



Program on

ARTIFICIAL INTELLIGENCE TECHNIQUES AND THEIR APPLICATIONS IN DESIGN AND MANUFACTURING

Nov 11-16, 2018

by

International Faculty

Dr Deyi Xue

Professor

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University of Calgary, Alberta, Canada

Course Coordinators

Dr Vishal Santosh Sharma

Associate Professor, Dept of Industrial and Production Engineering

&

Dr Harsh K Verma

Associate Professor, Dept of Computer Science and Engineering



Organized by

DEPARTMENT OF INDUSTRIAL AND PRODUCTION ENGINEERING

&

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

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

Institute Website: www.nitj.ac.in

OVERVIEW OF THE PROGRAM

With the advances of computer technologies, many design and manufacturing activities have been automated by computer systems to improve design performance, reduce production cost and shorten product development lead-time. Among various advanced computing methodologies and tools, artificial intelligence techniques have been widely used for supporting various activities in different product development life-cycle phases. Many knowledge-intensive products and systems have also been developed to better satisfy customer requirements. Typical applications of artificial intelligence techniques in product development process include:

- Decision making for identification of product specifications based on customer requirements
- Creation of design solutions based on design knowledge
- Planning, scheduling and control of production processes based on manufacturing knowledge
- Planning of service activities based on knowledge of product utilization

Among various artificial intelligence techniques, heuristic search, fuzzy mathematics, neural networks and evolutionary computing are the mostly used methods in design and manufacturing.

- Heuristic search is effective for solving discrete decision-making problems that can be modeled by data structures.
- Fuzzy mathematics is effective for solving problems involving subjective uncertainties.
- Neural network is effective for learning of knowledge with massive available data.
- Evolutionary computing is effective to identify the global optimal solution for design of complex products and systems.

COURSE CONTENTS

- Introduction of some key artificial intelligence concepts
- Practice of some key artificial intelligence tools in MATLAB
- Demonstrations of case studies on applications of artificial intelligence techniques in design and manufacturing
- Engineering problem solving through implementation of a course project
- Overview of research topics and directions on artificial intelligence techniques in design and manufacturing

ORGANIZATION

- Lectures for introduction of artificial intelligence concepts, demonstrations of case study applications, and overview of research topics and directions
- Tutorials for practice of MATLAB functions and implementation of course projects
- Evaluations through an examination and a course project presentation

TEACHING FACULTY:



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Deyi Xue is currently a Professor at the Department of Mechanical and Manufacturing Engineering, University of Calgary, Canada. Deyi Xue received his Ph.D. and M.Sc. degrees from Department of Precision Machinery Engineering, University of Tokyo in 1992 and 1989 respectively, and his B.Sc. degree from Department of Precision Instrumentation Engineering, Tianjin University in 1985. He worked as an Assistant Professor at University of Calgary in 1995-2000, and an Associate Professor in 2000-2007. He is also a Professional Engineer of Association of Professional Engineers and Geophysicists of Alberta (APEGA).

Deyi Xue's research is primarily in the areas of computer based design and manufacturing including (1) integrated product life-cycle modeling and optimal concurrent design, (2) design and manufacturing for mass customization, (3) design theory and methodology, (4) production planning, scheduling, and control, (5) engineering optimization, (6) machining and inspection of freeform surfaces, and (7) design and manufacturing of fuel cell systems. His research has been supported by many granting agencies including Natural Science and Engineering Research Council (NSERC) of Canada through its Discovery Grant program, Strategic Project program and Strategic Network Grant program, other federal and provincial government agencies, and industries. He has published over 200 research papers, including over 70 papers in refereed SCI journals.

He is an editorial board member of two international journals: *Advanced Engineering Informatics* and *Chinese Journal of Mechanical Engineering (English Edition)*. He serves as a reviewer for over 20 international journals. He has also worked as chair and member of program/organizing committees for over 50 international conferences.

COURSE COORDINATORS:

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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

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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 DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

The Department of Computer Science and Engineering was started in 1990 with an intake of 40 students in undergraduate programme, which was revised later on to 93. Currently, the Department offers B.Tech in Computer Science and Engineering, two full-time M.Tech programmes in Computer Science & Engineering and Information Security. The Department also offers the research programmes in the area of Computer Networks, Image Processing, DBMS, Software Engineering, Data Mining, Cloud Computing, Machine Learning, Internet of Things, Data Analytics, Wireless Networks and Information Security. The Department has well established state of the art laboratories with sophisticated equipment for undergraduate, post graduate and Ph.D students.

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 “ ARTIFICIAL INTELLIGENCE TECHNIQUES AND THEIR APPLICATIONS IN DESIGN AND MANUFACTURING ” 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 ARTIFICIAL INTELLIGENCE TECHNIQUES AND THEIR APPLICATIONS IN DESIGN AND MANUFACTURING Nov 11-16, 2018

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

Designation/Department/Organization: _____

Address for Correspondence: _____

E-mail ID: _____

Field of Specialization: _____

Experience : _____ (in years)

Details of fees _____ Cash/DD/NEFT _____

Signature _____ Date _____

Bank Details: Account Name: GIAN programme on artificial intelligenc

Account number: 2945101003489

Canara Bank IFSC CODE : CNRB0002945 MICR CODE: 144015011

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](mailto:coordinators_sharmavs@nitj.ac.in)

For more information on other GIAN courses, contact Dr S. Bajpai, Local GIAN Coordinator, email: bajpais@nitj.ac.in.