National Knowledge Network

Ministry of Electronics & Information Technology

Digital India
Power To Empower

सत्यमेव जयते

Government of India Initiative for Employability Enhancement

Mentoring
Passionate Academicians
for Future Generation
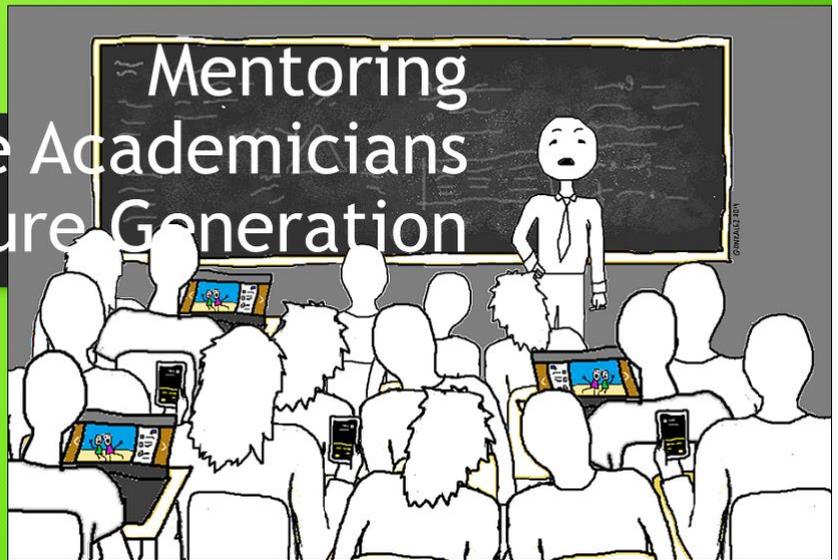
- *Faculty Training*
- *Training and Consultancy*
- *Services for Industry*
- *Technical Incubation and Entrepreneurship*
- *Continuing Education for Students & Professionals*

CONVERGENCE
BLOCKCHAIN
I.O.T.
A.I.
HOLOGRAPHIC COMPUTING

IIT Guwahati   **IIITDM Jabalpur**   **MNIT Jaipur**   **IIT Kanpur**   **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 :
https://meity.gov.in/esdm/scheme-financial-assistance-setting-electronics-and-ict-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 Summers (i.e., Jun- Sept 2020). All these Summer- courses will be offered through online live web-conferencing, with lectures delivered by invited experts from IITs, NITs, IIITs and other premier institutes/industries. In addition, online proctoring coordinators designated by respective academies centres will take care of sessions on design orientation/activity linked problems/ assignments/ case studies and quiz test(s). Participants would be able to join online to web-conferencing platform using video/audio. For registration participants need to apply to any participating academy online through its website, as mentioned in details of respective programme,

How to apply:

* A participant is encouraged to apply to one of the academies, who is participating in that programme. These are named either a Principal coordinating, Co-principal coordinating or Academy level coordinating academies in details of the respective programme.
* Government of India norms will be followed for SC/ST category participants.
* The application form is to be submitted in the online mode to the Academy level coordinator of the respective academy.

Note: Refer, programme offering Academies websites for complete contact address and other details of Summer courses.

Following are the programmes being offered online live in this Summer, Jun- Oct 2020, each of 10 days duration.

Course Name	Starting date of the Programme	Completion date of the programme	Course Name	Starting date of the Programme	Completion date of the programme
Quantum Computing	22 Jun 2020	3 Jul 2020	ICT Tools for Teaching, Learning process & Institutes	10 Aug 2020	21 Aug 2020
Machine Learning for Computer Vision	29 Jun 2020	10 Jul 2020	5G System on Chip Design	24 Aug 2020	4 Sep 2020
Advanced Optimization Techniques and Hands-on with MATLAB/SCILAB	13 Jul 2020	24 Jul 2020	Python Programming	7 Sep 2020	18 Sep 2020
Embedded UVM open source Emulation & Functional Verification	13 Jul 2020	24 Jul 2020	Tools for Writing, Authoring and reviewing manuscripts	21 Sep 2020	2 Oct 2020
Wireless Communication Technologies for IoT	27 Jul 2020	7 Aug 2020	Cyber Security	5 Oct 2020	16 Oct 2020
Data Science for All	27 Jul 2020	7 Aug 2020			

Following are the programmes being offered as Self-Paced in this Summer, Jun- Oct 2020, by IIT Kanpur Academy.

Computer System Security	Being offered	https://ict.iitk.ac.in	Android Development	Being offered	https://ict.iitk.ac.in
Full Stack Developer	Being offered	https://ict.iitk.ac.in			

Target Beneficiaries:

Interested Faculty of engineering/technical institutions are eligible to attend these Summer courses. Additionally, faculty of non-engineering background are also invited to attend FDP on ICT Tools and techniques for Teaching Learning Process & Institutes. Non-faculty participants are also invited to attend to upgrade their skills..

Availability of seats at each offering Academy:

Participants will be selected based on first-cum-first-serve basis by organizing academy. Selected participants will be communicated through e-mail / notified in E&ICT Academy websites. There is no limit on number of participants, however, only first 1000 participants would enjoy duplex both way video/audio. Rest of the participants would enjoy receiving video/audio but may not raise queries in real-time.

Course duration:

Each course is designed as 3 credit equivalent for 35-40 hours (Theory Lectures, Hands-on/Design orientation/Activity linked problems/Assignments Problem Solving/Case Studies sessions/Quiz Tests). The contact hours are to be spread over 10 days, implying NOT more than 3½ hours per day.

Accommodation & Travel

There is no provision as well as scope for Boarding and Lodging, as all the programmes are being offered ONLINE.

Registration Fee for each Summer Course:

No Registration fee is charged for attending these programme. However, candidate is required to pay an examination fee of Rs. 500/- (faculty/PhD-scholars) OR Rs. 1000/- (others), if they desire a certificate of completion of programme. Certificate for participation as well as for Satisfactory performance will be given to the participants subject to fulfillment of attending all sessions, submission of assignments and clearing the test(s) to all the paying participants.

Mode of Payment: Preferred mode is ONLINE payment at respective Academy site.

Academy Name	Payment through DD/CBS-Cheque
IIT Guwahati	Online registration at web site of Academy, IIT Guwahati- http://www.iitg.ernet.in/eictacad/
IIITDM Jabalpur	Online registration at web site of Academy, IIITDM Jabalpur- http://ict.iiitdmj.ac.in/
MNIT Jaipur	Online registration at web site of Academy, MNIT Jaipur- http://www.mnit.ac.in/eict
NIT Patna	Online registration at web site of Academy of NIT Patna- http://www.nitp.ac.in/ict
IIT Roorkee	Online registration at web site of Academy of IIT Roorkee- http://eict.iitr.ac.in/
NIT Warangal	Online registration at web site of Academy NIT Warangal- http://nitw.ac.in/eict/

- Last Date for Submission of Applications is Monday of earlier week from the start date of respective programme.
- The intimation of Selection for participation will be posted on website on Wednesday of previous week.

The details of Online-Summer courses being offered by E&ICT Academy, IIITDM Jabalpur during Jun- Sept 2020 follows.

1. Machine Learning for Computer Vision   29 Jun – 10 Jul 2020

EXPERTS/SPEAKERS-
Prof. P.K. Biswas, IIT Kharagpur, Dr. Partha Pratim Roy, IIT Roorkee, Dr. Santosh Viparthi, MNIT Jaipur, Prof. Aparajita Ojha, IIITDM Jabalpur, 1 full day session by an expert from NVIDIA

Principal Coordinator	Co- Principal Coordinator	Academy level Coordinator- Contact Details for Queries
Prof. Aparajita Ojha aojha@iiitdmj.ac.in M:94258 00334 IIITDM Jabalpur	Dr. Santosh Vipparthi skvipparthi@mnit.ac.in M: 954 9658 135 MNIT Jaipur	Dr Ayan Seal, ayan@iiitdmj.ac.in 9425163016(Cell) IIITDM Jabalpur

MODULES TOPICS-

- **Introduction to Image Processing and Computer Vision (CV)** Introduction to Computer Vision, Main Goals and Challenges, Structure of Human Eye and Vision, Color Models, Image Processing Goals and Tasks, Image Enhancement, Edge Detection, Segmentation, Differential Evolution, Social Spider Optimization)
- **Introduction to Artificial Intelligence (AI) and Machine Learning (ML)** Introduction to Artificial Intelligence and Machine Learning, Supervised and Unsupervised Learning, Feature Extraction using Local Patterns and their applications to Image Processing and CV

- : Image Classification, Image Enhancement, Segmentation.
- **Introduction to Deep Learning (DL)** Basic differences of Conventional ML and DL approaches, Feed forward Neural Networks (NN), Back propagation, Stochastics Gradient Method and Variants, Regularization, and Optimization. Types of NNs and limitations. Applications of NN in Image Processing and CV.
- **Convolutional Neural Network architectures (CNN) for CV** The Convolution Operation, Motivation, Pooling, Basic architecture of a Convolution Neural Network CNN as feature extractors

- Image classification using CNN, Image Enhancement and Segmentation, Introduction to GAN
- **Motion Detection and Depth Estimation (DE)** Optical Flow, Flow Net and their Versions, Stereo Vision, DL based Depth Estimation
- **Object Detection using CNN** R-CNN, Faster R-CNN, YOLO, SSD and more recent models for Object Detection
- **Applications of CNN** Face Detection and Recognition using CNN, Siamese Network and Triplet Loss. Recent Advances

2. Advanced Optimization Techniques and Hands-on with MATLAB/SCILAB   13- 24 Jul 2020

EXPERTS/SPEAKERS-

Principal Coordinator	Co- Principal Coordinator	Academy level Coordinator- Contact Details for Queries
Dr. S J Nanda sjnanda.ece@mnit.ac.in M: 954 9654 237 MNIT Jaipur	Dr Prashant K. Jain pkjain@iiitdmj.ac.in 9425800310 IIITDM Jabalpur	Prof. Ila Sharma ila.ece@mnit.ac.in M: MNIT Jaipur

MODULES TOPICS-

- Unconstrained and Constrained Optimization, Linear Programming, Graphical Method, Symmetric Dual Problems, Simplex Method, Derivative based Optimization, Newton's Method, Least Mean Square Method. Quantum Superposition and Entanglement; Quantum

- Swarm Intelligence (Particle Swarm Optimization, Ant Colony Optimization, Cat Swarm Optimization, Cuckoo-search, Grey Wolf Optimization, Whale Optimization), Bio-Inspired Optimization (Artificial Immune System, Bacterial Foraging Optimization), Physical Algorithms (Simulated Annealing,

- Linear Optical Approaches; Nonlinear Optical Approaches; Limits of the approaches; Future scope
- Benchmark mathematical function optimization, Linear and Nonlinear System Identification, Dynamic System Identification, Communication Channel

Gates and Circuits; No cloning theorem & Quantum Teleportation; Bell's inequality and its implications • Multi-modal function Optimization, Evolutionary Computation (Genetic algorithm, Genetic Programming, Differential Evolution, Social Spider Optimization)	Colliding Bodies Optimization, Gravitational Search Optimization). • Multi-objective Optimization, Non-dominated Solutions, Non-dominated Sorted Genetic Algorithm (NSGA-II), Multi objective Particle Swarm Optimization, Many-objective Optimization, NSGA-III.	Equalization, Device Modeling, Forecasting/Prediction of time series, Data Classification and Clustering, Hybridization of optimization techniques with Neural Networks and Deep Neural Networks.

3. Data Science for All   27 Jul – 7 Aug 2020

EXPERTS/SPEAKERS- Prof DVLN Somayajulu-IIITDMK, Prof RBV Subramnayam NIT-W, Dr Atul Gupta IIITDMJ, Dr T Ramakrishnudu NIT-W, Dr Nagesh Bhattu – NIT AP, Dr Anand Kumar- NIT K Surathkal, Industry speakers.

Principal Coordinator	Co- Principal Coordinator	Academy level Coordinator- Contact Details for Queries
Prof. R. B. V. Subramanyam rbvs66@gmail.com M: *9491346969* NIT Warangal	Dr. Atul Gupta, IIITDM Jabalpur atul@iiitdmj.ac.in 9425152499 Academy level coordinator Dr. Kusum Kumari Bharti, kusum@iiitdmj.ac.in M: 9406711296; IIITDM Jabalpur	Prof. R. B. V. Subramanyam rbvs66@gmail.com M: *9491346969* NIT Warangal
MODULES TOPICS-		
• **Mathematical Foundations of Data Sciences**: Matrices, Vectors, Vector Spaces, Matrix Decomposition, Singular Value Decomposition, Statistical Measures, Probability basics, density function, variance, conditional probability, Markov Chains	• **Data Processing**: Dimensionality Reduction, Principal Component Analysis. • **Machine Learning basics**: Regression, Classification – Decision Trees, Naïve Bayesian Classifier, Clustering, Handling Large Datasets: MapReduce	• **R for Data Science**: Data Wrangling, Data Visualization, Programming • **Python for Data Science**: Normal Python, NumPy, Pandas, Matplotlib • Deep Learning • **Scikit, Keras and TensorFlow**: Practice on ML topics

4. ICT Tools for Teaching, Learning process & Institutes   10 Aug – 21 Aug 2020

EXPERTS/SPEAKERS-
(i) Prof. D. B. Phatak, IITB (ii) Prof. Prabhakar, IITK (confirmation awaited)
Experts from host institutes- (i) Prof. Aparajita Ojha, IIITDMJ (ii) Prof. L. Bhargava, MNITJ (iii) Dr. Pilli Emmanuel Shubhakar, MNITJ, (iv) Dr. Arka Prokash Mazumdar, MNITJ (v) Dr. A. M. Joshi, (vi) Dr. R. K. Maddila, MNITJ, (vii) Prof. V. Sahula, MNITJ

Principal Coordinator	Co- Principal Coordinator	Coordinator from IIITDM Jabalpur
Dr. Bharat Gupta, NIT Patna bharat@nitp.ac.in M:93314 06964	Dr. Amit M. Joshi, MNIT Jaipur amjoshi.ece@mnit.ac.in M: 954 9654 239	**Dr Prashant Kumar Jain IIIDM Jabalpur pkjain@iiitdmj.ac.in 9425800310**
Academy level Coordinator-	**Contact Details for Queries**	
Dr. Rakesh Ranjan M:9334385016, Email: rr@nitp.ac.in NIT Patna	Dr. J. B Maurya, M:9198042481 Email: jbm.ec@nitp.ac.in NIT Patna	

MODULES TOPICS-

- **Use of ICT**- Effective use of ICT for transforming pedagogy and empowering students; Empowerment through Communication skills
- **Online/blended Learning**- Adopting online/blended-learning in teaching learning process
- **MooC**- Use of MooC for contents management, class organization, assessment; MooC's deployment and use; Building Course Website and Google Suite
- **Teaching Learning Tools & e-content generation**- Using tools for teaching learning- interactive whiteboards/smart-screens, video-conferencing, digital content creation, design of instructional material & presentation;
- **Content Dissemination-** Management, Version Control; ICT tool for English language teaching and learning; Illustration tools and author aids- Visio
- **Computer Based Training (CBT)** =- CBT for letters generation, certificate preparation, report writing, Presentation and posters preparation, Spreadsheets & evaluation, Research Resources & Bibliography Management etc.

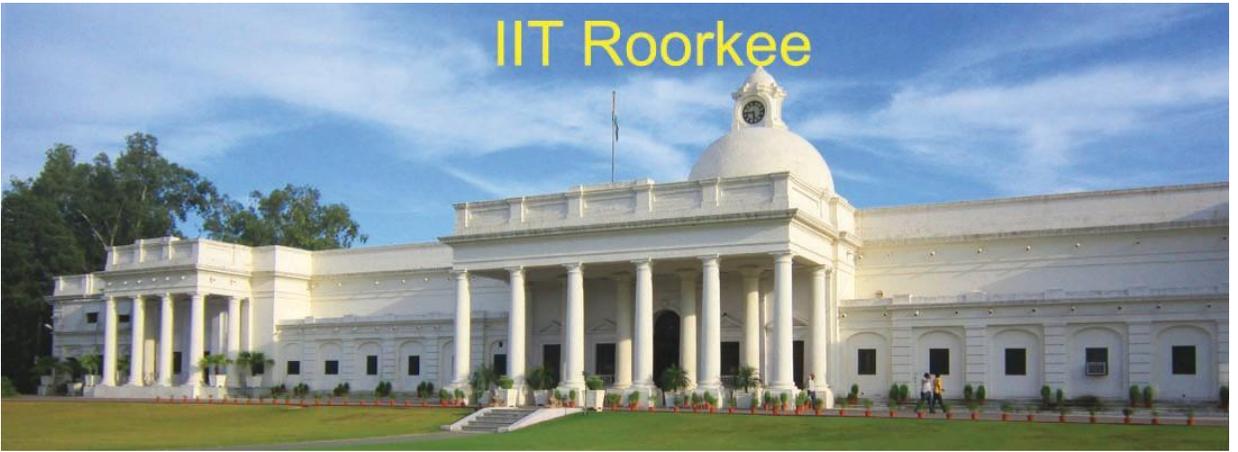## 5. Python Programming – 18 Sept 2020   7 Sept

EXPERTS/SPEAKERS-
Prof. Aparajita Ojha, IIITDMJ, Dr. Arka P. Mazumdar, MNITJ, Dr. Emmanuel S. Pilli, MNITJ

Principal Coordinator	Co- Principal Coordinator	Academy level Coordinator- Contact Details for Queries
Dr. Atul Gupta, atul@iiitdmj.ac.in 9425152499 IIITDM Jabalpur	Dr. Arka Prokash Mazumdar apmazumdar.cse@mnit.ac.in M: 954 9658 129 MNIT Jaipur	Dr Prashant K. Jain IIITDM Jabalpur pkjain@iiitdmj.ac.in 9425800310

MODULES TOPICS-

- **Introduction & basics of Python Programming:** History of Python, Installing Python, Executing Python Programs, Internal Working of Python, Python Implementations. Python Character Set, Token, Python Core Data Type, print() function, Assigning Value to Variable, input() function, eval() function, Formatting Number and Strings, Operators and Expressions, Differential Evolution, Social Spider Optimization)
- **Decision Statements; Loop Control Statements; Functions, Strings** Boolean Type, Boolean Operators, Using Number and Strings with Boolean Operators, Decision Making Statements and Conditional Expressions While loop, range( ) Function, For Loop, Nested Loops, Break Statement, Continue Statement; Syntax and Basics of a Function, Use of a function, Parameters and Arguments,

- Local and Global Scope Scope of a Variable, return statement and Recursive Functions.; str class, Inbuilt functions for String, index[] operator, traversal of String, String operators, String Operations,
- **Lists and Dictionaries; Tuples and Sets; File Handling; Pandas** Creating Lists, Basic list operators, Slicing, Inbuilt functions for Lists, List operator, List Methods, Splitting, Need of Dictionary, Creating a Dictionary , Adding and Replacing Values, Retrieving Values ; Deleting Items and Traversing Dictionaries. Tuples and Sets: Creating Tuples; Tuple () Function, Inbuilt Functions for Tuples, Indexing and Slicing; Operations on Tuples; Traverse Tuples from a List, Set operators; Set class. Object-Oriented Programming: Classes and objects, methods,

- Operator Overloading, Inheritance, super () and Method Overriding. File Handling: Need of File Handling, Reading/Writing Text and Numbers to/from a File; Directories on a disk. Pandas: Using Pandas, the python data analysis library and data frames
- **Data Handling and Use Cases-** RE Pattern Matching, Parsing Data, Introduction to Regression , Types of Regression , Use Cases , Exploratory data analysis , Correlation Matrix , Visualization using Matplotlib and Implementing linear regression.
- **Machine Learning**- Machine Learning - Algorithm, Algorithms - Random forest , Super vector Machine , Random Forest , Build your own model in python and Comparison between random forest and decision tree.

IIT Roorkee

IIT Guwahati

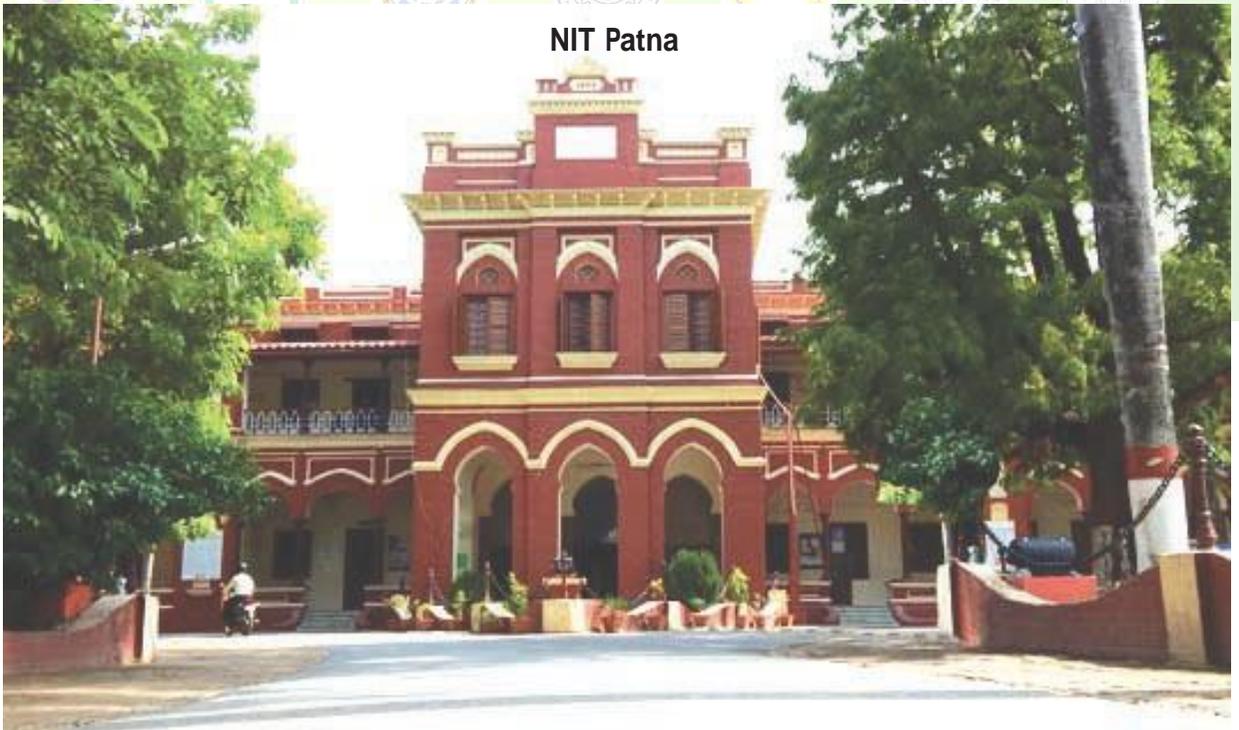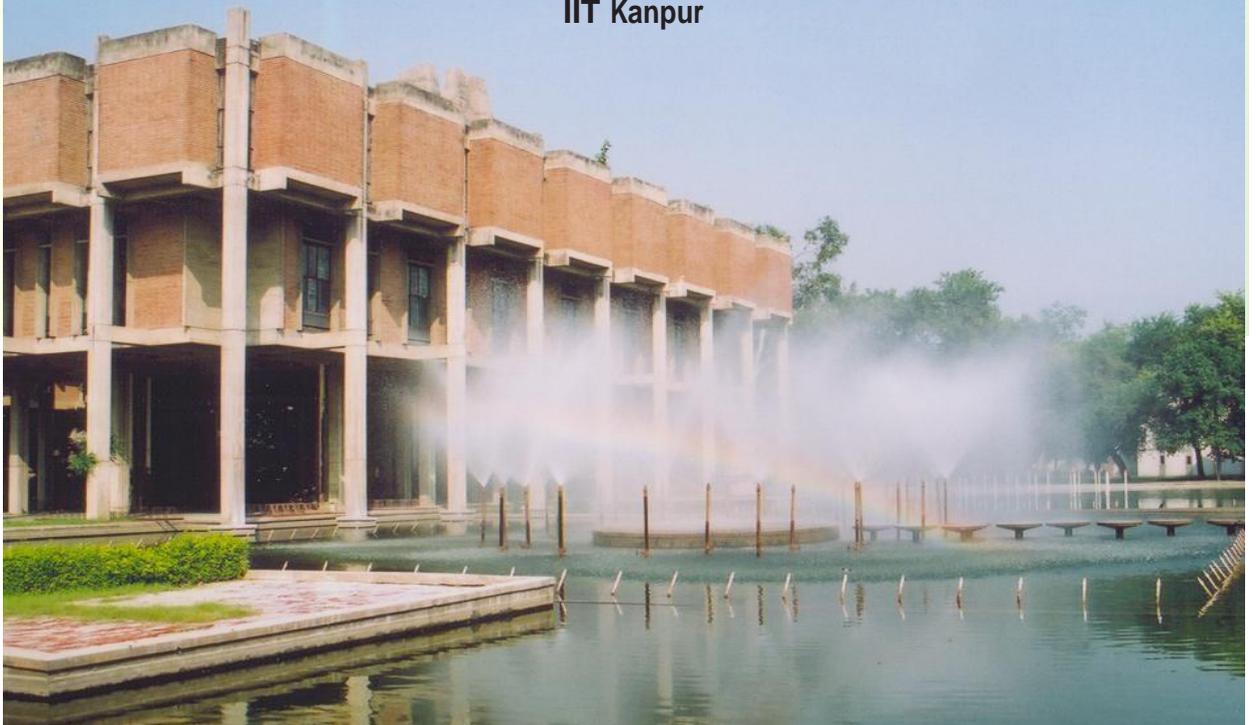NIT WARANGAL

MNIT Jaipur

NIT Patna

PDPM IIITDM Jabalpur

IIT Kanpur

FARMING DATA
Vast farm data is stored on cloud, fed to advanced analytics engine, and used by agro-input companies to customize serving and farmers to make timely operating decisions to enhance yield and profitability.

CONNECTED LIVESTOCK
Sensors monitor animal health and food intake; send alerts on health anomalies or reduction in food/water intake.

SMART DRONES
Survey fields, map weeds, yield and soil variations; enable application of inputs and map productivity. Drones are also used for applying pesticide and herbicide.

AUTONOMOUS TRACTOR
GPS-controlled autonomous tractor charts its route automatically, ploughs the land saving fuel, and reduces soil erosion and maintains soil quality.

WEATHER FORECAST
Enables decisions about when to plant, what area and crop variety to plant, when to apply fertilizers and when to harvest.

CROWD SOURCING
Establish agribusiness communities of practice to share insights or videos/pictures; also share information with other farmers in rural areas.

FLEET OF AGRIBOTS
Agribots tend to crops, weeding, fertilization and harvesting; reduce fertilizer cost up to 90% and eliminate human labor.

SOIL SENSORS
Provides information for ground-truthing irrigation decisions and fine-tuning irrigation practices; avoids under and over-irrigation saving crops from yield loss, water-related diseases, nutrient losses and leach-outs.

Academy & States/UTs catred	Advisory Board Chairman	Chief Investigator	Contact Details at Academy For all general queries
Electronics & ICT Academy at IIT Guwahati Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura,Sikkim	*Prof. T. G. Sitharam* director@iitg.ac.in	*Prof. Ratnajit Bhattacharjee* ratnajit@iitg.ac.in M: 9954498116	Ms Feroza Haque (PM) Email: feroza.haque@iitg.ac.in M: 789 6233 561 Website: www.iitg.ernet.in/eictacad/
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