll in any number of the GIAN courses offered.

Stage – 2: Course Registration (Through GIAN Portal): Log in to the GIAN portal with the user ID and Password created. Click on “Course Registration” option given at the top of the registration form. Select the Course titled “ MANUFACTURING AUTOMATION-ROBOTICS AND PROCESS INTEGRATION ” from the list and click on “Save” option. Confirm your registration by Clicking on “Confirm Course”.

Dr B R Ambedkar National Institute of Technology Jalandhar 144011, Punjab

**REGISTRATION FORM  
COURSE ON  
MANUFACTURING AUTOMATION-ROBOTICS AND PROCESS INTEGRATION  
Dec 17-22, 2018**

Name: Mr./Ms/Dr. \_\_\_\_\_  
(In capital letters)

Designation/Department/Organization: \_\_\_\_\_

Address for Correspondence: \_\_\_\_\_

E-mail ID: \_\_\_\_\_

Field of Specialization: \_\_\_\_\_

Experience : \_\_\_\_\_ (in years)

Signature \_\_\_\_\_ Date \_\_\_\_\_

**RECOMMENDATION OF THE SPONSORING AUTHORITY:**

The applicant is hereby sponsored and will be permitted to attend the GIAN Program, if selected.

Date: \_\_\_\_\_ Signature and Seal of Sponsoring Authority

Application Form along with requisite fees should be sent to the course

[coordinators :sharmavs@nitj.ac.in,+91-9463010259](mailto:coordinators@nitj.ac.in)

For more information on other GIAN courses, contact Dr S. Bajpai, Local GIAN Coordinator,

email: [bajpais@nitj.ac.in](mailto:bajpais@nitj.ac.in).