

## Introduction

Soft and evolutionary computings are two emerging areas of computational intelligence which find extensive applications in all branches of engineering including economics and management. The present short term course aims to introduce this new emerging area starting from fundamentals and will include the relevant theory and practical classes through MATLAB simulation .The course contents will be taught by eminent experts in the field and having adequate teaching and research experience. The typical course content will include adaptive systems, various types of artificial neural networks (ANN), fuzzy logic (FL), neuro fuzzy techniques (NF), and genetic algorithms (GA), bacterial foraging optimization (BFO), particle swarm optimization (PSO) , ant colony algorithm (ACO), artificial immune system (AIS) and gene regulatory networks (GRN). The application areas will include telecommunication, control, instrumentation, finance, robotics and biomedical engineering. Illustrations will cover time series prediction, function approximation, forecasting of financial data, direct and inverse modeling of nonlinear system and noise filtering.

## Course Contents

- Basics of Adaptive Techniques.
- Filtering, Direct and Inverse Modeling and Prediction.
- Adaptive Techniques in DSP
  - Least Mean Square(LMS) Algorithm and its variations
  - Recursive Least Square ( RLS) Algorithm
  - Block Adaptive Filters.
- Neural Networks
  - Multilayer Perceptron (MLP)
  - Radial Basis Function (RBF)
  - Functional Link Artificial Neural Network(FLANN)
  - Fuzzy Logic(FL)

- Evolutionary Computation Tools
  - Genetic Algorithms
  - Particle Swarm Optimization(PSO)
  - Bacteria Foraging Optimization(BFO)
  - Gene Regulatory Network(GRN)
  - Artificial Immune System(AIS)
- Applications
  - Telecommunication(Channel Equalization, Data and image compression and Noise Filtering)
  - Adaptive Control and System Identification
  - Financial and Market Forecasting(Stock Market and Exchange Rates)
  - Intelligent Instrumentation.
  - Optimization of single objective, multiobjective , unimodal and multi modal Problems.
  - Function Approximation and time series forecasting.

## Faculty:

The faculty of Department of Electronics & communication Engineering, NIT Rourkela will form the core group for conducting this course. Eminent Guest faculty will also be invited from leading technical institutes to assist this programme.

## Eligibility:

The programme is open to the all faculties of engineering, MBA and MCA departments of AICTE approved engineering, MCA and MBA Institutes.

## Selection :

The number of teacher participants is limited to 50 The seats will be filled on a first-come first-served basis.

## APPLICATION FORM

MHRD-AICTE Sponsored Staff Development Programme on  
**Soft and Evolutionary Computing: Theory and Applications**  
(15- 28 Sept. , 2008)

1. Name \_\_\_\_\_
2. E-mail \_\_\_\_\_
3. Contact No \_\_\_\_\_
4. Designation \_\_\_\_\_
5. Institution \_\_\_\_\_
6. Department \_\_\_\_\_
7. Whether the Institution has AICTE Recognition YES / NO
8. Address for Correspondence \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
9. Experience (in years) \_\_\_\_\_
10. Accommodation required YES / NO

*Signature of the applicant*

## SPONSORSHIP CERTIFICATE

Dr/Mr/Ms \_\_\_\_\_ is an employee of our Institute/Organization and is hereby sponsored to participate in the Refresher course on “**Soft and Evolutionary Computing: Theory and its Application**” 15th September to 28th September 2008 at Department of Electronics and Communication Engineering, National Institute of Technology, Rourkela.

Date

Signature of Head of Institution  
(with seal)

### Registration

This program is funded by MHRD-AICTE, Govt. of India. There is **no Registration fee**. Registration form in the prescribed format should reach the Coordinator on or before 08-09-2008. The registered participants list will be notified in the institute web site [www.nitrkl.ac.in](http://www.nitrkl.ac.in) on or before 10-09-2008. Also an e-mail communication along with the schedule will be sent to the participants.

### Important Dates:

Last date of submission: **08-09-2008**

Intimation of acceptance: **10-09-2008**

### TA & Accommodation

TA to the extent of Third AC by shortest route will be reimbursed to the Participants upon the submission of tickets. The registered participants will be provided free boarding and lodging in the institute.

### Address for correspondence

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### About the Department

The Electronics and Communication Engg. Dept. offers two B. Tech. programs on (i) Electronics and Communication Engg. (ii) Electronics & Instrumentation Engg. In addition to two M. Tech. Programs on (i) Telamatics and Signal Processing (ii) VLSI Design and Embedded System. The Dept. also offers M. Tech(R) and Ph. D. programs in various specializations such as DSP, communication, VLSI Design, Soft Computing and Instrumentation Engg. The Dept. has earned name in imparting effective education, research, technology development and training in these areas. The Dept. also collaborates with Industry, Academic and Professional bodies and actively engaged in a number of technology development sponsored projects. The dept. is accredited by NBA for five years. The department is having distinguished faculties in the area of the proposed short term programme.

### About the Institute

The National Institute Of Technology, Rourkela was founded as Regional Engineering College on 15<sup>th</sup> August 1961. It is one of the premier national level technical institution in the country with reputation for excellence at Under graduate, post graduate and doctoral levels. The institute boasts of its state-of-the-art academic and research infrastructure. The institute, spreads over 262 hectare of lush green picturesque landscape, aims at intellectual growth in a community-friendly ambience.

Rourkela is a bustling industrial city and major hub of industrial activity in Eastern India. The city is situated on the Howrah-Mumbai main line and is well connected with Kolkata, Delhi, Chennai and Mumbai as well as with state capitals, Bhubaneswar, Ranchi and Raipur. The location of institute is about 6 kms from Rourkela railway station and 2 kms from sector-2 bus stand.

## MHRD-AICTE Sponsored Staff Development Programme

on

### Soft and Evolutionary Computing: Theory and its Application

(15-28 Sept. 2008)



**Coordinator**  
**Prof. G. Panda, FNAE, FNASc.**

**Co-Coordinator**  
**Prof. A.K. Sahoo.**

DEPARTMENT OF  
ELECTRONICS AND COMMUNICATION  
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