Ministry of Electronics and Information Technology (MeitY)

Govt. of India supports its

Electronics and ICT Academies to organize Faculty Development Programme **on**

ANN and Deep Learning during 11th – 15th June, 2018 at

IIT Guwahati, IIT Roorkee, IIITDM Jabalpur, MNIT Jaipur, NIT Patna and NIT Warangal

About Summer Courses

Faculty Development Programmes in core areas of Electronics and Information & Communication Technology (ICT) streams have been planned by academies for delivery during Summer (i.e., May - June 2018). All these summer courses will be offered through National Knowledge Network (NKN) by inviting experts from IITs, NITs, IIITs and other premier institutes/industries. In addition, local course coordinators at respective academies /identified remote centers will take care of sessions on design oriented/activity linked problems/ assignments/ case studies and quiz test(s).

These courses will be delivered at E & ICT Academies/identified centers through NKN infrastructure. Candidates could apply for training at academy locations or identified centers as per the convenience.

Course : ANN and Deep Learning

Principal Coordinator - Academy	Support Coordinator - Academy	Participating Academies and Local Coordinator Details
Prof. Aparajita Ojha academyiiitdmj@gmail.com IIITDM Jabalpur	*Prof. DVLN Somayajulu* eict.nitw@gmail.com NIT Warangal	**IIITDM Jabalpur -** *Prof. Aparajita Ojha* academyiiitdmj@gmail.com
		NIT Warangal - *Dr. R. Padmavathy* rpadma@nitw.ac.in
		IIT Guwahati - *Prof. Rohit Sinha* rsinha@iitg.ernet.in
		MNIT Jaipur - *Dr. Santosh Vipparthi* skvipparthi.cse@mnit.ac.in
		NIT Patna - *Dr. J P Singh* jps@nitp.ac.in

Module details of ANN and Deep Learning

S.No.	Module Name	Topics
1.	**Artificial Neural Networks (ANNs)**	Brief introduction and history of Artificial Neural Networks (ANN), Biological inspiration, Perceptrons, Types of NN architectures, Supervised learning using neural networks (NNs), Forward and backward propagation.
		Multilayer perceptron (MLP), Back propagation training for MLP, Computation graph, Logistic regression gradient descent, Stochastic gradient descent. Factors affecting back propagation training, Applications to some practical classification problems. Hands on: Demonstration on implementation of Shallow and Deep architecture, introduction to Python and Tensorflow, Brief introduction to Python and Numpy.
2.	**Deep Learning**	Deep Feed forward Networks - Example: Learning XOR, Gradient-Based Learning, Hidden Units. Regularization for Deep Learning -

		Parameter
		Norm Penalties, Norm Penalties as Constrained Optimization, Regularization, Dataset Augmentation, Early Stopping, Parameter Tying and Parameter Sharing, Sparse Representations, Dropout regularization
		Hands on: Building the first NN step by step, programming exercises on Back propagation,
3.	**Optimization for Training Deep Models**	**How Learning Differs from Pure Optimization, Challenges in Neural Network Optimization, Basic Algorithms, Hyperparameter tuning, Minibatch gradient descent, RMSProp and Adam optimization Hands on: Hyper parameter tuning and regularization practice, Minibatch gradient descent, Adam optimization.**
4.	**Convolutional Networks**	**The Convolution Operation, Motivation, Pooling, Basic architecture of a Convolution Neural Network, Variants of the Basic Convolution Model, Evolution of Convolution NN Architectures - AlexNet, ResNet. Hands on : Convolution neural network application using Tensorflow, building an application for object detection, face recognition.**
5.	**Sequence Modeling**	**Recurrent and Recursive Nets - Unfolding Computational Graphs, Recurrent Neural Networks, Bidirectional RNNs, Encoder-Decoder Sequence-to-Sequence Architectures, The Challenge of Long-Term Dependencies, The Long Short-Term Memory and Other Gated RNNs. Lab: Program demonstration for applications in POS Tagging, Named Entity Recognition and language modeling, Machine Translation.**

Registration Fee: No Registration fee is charged for attending this programme planned at any designated academies/Remote centers. However, candidate should submit a refundable Demand Draft of Rs.1000/- along with application and the same will be handed over to participant on the last day of the training. Satisfactory Certificate will be given subject to fulfillment of attending all sessions, submission of assignments and clearing the test(s).

Last Date of Registration: 28th May'2018.

Lodging and Boarding will be provided free of cost at the Academy.

Participants can also attend the course at the following Remote Nodal Center

1.Maulana Azad National Institute of Technology (MANIT), Bhopal, Madhya Pradesh.

Remote Center Coordinator: Dr. Lalita Gupta

Email: gupta.lalita@gmail.com

2. DSPM- International Institute of Information Technology (DSPM-IIIT), Naya Raipur, Chhattisgarh

Remote Center Coordinator: Dr. Muneendra Ojha and Dr. Satyanarayana V

Email: muneendra@iiitnr.edu.in**, satya@**iiitnr.edu.in

3. Shri Ramdeobaba College of Engineering and Management (RCOEM), Nagpur, Maharashtra.