

ABOUT THE GIAN COURSES

The Ministry of Human Resource Development (MHRD), Government of India has launched an innovative program titled "Global Initiative of Academic Networks (GIAN)" in higher education, in order to garner the best international expertise into our system. As a part of this, internationally renowned academicians and scientists are invited to augment the country's academic resources, accelerate the pace of quality reforms and elevate India's scientific and technological capacity to global excellence. More details on GIAN courses can be seen at <http://www.gian.iitkgp.ac.in/>.

OVERVIEW OF THE PROGRAM

In today's highly competitive business environment, companies must be innovative, pro-reactive and close to the market. To reduce the designing time of innovative products or the time for improving existing products, companies want to capitalise their know-how by means of model libraries and implement new organisations. The teams in charge of new projects are multidisciplinary (composed of engineers from mechanical, hydraulic, thermal, electrical, electronic, automation domains, ..). They work in R&D using an "integrated design approach" including all the different aspects of the project, such as modelling, simulation, actuator sizing, control, safety and prototyping.

The crucial point is the choice of a modelling tool satisfying the following requirements:

- * It must make easy the communication and data and model exchanges between specialists from different physical domains,
 - * It must be usable at all the stages of the designing procedure, and take into account the energetic aspects
 - * It must provide the user with a dynamical model with enough physical insight for it to be used as a virtual test bench for testing control laws and failure scenarios.
- Many companies in the world have chosen the bond graph methodology for its capabilities to meet the above criteria. As examples, we can cite:
- * All the car companies (PSA, Renault, Ford, Toyota, ...) and their suppliers (Valvo, Siemens, Bosch, ...)
 - * Aeronautic and aerospace companies viz. Airbus or Boeing
 - * Electricity providers ...

OBJECTIVES

- * Exposing the participants to the problem of designing complex physical systems involving several energy domains
- * Presenting the fundamentals of dynamical modelling (domain of validity of a model, causality) and of simulation (solvers, objectives, result analysis, ..)
- * Proposing by means of the notions of analogy between physical domains, a generic dynamical modelling approach based on energy concepts.
- * Providing exposure to practical problems through case studies

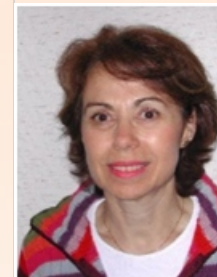
COURSE ORGANISATION:

- * Presentation of the methodology and implementation on examples
- * Application of 20 sim software
- * Case study: Modelling and simulation of a Toyota PRIUS hybrid vehicle

COURSE CONTENTS

- * Problem statement: Why a model?
- * Introduction: Examples on industrial applications
- * Bond graph methodology – Electrical and hydraulic systems
- * Mechanical systems – Thermal systems
- * Causality
- * Analysis of the model properties
- * Mathematical models deduced from the bond graph
- * Solving two industrial problems
- * Introduction to the modeling software
- * Modeling of a mechatronic system
- * Modeling and study of a thermofluid system
- * Global model of the Toyota PRIUS III powertrain
- * Test of different architectures and strategies for the hybrid vehicle.

TEACHING FACULTY



Dr. Geneviève Dauphin-Tanguy

Professor Geneviève Dauphin-Tanguy, graduated from University of Lille, France (MSc Physics, MSc Mathematics, MSc Mechanics) and from the French Grande Ecole d'Ingénieurs, Ecole Centrale de Lille (State Engineering Diploma), received the Ph.D. in 1981 and the Doctorate of Sciences in 1983 both from University of Lille.

She is presently Professor of Control Design at Ecole Centrale de Lille. She was the Head of research laboratory LAIL (Laboratoire d'Automatique Informatique de Lille) sponsored by the CNRS, French National Center For Scientific Research from 1995 to 1998. From its creation (1983) until 2010, she was Head of the Research group "Bond Graphs" in the Laboratoire d'Automatique Génie Informatique et Signal. She is expert

for the French Ministry of Education and Research. She is mainly engaged in the research fields of Modelling, Analysis, Control and Monitoring of systems by using the bond graph tool. Her application domains are mechatronics in car and aeronautic industry, renewable electrical energy power plants and thermo fluid processes.

She has many international university collaborations (research projects, co-supervised PhD, co-authored publications, several month visiting professor positions) with Venezuela, Argentina, Brazil, Mexico, India, Tunisia, UK, Germany, USA, Romania.

She has been invited by the Indian DRDO to deliver keynote lectures in a seminar on "Bond graph Methodology" in Pune by R&DE (Engrs) Golden Jubilee Celebrations in January 2012.

She has been involved in several industrial collaborations (research contracts, PhD fundings) mainly in the domains of Aeronautics, aerospace (Airbus group, Safran), car industry (PSA Peugeot Citroën), Energy (Electricity of France EDF) She is the co-author of 9 books, the co-editor of 3; she has contributed to "Systems and Control Encyclopedia", and presented more than 300 articles and communications in international journals and conferences.

She has been the supervisor of more than 60 PhD thesis, and presently supervises 3 PhD thesis.

She has also been a Session organizer and member of the International Program Committee in many IEEE, IMACS and SCS Conferences. She was the Program Chair of the International Conference on Bond-Graph Modelling ICBGM'97, part of the Western SCS Multiconference (January 1997, Tucson, Arizona, USA) and the General Chair of ICBGM'2001 (January 2001, Phoenix, Arizona, USA). She was the Chair of the symposium Modelling, Analysis and Control, part of the IMACS/IEEE CESA Multiconference on "Computational Engineering in Systems Applications" held in Lille (France) in July 2003 and the co-Chair of IMAACA-SCS conferences in Genoa (Italy) in October 2004, Marseille (France) in October 2005, Buenos Aires (Brazil) in February 2007, Fes (Morocco) in October 2010, Rome (Italy) in September 2011, Vienna (Austria) in September 2012, Athens (Greece) in September 2013, Genoa (Italy) in September 2015.

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.

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 "DYNAMIC MODELLING AND SIMULATION OF MULTI-PHYSICS SYSTEMS USING BOND GRAPH" from the list and click on "Save" option. Confirm your registration by Clicking on "Confirm Course".

REGISTRATION FEES

Participants from abroad: US \$500

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

Academic Institutions: Rs. 8,000/-

Students: Rs. 2,000/- (Rs. 1000/- for SC/ST)

The above fee includes instructional materials, internet facility and refreshments. Boarding and lodging will be provided on payment basis subject to availability.



Professor Joseph Anand Vaz

Dr Anand Vaz received the B.E. (Mech) degree from the College of Engineering Poona, University of Poona, in 1985, M.Tech and Ph.D from the Department of Mechanical Engineering, Indian Institute of Technology, Kharagpur, in 1988 and 1996 respectively. He is a Professor in the Department of Mechanical Engineering at the Dr B R Ambedkar National Institute of Technology, Jalandhar since October 2007. He was also the Head of the department from 2009-2012, and is the Dean (Academic) at present. He was a Professor at the Sant Longowal Institute of Engineering and Technology (SLIET), India, since 1999 and was an Assistant Professor at the same institution from 1993 to 1999. At SLIET, he had also handled responsibilities as Dean (Academics), Dean (Planning &

Research) and Head of the Mechanical Engineering Department and Workshop. He has also served with the Machine Tools division of M/s. Voltas Ltd., India, 1985-86, and with M/s. Sriram Diesels, Balanagar, Hyderabad, India, 1988. He has been an invited Professor to Ecole Centrale de Lille, France, in 2015, 2014, 2012, 2010, 2007, 2002 and 2000. He was awarded a JSPS Postdoctoral Fellowship for Foreign Researchers in Japan by the Japan Society for the Promotion of Science (JSPS), and pursued research at the Department of Robotics, Ritsumeikan University, Japan, 2002-2004. He has been to the United States, France, Japan, Spain, UK, Israel, Italy and Malaysia for dissemination of research work. He has completed three sponsored research projects and is currently supervising 5 PhD scholars. He has been a reviewer for the ASME Journal of Dynamic Systems, Measurement and Control, IEEE transactions on Robotics, Journal of the Franklin Institute, Mechanism and Machine Theory, IASTED International Journal of Modeling, Simulation and Control. He is a member of the ASME, IEEE, Life member of ISTE and The Association for Machines and Mechanisms (AMM). He had founded the ASME student section at NIT Jalandhar in 2011 and continues to guide and encourage students as its Faculty Advisor. He was chairman of NCDDM 2007 at SLIET Longowal, has delivered several keynote lectures, and has chaired several conference sessions both in India and abroad. He has coordinated and organized several MHRD/AICTE sponsored faculty development programmes on Mechatronics, Modeling and Simulation, etc. His research interests are in System Dynamics and Control – especially using Bond Graph, Mechatronics, Robotics and Automation, Mechanisms and Machines, Simulation, understanding musculoskeletal actuation and systematic development of prosthetic devices for rehabilitation of hand impairment. He is also very passionate about teaching and has designed many innovative lecture presentations together with MATLAB based simulations.



Dr. Vishal S. Sharma

Dr. Vishal S. Sharma graduated from Shivaji University Kolhapur in Production Engineering with distinction in the year 1992. He obtained Master of Engineering (Mechanical Engineering) from Punjab University, Chandigarh, India in the year 1998. Later he received his Doctorate in the field of Mechanical Engineering from Kurukshetra University in the year 2005. He was a post-doctoral fellow at ENSAM, France during the period 2009-2010 (one year). At present he is working as Associate Professor in the Department of Industrial & Production Engineering at Dr B R Ambedkar National Institute of Technology, Jalandhar, Punjab, India. He has three years of industrial, 20 years of teaching and 10 years of research experience. His teaching and research interests are metal cutting, industrial automation, condition

monitoring and Robotics. He has contributed more than 30 International journal publications in the area of optimization of production systems and automation.

PAYMENT OF FEES

DD in favour of "GIAN: DYNAMIC MODELLING AND SIMULATION OF MULTI-PHYSICS"
payable at Jalandhar or

Bank Transfer - Account Name & Number:

"GIAN: DYNAMIC MODELLING AND SIMULATION OF MULTI-PHYSICS" 65264553462

State Bank of Patiala, REC Jalandhar (Branch Code: 50841)

IFSC Code: STBP0000841 SWIFT Code: STBPINBB021 MICR Code: 144007015

Bank Telephone: 0181-2690695

Application Form along with requisite fees should be sent to the coordinators by e-mail before 14th Nov. 2016. Selection will be made purely on eligibility and on first come first serve basis. No. of seats: 30



Ministry of Human Resource Development
Government of India



Global Initiative of
Academic Networks
(GIAN)

GIAN

COURSE ON DYNAMIC MODELLING AND SIMULATION OF MULTI-PHYSICS SYSTEMS USING BOND GRAPH

28th November- 7th December, 2016

INTERNATIONAL FACULTY

Dr. Geneviève Dauphin-Tanguy

Professeur

Cité Scientifique Villeneuve d'Ascq Cedex, France

COURSE COORDINATORS

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Dr. B. R. Ambedkar National Institute of Technology

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Tel: +91-181-2690301 ext. 2801; Fax: +91-181-2690320 email: sharmavs@nitj.ac.in

Organized by

Department of Mechanical Engineering

and

Department of Industrial and Production Engineering

Dr B R Ambedkar National Institute of Technology

Jalandhar-144011, Punjab, INDIA

Institute Website: www.nitj.ac.in



REGISTRATION FORM

Gian

COURSE ON

DYNAMIC MODELLING AND SIMULATION OF MULTI-PHYSICS SYSTEMS USING BOND GRAPH

28th November - 7th December, 2016

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

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 payment _____ Cash / DD / NEFT

DD in favour of "GIAN: DYNAMIC MODELLING AND SIMULATION OF MULTI-PHYSICS"

payable at Jalandhar

or

Bank Transfer - Account Name & Number:

"GIAN: DYNAMIC MODELLING AND SIMULATION OF MULTI-PHYSICS" 65264553462

State Bank of Patiala, REC Jalandhar (Branch Code: 50841)

IFSC Code: STBP0000841 SWIFT Code: STBPINBB021 MICR Code: 144007015

Bank Telephone: 0181-2690695

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

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 BTech, MTech, MSc, MBA and PhD programmes in several disciplines of Engineering, Technology and Sciences.

Location: The city of Jalandhar is situated between the rivers Sutlej and Beas on National Highway 1. It is one of the important cities of Punjab and is known for rich educational, cultural and literary activities. It is an internationally renowned industrial centre for sports goods, leather goods and hand-tools. The city is 370 kms away from Delhi enroute to Amritsar and is easily accessible from Delhi by train or bus. The Shatabdi Express trains plying from New Delhi in the morning and in the evening hours are among the best modes of travel to Jalandhar. This train takes less than 5 hours to reach Jalandhar City from New Delhi.

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.

Campus: The Institute campus is spread over an area of 154 acres. It has many topographical features, various buildings of different nature with clean and wide roads surrounded by a green belt. The campus area has been broadly divided into different functional zones: (i) institution zone for teaching departments/centers/administration (ii) residential zone for the faculty and staff (iii) students' hostel zone. Other amenities on the campus include a guest house, a community centre, a dispensary, shopping centre, banks, post office, sports complex, playgrounds, new tennis courts, basketball courts, volleyball courts, open air theatre, central seminar hall and night canteen etc.

This GIAN course is a collaborative effort by the Departments of Mechanical Engineering and Industrial and Production Engineering.

ABOUT THE DEPARTMENT OF MECHANICAL ENGINEERING (ME)

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.

ABOUT THE DEPARTMENT OF INDUSTRIAL & PRODUCTION ENGINEERING (IPE)

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.