Ministry of Electronics & Information Technology (MeitY)
Government of India

ELECTRONICS INDIA
Billion Needs Million Chips

Government of India Initiative for Employability Enhancement

- **Faculty Training**
- **Training and Consultancy**
- **Services for Industry**
- **Technical Incubation and Entrepreneurship**
- **Continuing Education for Students & Professionals**

Digital India
Power To Empower

| IIT Guwahati | IIITDM Jabalpur | MNIT Jaipur | NIT Patna | IIT Roorkee | NIT Warangal |

India is fast emerging as a world power in Information, Communications Technology and Electronics (ICTE) sectors. To complement its growth and further development, there is an ever-increasing need for trained professionals with specialization in this space. This includes training of professionals not only in existing and changing technologies but also in the fields of R&D and electronics manufacturing. This will specifically be aimed at the ICTE sector to create a substantial resource pool of talent and generate ample opportunities for entrepreneurs.

Ministry of Electronics & Information Technology (MeitY) has approved a scheme and setup Electronics and ICT Academies at 07 (seven) institutions viz. IIT Guwahati, IIT Kanpur, NIT Warangal, NIT Patna and IIITDM Jabalpur (all five under Category-A); and IIT Roorkee, MNIT Jaipur (both under Category B). The Ministry had earlier setup two ICT Academies at Tamil Nadu and Kerala respectively. Estimated cost and targets for the Electronics and ICT Academy in the two Categories for a period of four years are as under:

Category	Total Outlay	Internal Revenue Generation	Grants-in-Aid from Central Government	Training Target (Faculty members)
Category-A	Rs. 25 crore	Rs. 7.50 crore	Rs. 17.50 crore	16,000
Category-B	Rs. 10 crore	Rs. 3.00 crore	Rs. 7.00 crore	6,400

These Academies are aimed at faculty/mentor development and upgradation to improve the employability of the graduates, diploma holders in various streams, through collaboration of States/Union Territories. Each Academy is being provided funding support for four years and is expected to generate revenue by charging fee and taking up other activities to meet the recurring cost in a gradual manner and become self-sustainable by the end of fourth year onwards. All these Academies will cater to the requirements of identified neighbouring States and UTs also. Brief information about all the Academies is available at : http://Meity.gov.in/content/scheme-financial-assistance-setting-electronics-andict-academies

Activities of the Academies

- Faculty development for
    — Specialized training with hands-on on basic and advanced level topics for Engineering streams and
    — Domain based training on use of ICT tools and techniques for non-engineering streams
- Training and consultancy services for industry
- Curriculum development for Industry
- Continuing Education programme for students / working professionals
- Design, Develop and Deliver specialized modules for specific research areas
- Providing advice and support for technical incubation and entrepreneurial activities

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-July 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 centres 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 centres through NKN infrastructure. Candidates could apply for training at academy locations or identified centres as per the convenience. For details about identified centres, please refer to respective academy websites. The following seven courses would be taken up for delivery during forthcoming summer vacation:

S.No.	Course Name	Principal Coordinating - Academy	Co-principal Coordinating - Academy	Proposed Dates From	To
1.	Big Data Analytics	NIT, Warangal	IIITDM Jabalpur	21-5-2018	25-5-2018
2.	VLSI Design Verification	MNIT Jaipur	IIT Guwahati	26-5-2018	30-5-2018
3.	Electric Vehicle	IIT Guwahati	MNIT Jaipur	28-5-2018	01-6-2018
4.	AI and Machine Learning	IIT Roorkee	MNIT Jaipur	04-6-2018	08-6-2018
5.	ANN and Deep Learning	IIITDM Jabalpur	NIT Warangal	11-6-2018	15-6-2018
6.	5G Communications	IIT Guwahati	IIT Roorkee	11-6-2018	15-6-2018
7.	Internet of Things (IoT)	NIT, Warangal	NIT Patna	18-6-2018	22-6-2018

Target Beneficiaries:

Interested Faculty of engineering/technical institutions are eligible to attend these summer courses.

Availability of seats at each offering Academy:

Fifty (50) seats are available for each summer course to be offered at each Academy/Remote Centre. Participants will be selected based on first-cum-first-serve basis by each academy. Selected participants will be communicated through e-mail / notified in E&ICT Academy websites.

Course duration:

Each summer course is designed for 40 hours (Theory Lectures: 20-25 hours, Hands-on/Design-oriented/activity linked/Problem Solving/Case Studies sessions/Quiz Tests: 15-20 hours)

Accommodation:

Boarding and Lodging at Hostels/Guest House will be provided at free of cost only at Identified E&ICT Academies. For details refer respective Academy websites. At other identified Remote centres only working lunch and snacks will be provided.

Travel:

No Travel Allowance will be paid to the participants.

Registration Fee for each Summer Course:

No Registration fee is charged for attending this programme planned at any designated academies/Remote centres. 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).

Mode of Payment:

Academy Name	Payment through DD
NIT Warangal	Demand Draft in favor of **"Electronics and ICT Academy, NITW"** payable at NIT Warangal
IIT Guwahati	Demand Draft in favor of **"Registrar, IIT Guwahati"** Payable at Guwahati
IIITDM Jabalpur	Demand Draft in favor of **"Electronics and ICT Academy, IIITDMJ"** payable at Jabalpur
MNIT Jaipur	Demand draft in favor of **"Electronics and ICT Academy, MNIT Jaipur"** Payable at Jaipur
NIT Patna	Demand draft in favor of **"Director, NIT Patna"** payable at Patna
IIT Roorkee	Demand draft in favor of **"Dean SRIC IIT Roorkee"** payable at Roorkee

How to apply:

* A duly filled in application form in the prescribed form signed by the Head of the Institute to which candidate belongs (along with demand draft) should reach by post to the local coordinator of the participating academy.

* Government of India norms will be followed for SC/ST category participants.

* The application form along with DD can also be submitted in the online mode to Local Coordinator of the respective academy.

Note: Refer offering Academies websites for complete postal address and other details of summer courses.

Last Date for Submission of Applications and Intimation of Selection:

	Big Data Analytics (21-25, May 2018)	VLSI Design Verification (26-30, May 2018)	Electric Vehicle 28th May - 1st June 2018)	AI and Machine Learning (4-8, June 2018)	ANN and Deep Learning (11-15, June 2018)	5G commu-nications (11-15, June 2018)	IoT (18-22, June 2018)
Last Date for Submission of application form	**7th May 2018**	**17th May 2018**	**15th May 2018**	**28th May 2018**	**28th May 2018**	**28th May 2018**	**31st May 2018**
Selection list Intimation by E-mail/Display in web site	**11th May 2018**	**21st May 2018**	**21st May 2018**	**31st May 2018**	**4th June 2018**	**4th June 2018**	**11th June 2018**

The following are the details of summer courses being offered during May - July 2018:

Course 1: Big Data Analytics

(Offered during 21st - 25th May, 2018)

Principal Coordinator - Academy	Support Coordinator - Academy	Participating Academies and Local Coordinator Details
Dr. R.B.V. Subramaanyam rbvs66@gmail.com **NIT Warangal**	*Dr. Manish Kumar Bajpai* mkbajpai@iiitdmj.ac.in **IIITDM Jabalpur**	**NIT Warangal -** Dr. R. B. V. Subramaanyam rbvs66@gmail.com
		IIITDM Jabalpur - *Dr. Manish Kumar Bajpai* mkbajpai@iiitdmj.ac.in
		MNIT Jaipur - *Dr. Namita Mittal* nmittal.cse@mnit.ac.in
		IIT Guwahati - *Dr. Gaurav Trivedi* trivedi@iitg.ernet.in

Module details of Big Data Analytics:

S.No.	Module Name	Topics
1.	**Introduction to Big Data Analytics and Map reduce Computing**	Introduction to Big Data. Overview of Hadoop. Overview of Map - Reduce Computing. Details of MR computing paradigm. Problems and Practice.
2.	**Hadoop and SPARK Programming**	Implementation of MR on Hadoop. Features of SPARK and other ecosystems.
3.	**NoSQL Databases**	Overview of NoSQL databases. CAP theorem. BASE properties. Mongo DB. Hands-on using MongoDB, PIG, and HIVE.
4.	**Text Analytics**	Text Processing and Analysis along with Case Studies.
5.	**Graph Analytics**	Graph Data Processing using Big Data Technologies. Social Network Analysis.
6.	**Distributed Systems vs Big Data Technologies**	Internals of Big Data Technologies. Low level processing of Data. Open MP/MPI based programs.

Course 2: VLSI Design Verification

(Offered during 26th - 30th, May 2018)

Principal Coordinator - Academy	Support Coordinator - Academy	Participating Academies and Local Coordinator Details
Prof. Vineet Sahula vsahula@mnit.ac.in **MNIT Jaipur**	*Dr. Gaurav Trivedi* trivedi@iitg.ernet.in **IIT Guwahati**	**MNIT Jaipur - *Prof. Vineet Sahula*** vsahula@mnit.ac.in
		IIT Guwahati - *Dr. Gaurav Trivedi* trivedi@iitg.ernet.in
		IIITDM Jabalpur - *Prof. P.N. Kondekar* pnkondekar@iiitdmj.ac.in
		NIT, Warangal - *Dr. P Srihari Rao* patri@nitw.ac.in

Module details of VLSI Design Verification:

S.No.	Module Name	Topics
1.	**Digital Design Flow**	Introduction to VHDL/Verilog- Data types, Concurrent statements, sequential statements, behavioral modeling.
2.	**Implementation**	Introduction to programmable logic devices- PALs, PLDs, CPLDs and FPGAs.
3.	**High Level Synthesis**	Data path & Control Path, BDD, Scheduling, Resource Binding, Resource Allocation.
4.	**Verification**	Test benches, Formal Verification of digital hardware systems, FSM based Verification, CAD Tools for verification
5.	**System Level Verification**	System Verilog, Assertions & checkers, Coverage Driven Verification

Course 3: Electric Vehicle

(Offered during 28th May - 1st June 2018)

Principal Coordinator Academy	Support Coordinator Academy	Participating Academies and Local Coordinator Details
Dr. Praveen Kumar praveen_kumar @iitg.ernet.in **IIT Guwahati**	*Dr. Arun K. Verma* arun.ee@mnit.ac.in **MNIT Jaipur**	**IIT Guwahati & IIT Madras -** *Dr. Praveen Kumar &* praveen_kumar@iitg.ernet.in **IIT Madras -** *Dr. Prabhjot Kaur*
		MNIT Jaipur - *Dr. Nitin Gupta* nitingupta.ee@mnit.ac.in
		IIT Roorkee - *Dr. Sanjeev Manhas* samanfec@iitr.ac.in
		NIT Patna - *Dr. Mala De & Dr. Vimlesh Verma* mala@nitp.ac.in & vimlesh.verma@nip.ac.in
		IIITDM Jabalpur - *Prof. V.K. Gupta* vkgupta@iiitdmj.ac.in
		NIT, Warangal - *Dr. D. Sreenivasa Rao* srinudee@nitw.ac.in

Module details of Electric Vehicle:

S.No.	Module Name	Topics
1.	**Introduction to Electric Vehicle (EV)**	EV history, Well to Wheel Analysis, EV architectures and drivetrains, Vehicle drive cycle analysis on sizing of EV drivetrains, and Motors and their suitability for EVs Hands-on: a) Well to wheel analysis for various electricity generation scenarios and b) Drive cycle analysis and extraction of information.
2.	**EV Control and Storage Systems**	EV control systems, Storage Systems and new battery technologies, potential and forecasting, Impact of EVs on the grid Hands-on: a) Sizing EV subsystems for an application and b) Simulation of speed control of PM Motor.

S.No.	Module Name	Topics
3.	**Antennas in 5G**	Modulation techniques and waveform design for 5G communication Hands-on: Modulation techniques and waveform design for 5G communication.
4.	**V2G and G2V Technologies**	Discussion on V2G and G2V technologies
5.	**Current Trends in EV**	Policies, R&D and deployment roadmap for India, and End of life and recycling of EVs.

Course 4: AI and Machine Learing

(Offered during 4th - 8th, June 2018)

Principal Coordinator - Academy	Support Coordinator - Academy	Participating Academies and Local Coordinator Details
Prof. Dr. Sanjeev Manhas samanfec@iitr.ac.in **IIT Roorkee**	*Dr. Satyasai J. Nanda* sjnanda.ece@mnit.ac.in **MNIT Jaipur**	**IIT Roorkee -** *Dr. R Balasubramanian* balarfma@iitr.ac.in
		MNIT Jaipur - *Dr. Santosh Vipparthi* skvipparthi.cse@mnit.ac.in
		IIITDM Jabalpur - *Dr. Atul Gupa* atul@iiitdmj.ac.in
		NIT Warangal - *Prof. DVLN Somyajulu* eict.nitw@gmail.com
		NIT Patna - *Dr. Akshay Deepak* & *Dr. Ditipriya Sinha* akshayd@nitp.ac.in & ditipriya.cse@nitp.ac.in

Module details of AI and Machine Learning:

S.No.	Module Name	Topics
1.	**AI Fundamentals**	Fundamental Concepts of AI: Agents, environments, general model; Problem Solving techniques.
2.	**Search Techniques**	Uninformed search, heuristic search, adversarial search and game trees; Solution of constraint satisfaction problems using Search.
3.	**Knowledge Representation**	Propositional and predicate calculus, semantics for predicate calculus, inference rules.
4.	**Machine Learning Structures**	Supervised and unsupervised learning. Artificial Neural Network (Multi Layer Perception), Radial Basis Function, Functional Link ANN, Self Organizing Map, Clustering Adaptive FIR and IIR structures.
5.	**Machine Learning Algorithms**	Least Mean Square algorithm, Back Propagation, Genetic algorithm, Differential Evolution, Particle Swarm Optimization and Other Nature Inspired Optimization.

Course 5:	ANN and Deep Learning

(Offered during 11th - 15th, June 2018)

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 Learing:

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.

S.No.	Module Name	Topics
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. |

Course 6: 5G Communications

(Offered during 11th - 15th June 2018)

Principal Coordinator - Academy	Support Coordinator - Academy	Participating Academies and Local Coordinator Details
Prof. Ratnajit Bhattacharjee ratnajit@iitg.ernet.in **IIT Guwahati**	*Dr. Vinod Pankajakshan* vinodfec@iitr.ac.in **IIT Roorkee**	**IIT Guwahati -** *Dr. Santosh Biswas* santosh_biswas@iitg.ernet.in
		IIT Roorkee - *Dr. Vinod Pankajakshan* vinodfec@iitr.ac.in
		NIT Patna - *Dr. Seemant Saha & Dr. Bharat Gupta* seemanti@nitp.ac.in & bharat@nitp.ac.in
		NIT Warangal - *Dr. J. Ravi Kumar* jrk@nitw.ac.in
		IIITDM Jabalpur - *Dr. Biswajit Mukerjee* bmukherjee@iitdmj.ac.in

Module details of 5G Communications:

S.No.	Module Name	Topics
1.	**Introduction to 5G**	Evolution of Wireless Communication technology generations, Roadmap to 5G: targeted specifications and Radio access technologies for 5G-Massive MIMO and millimetre wave.
2.	**Modulation Techniques**	Modulation techniques and waveform design for 5G communication Hands-on: Modulation techniques and waveform design for 5G communication.
3.	**Antennas in 5G**	Role of Antennas in 5G and RF subsystem for 5G Hands-on: Antennas and RF subsystem for 5G
4.	**Trends in Software Defined Networking**	Hyperdense small cell deployment for capacity improvement, Self organizing network, Machine type communication, Cooperative communication and cognitive radio Hands-on: Cooperative communication and cognitive radio.
5.	**5G Internet and Security**	5G Internet, Security for 5G Communications and Unified, 5G Broadcast-Broadband Architecture. Hands-on: Security for 5G Communications

## Course 7: Internet of Things (IoT)

(Offered during 18th - 22nd, June 2018)

Principal Coordinator - Academy	Support Coordinator - Academy	Participating Academies and Local Coordinator Details
Dr. Rashmi Ranjan Rout rashrr@nitw.ac.in **NIT Warangal**	*Dr. Bharat Gupta* bharat@nitp.ac.in **NIT Patna**	**NIT Warangal -** *Dr. Raju Bhukya* drrajunitw@gmail.com
		NIT Patna - *Dr. A. Ghosh & Dr. Bharat Gupta* arunangshu.ghosh@nitp.ac.in & bharat@nitp.ac.in
		IIT Guwahati - *Dr. Santosh Biswas* santosh_biswas@iitg.ernet.in
		IIITDM Jabalpur - *Prof. P.N. Kondekar* pnkondekar@iiitdmj.ac.in
		MNIT Jaipur - *Dr. Arka P. Mazumdar* apmazumdar.cse@mnit.ac.in

Module details of Internet of Things (IoT):

S.No.	Module Name	Topics
1.	**Foundations of Internet of Things**	Introduction IoT architectures, Communication Standards, M2M and IoT Technology, Sensor based Solutions and RFIDs in IoT. Assignments on Design and Analysis of IoT Architectures
2.	**Protocol Stack in IoT ase Studies/Quiz: 4 hrs)**	Data Link Layer Protocols, Network Layer Protocols, Application oriented communication protocols. Assignments on Protocol design by considering resource constraints and context awareness
4.	**Data Acquiring, Organizing and Analytics in IoT**	Data Acquiring and Storage, Cloud Service models for IoT, Business Models in IoT Assignments/case studies on IoT Data Analytics methods
4.	**Designing Software and Hardware for IoT Applications**	Prototyping Embedded Device Software, Web APIs, Hardware platforms, Smart Applications. Laboratory Experiments on IoT applications
5.	**Privacy and Security in IoT**	Vulnerabilities, Security Requirements and Threat Analysis, IoT Security Tomography and Layered Attacker model, Access control methods, Privacy Issues in IoT Architectures. Assignments on Security models and privacy preserving approaches.

IIT Roorkee
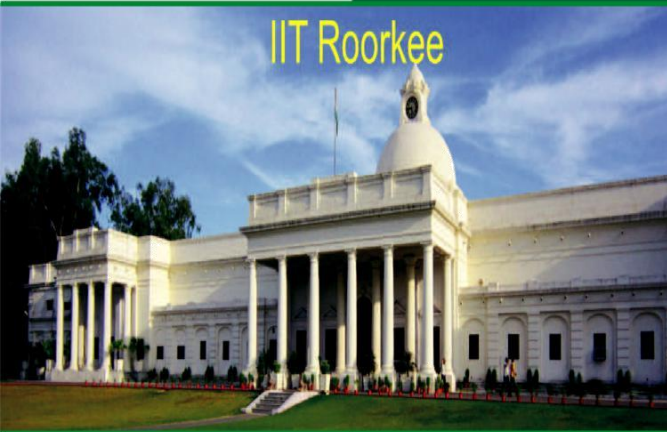
IIT Guwahati

NIT WARANGAL

MNIT Jaipur

NIT Patna

PDPM IIITDM Jabalpur

Contact us

Academy Name	States to Which Catering	Chair/Chief Coordinator	Contact Details
Electronics & ICT Academy at NIT Warangal	Telangana, Andhra Pradesh, Karnataka, Puducherry, Andaman and Nicobar Islands, Goa	*Prof. D.V.L.N. Somayajulu*	Email: eict.nitw@gmail.com M: 09121016547 Website: http://nitw.ac.in/eict/
Electronics & ICT Academy at IIT Guwahati	Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura,Sikkim	*Prof. Ratnajit Bhattacharjee*	Email:ratnajit@iitg.ernet.in M: 09954498116 Website: https://www.iitg.ernet.in/eictacad/
Electronics & ICT Academy at IIITDM Jabalpur	Madhya Pradesh, Chhattisgarh, Maharashtra	*Prof. Aparajita Ojha*	Email: aojha@iiitdmj.ac.in M: +919425800334 Website: http://ict.iiitdmj.ac.in/
Electronics & ICT Academy at NIT Patna	Bihar, Jharkhand, Odisha, West Bengal	*Dr. Bharat Gupta*	Email: bharat@nitp.ac.in M: 09331406964 Website: www.nitp.ac.in/ict
Electronics & ICT Academy at IIT Roorkee	Jammu and Kashmir, Himachal Pradesh and Uttarakhand	*Dr. Sanjeev Manhas*	Email: smanhas333@gmail.com samanfec@iitr.ac.in Contact No.: 01332-286457 Website: http://eict.iitr.ac.in/
Electronics & ICT Academy at Malaviya National Institute of Technology Jaipur	Rajasthan, Gujarat, Dadra & Nagar Haveli, Daman & Diu	*Prof. Vineet Sahula*	Email: vsahula.ece@mnit.ac.in M: 954 9654 227 Website:www.mnit.ac.in/eict