

# Faculty Development Program on Artificial Intelligence and Data Analytics with MATLAB

Under the banner of  
Electronics and ICT Academy, NIT Patna

08<sup>th</sup> - 15<sup>th</sup> June, 2020



## Patron

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Director, NIT Patna

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Co-coordinators (NIT Patna)  
**Dr. Bharat Gupta**

## Organized by

Electronics and ICT Academy, National Institute of  
Technology Patna, Patna- 800005. India.

[www.nitp.ac.in/ict/](http://www.nitp.ac.in/ict/)

## Supported by

Ministry of Electronics and Information Technology,  
MeitY, Govt. of India.

## About NIT Patna

National Institute of Technology Patna is the 18<sup>th</sup> National Institute of Technology created by the Ministry of HRD, Government of India after rechristening the erstwhile Bihar College of Engineering Patna on 28.01.2004. NIT Patna marked its humble beginning in 1886 with the establishment of pleaders survey training school which was subsequently promoted to Bihar College of Engineering Patna in 1924. This made this institute the 6<sup>th</sup> oldest Engineering institute of India. The Institute is situated on the south bank of holy river Ganges behind Gandhi Ghat (where the ash of father of the Nation, Mahatma Gandhi was offered in the river Ganges). The campus has a picturesque river view with historic building presenting a spectacle of architecture delight and natural beauty. The Institute imparts high level education training, research and development in science, engineering, technology, and humanities along with high quality education and values at UG, PG and Ph.D. level. At present the Institute offers courses in six major technical disciplines viz. *Architecture, Civil Engineering, Computer Science & Engg., Electrical Engg., Electronics & Communication Engg. and Mechanical Engg.* It also consists of well-established departments of Physics, Chemistry, Mathematics and Humanities and Social Sciences.

## Electronics and ICT Academy

Ministry of Electronics and Information Technology, Government of India has instituted seven Electronics and Information & Communications Technology (ICT) Academies of which, the academy of NIT Patna is one. The Academy at NIT Patna aims to design and organize basic as well as specialized training programs in niche areas of Electronics and ICT for the development of required knowledge base, skills and tools to equip the teaching community with better knowledge and understanding.

## Overview

In recent years, we've seen a resurgence in Artificial Intelligence (AI), and Machine Learning (ML). Machine learning has led to some amazing results, like being able to analyze the medical images and predict diseases on-par with human experts. ML can be embedded into all sorts of different products, and it's used in many

industries, like finance, online advertising, medicine, and robotics. It is a widely applicable tool that will benefit the people, working in different industries, R&D organization, etc. Further, the artificial neural network normally used for predictive modeling, adaptive control, etc., where the dataset based training enables it for self-learning and based on this next level predictions can be done from a complex and seemingly unrelated set of information. Generally, the machine learning (ML) approach is considered as the subset of the AI, and the deep learning (DL) is the subset of ML. Apart from this, covering the several aspects of Data analysis and processing, interface with excel, etc. will be the added advantage for the participants that may add new dimensions to the strategies to solve the problems. The current course is mainly focused on several advanced topics related to the Artificial Intelligence, Data Analytics, along with some essential concepts/practices on basics of MATLAB. This course will go from basics to advance in AI and related topics utilizing the MATLAB platform, with the step-by-step approach, to make it easy to understand and to enable the participants to develop ML applications.

## Objective and Scope

- ✦ To familiarize the participants with the basics of MATLAB and some of the toolboxes based on Optimization, Curve Fitting, ML & DL, etc.
- ✦ Develop conceptual and fundamental concept of Data Analytics elements.
- ✦ Develop basic understanding of all key component of MATLAB for Data Analytics and AI.
- ✦ Develop understanding of Data Science and various feature extraction techniques.
- ✦ Develop conceptual and fundamental concept of Machine Learning elements and to understand different types of Machine learning based algorithms.
- ✦ Understand the performance and limitation of AI and ML algorithms.
- ✦ Finally this program will provide opportunity to develop ML/AI algorithms for Smart Application development.

## Course Content

- ✦ Introduction to MATLAB: Variables, Loops, Conditions, Functions, Numbers, Vectors, and Matrices in MATLAB.

- ✦ Image Processing, Computer Vision and Pattern Recognition.
- ✦ Data processing: Importing data, Automate the Import Process, Data Selection operations.
- ✦ Data Analysis: Visualizing data, Distribution & Visualizing Multi-Dimension Data, Curve Fitting, etc.
- ✦ Organizing & cleaning data: Combining Data and Joining Tables, Normalizing and Smoothing Data, etc.
- ✦ Machine Learning Model and KNN: Learning KNN model with features subset and with non-numeric data, Export Model for testing, etc.
- ✦ Neural Network: Neural Model, Training Process, Back Prop. Architecture, Feature Extraction, etc.
- ✦ ML & DL, Recurrent & Convolution Neural Networks, LSTM & CNN, and applications of AI, etc.

### Outcomes

By the end of the program, the participants should:

- ✦ Understand the elemental concepts of MATLAB, including the toolboxes related to AI and others.
- ✦ Have a good understanding of the fundamental issues and challenges of machine learning: data, model selection, model complexity, etc.
- ✦ Have an understanding of the steps used in Data Extraction, Cleaning and Pre-processing etc.
- ✦ Appreciate the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and unsupervised learning.
- ✦ Know how to work with Machine and Deep learning approaches, along with the applications of AI.
- ✦ Be able to design and implement various machine learning algorithms.
- ✦ Understand the KNN model and its properties.
- ✦ Get motivation for further studies and research in these domains.

### One-week FDP includes

- ✦ **40 hours Instructor-led Live Online Hands-on based Learning & Interactive Query Session.**
- ✦ Soft copy of study material, Training PPT's, etc.
- ✦ Participants will be able to download the recorded sessions after completion of each of the sessions.
- ✦ Certificate from E&ICT Academy, NIT Patna

### Who Can Participate

Faculty members of UGC/AICTE recognized Universities and Engineering colleges all over India, Research scholars (PhD only), students and Industry personals. However, priority will be given to the faculty members.

### Resource Persons

- ✦ Mr. Jai Mangal Singh, Redtron Edu. LLP
- ✦ Experts from NIT/ IIT and other premier institute.

### Registration Fee

- ✦ Faculty/ Research Scholar (PhD): **Rs. 500/-**,
- ✦ Students: **Rs. 500/-**,
- ✦ Industry and others: **Rs. 1000/-**.

### Registration Process

1. Before making the (online) payment, please check the availability of link for *Registration* and after making the payment, complete the registration process as soon as possible.
2. Registration fee can be paid by the online mode, the account details for this purpose is:  
Account Name: **NIT Patna**  
Account No.: **50380476798**  
IFSC Code: **ALLA0212286**
3. **Link for Registration in FDP:**  
<https://forms.gle/VzUUvRrtjjXK1f1v7>
4. The brochure of the program may be downloaded from the Institute website: [www.nitp.ac.in](http://www.nitp.ac.in).
5. **Last date of registration: 06.06.2020 (till 05:30 PM).**
6. **Total - 100 seats and the selection will be done on first-cum-first-serve basis.** PDF file of online filled registration form with proof of registration fee paid will be sent through email to **Dr. Rakesh Ranjan** (Email: [rr@nitp.ac.in](mailto:rr@nitp.ac.in)) and **Dr. Bharat Gupta** ([eictapatna@nitp.ac.in](mailto:eictapatna@nitp.ac.in)).

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REGISTRATION FORM (*SAMPLE*)

ONLY THE ONLINE-FILLED

REGISTRATION FORM WILL BE ACCEPTABLE

1. Name (block letter): .....
2. Gender: .....
3. Caste:.....
4. DOB:.....
5. Designation .....
6. Organization: .....
7. Address for communication: .....
- .....
- .....
- Pin code: ..... Ph. No.: .....
- E-mail: .....
8. Highest Academic Qualification: .....
9. Specialization: .....
10. Experience (in years):  
(a) Teaching: ..... (b) Industrial: .....
11. Aadhar No: .....

### DECLARATION

I do hereby agree to abide by the rules and regulations of the FDP.

Place: .....

Date:.....

.....  
Signature of the Applicant