Government of India Initiative for Employability Enhancement

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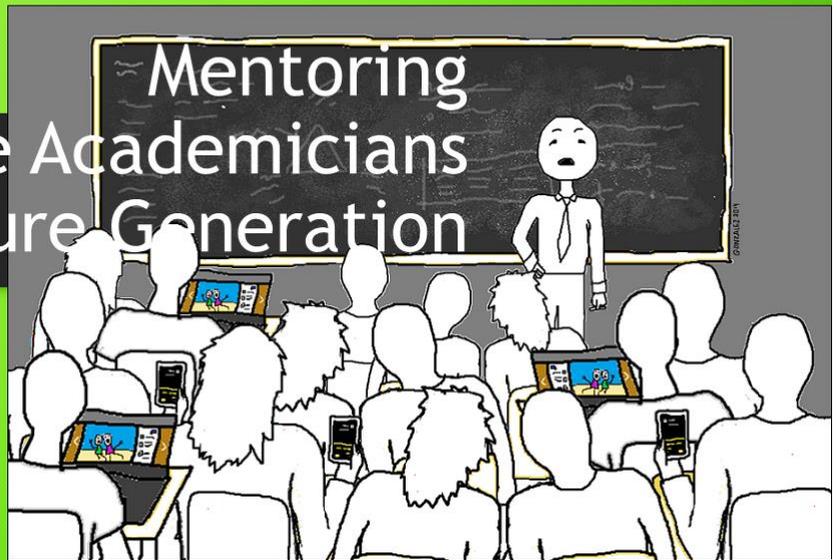
- *Faculty Training*
- *Training and Consultancy*
- *Services for Industry*
- *Technical Incubation and Entrepreneurship*
- *Continuing Education for Students & Professionals*

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) premier and leading 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. Subsequent to internal reviews in Ministry, revised cost and targets for the Electronics and ICT Academies in both the Categories for a period of six years are as follows.

Category	Total Outlay	Internal Revenue Generation	Grants-in-Aid from Central Government	Training Target Total
Category-A & B: 7- Academies	Rs. 87.7 crore	Rs. 10.4 crore	Rs. 77.3 crore	92,800

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 would be provided funding support upto financial year 2021-22, 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 March 2022. All these Academies will cater to the requirements of identified neighboring 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- Oct 2020). All these Summer- courses will be offered through online live web-conferencing, with lectures delivered by eminent 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:

* For a particular programme, a participant is encouraged to apply to Academy level coordinator ONLY, belonging to any participating academy in that 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 programmes are being offered online, through web-conferencing 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
Machine Learning for Computer Vision	29 Jun 2020	10 Jul 2020	ICT Tools for Teaching, Learning process & Institutes	10 Aug 2020	21 Aug 2020
Quantum Computing	06 Jul 2020	11 Jul 2020	Demystifying 5G RF ASICs	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	Digital 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 the aforesaid programmes 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 a mandatory examination fee of Rs. 500/- (faculty/PhD-scholars) OR Rs. 1000/- (others), if they desire a certificate of completion of programme. This 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) by 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 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

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Academy level Coordinator- Contact Details for Queries

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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. Quantum Computing (Delivered by experts from Microsoft)	6 - 11 Jul 2020

EXPERTS/SPEAKERS- Industry- Microsoft Inc. – experts from Microsoft Garage- Azure Quantum

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MODULES TOPICS-

- Quantum Measurements Density Matrices; Positive-Operator Valued Measure; Fragility of quantum information: Decoherence
- Quantum Superposition and Entanglement; Quantum Gates and Circuits; No cloning theorem & Quantum Teleportation; Bell's inequality and its implications

- Quantum Algorithms & Circuits; Deutsch and Deutsch–Jozsa algorithms; Grover's Search Algorithm; Quantum Fourier Transform
- Shore's Factorization Algorithm; Quantum Error Correction: Fault tolerance; Quantum Cryptography; Implementing Quantum Computing: issues of fidelity

- Scalability in quantum computing; NMR Quantum Computing; Spintronics and QED approaches
- Linear Optical Approaches; Nonlinear Optical Approaches; Limits of the approaches; Future scope

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

EXPERTS/SPEAKERS- 1) Prof. Ganapati Panda, Fellow INAE, Fellow NASI, Former Dy. Director and Prof. Emeritus, IIT Bhubaneswar, 2) Dr. Nithin V. George, Associate Professor, Dept. of Electrical Engineering, IIT Gandhinagar, 3) Dr. Pyari M. Pradhan, Assistant Professor, Dept. of Electronics and Communication Engg., IIT Roorkee 4) Dr. Sitanshu Sekhar Sahu, Assistant Professor, Dept. of Electronics and Communication Engg., Birla Institute of Technology Mesra 5) Dr. Jagdish Chand Bansal, Associate Professor, Dept. of Mathematics, South Asian University, New Delhi 6) Dr. Sriparna Saha, Associate Professor, Dept. of Computer Science and Engineering, IIT Patna 7) Dr Prashant K. Jain, IIITDMJ 8) Prof. Rajesh Kumar, Professor, Dept. of Electrical Engg., MNIT Jaipur 9) Dr. Satyasai Jagannath Nanda, Assistant Professor (Course Coordinator), Dept. of Electronics and Communication Engg., MNIT Jaipur

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MODULES TOPICS-

- **Fundamental of Optimization-** Unconstrained and Constrained Optimization, Linear Programming, Graphical Method, Symmetric Dual Problems, Simplex Method, Derivative based Optimization, Newton's Method, Least Mean Square Method.
- **Nature Inspired Optimization-** Multi-modal function Optimization, Evolutionary Computation (Genetic algorithm, Genetic Programming, Differential Evolution, Social Spider Optimization)

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, 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.

- **Applications-** Benchmark mathematical function optimization, Linear and Nonlinear System Identification, Dynamic System Identification, Communication Channel Equalization, Device Modeling, Forecasting/Prediction of time series, Data Classification and Clustering, Hybridization of optimization techniques with Neural Networks and Deep Neural Networks, genomic signal processing.

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4. Embedded UVM open source Emulation & Functional Verification   13- 24 Jul 2020

EXPERTS/SPEAKERS- (i) Inaugural Speaker- Ms. Dora Smith (Academic program(USA), Siemens); (ii) Other Speakers- 1. Mr. Devesh Dwivedi (Samsung Research Lab); 2. Mr. Anand Venkitachalam (Western Digital) 3. Mr. Ruchir Dixit (Managing Director, Siemens-Mentor); 4. Mr. Israr Ahamed Sheikh (Intel),5. Mr. Gaurav Jalan, Founder CEO, SpicaWorks (confirmation awaited), 6. Dr. Virendra Singh, IITB (Awaited), 7. Dr. Gaurav Trivedi, IITG
(iii) Industry Expert- Mr. Puneet Goel and Mr. Dinesh Gupta

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MODULES TOPICS-

- Introduction to Discrete Event Simulation Technology, Verilog, and Functional Verification, Getting acquainted with Simulation Tools
- Data Communication in Hardware, Bus functional models,

Types of Hardware Buses (Serial, Memory Mapped, Streaming), UVM report mechanism

- Concepts of object-oriented programming, EUVM data types and program structure
- UVM Phasing and Objection mechanisms,

TLM ,OOP Design Patterns (Template and Strategy)

- Advanced UVM Concepts – Factory, Callbacks – OOP Design Patterns (Factory and Observer), Concepts of SoC Verification

5. Wireless Communication Technologies for IoT	27 Jul – 7 Aug 2020

EXPERTS/SPEAKERS- Inaugural Speaker- Prof. Sukumar Nandi (IIT Guwahati); (ii) Other Speakers- 1. Dr. Ferdous Ahmed (IIIT Guwahati), Prof. Ratnajit Bhattacharjee(IIT Guwahati), Prof. Sukumar Nandi (IIT Guwahati), Dr. Santosh Biswas (IIT Guwahati), Dr. Rishikesh Kulkarni (IIT Guwahati); (iii) Speakers from Industry- Kaushlendra Singh Sisodia(Senior Expert, UniConverge), Mr. Rishabh Kumar(Senior Expert, UniConverge), Mr. Jitesh Kumar(Senior Expert, UniConverge)

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MODULES TOPICS-

• **Introduction to IoT**: What is IoT IoT applications in different domains Trends in IoT Market • **Basic Architecture**:Basic knowledge of IOT Architecture; Protocols Introduction (MQTT, AMQP, CoAP) • Recap of Embedded, Basic Concepts Sensors, Actuators, Microcontroller units and Architecture Application driven Selection of Microcontrollers • **IoT Architecture and Communication** Theory IoT Layered, Architecture and IPV6,	RF Zigbee, Wifi BLE e. LPWAN • **IoT Protocols** Theory MQTT: CoAP, 6LoWPANdesign • **Introduction of Cloud Computing**: About Cloud and Cloud Computing, Benefits of cloud, History of cloud computing, Deployment Models • **Cloud Computing** : Top Cloud providers, Service Models, Service catalogues, Different cloud services, Advantages for different offerings • **Web Services**:What are web services, Why web services, Types of web services,	RESTful web services, Design Principles • **Design Principles** Design principles with respect to architecture, power, ruggedness, size, weight, security Practical usecases. • **IoT Security:** How secure is IoT, Issues and vulnerabilities, Key aspects for securing IoT Solutions • **Industry 4.0**: Introduction to Industry 4.0, Road to Industry 4.0, Role of data, information, knowledge and collaboration in future organizations. Related Disciplines, System, Technologies for enabling Industry 4.0

6. 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.

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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

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

EXPERTS/SPEAKERS- Confirmation awaited- (i) Prof. D. B. Phatak, IITB (ii) Prof. Prabhakar, IITK

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) Dr. Santosh Vipparthi, MNITJ & Prof. V. Sahula, MNITJ (viii) Dr. Prabhat Kumar & Dr.Bharat Gupta, NIT Patna

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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.

8. Demystifying 5G RF ASICs — 24 Aug – 4 Sep 2020

EXPERTS/SPEAKERS- Shri Surinder Singh (Director, SCL Chandigarh); (ii) Other Speakers- Shri H. S Jatana (Senior Head, SCL Chandigarh), Prof. Anand Bulusu (IIT Roorkee), Dr. Salil Kashyap, Dr. Ribhu Dr. Sudarshan Mukherjee, Dr. Gaurav Trivedi, IITG (iii) Industry- Dr. Aditya Dalakoti, Mr. Ashish Jindal (DRDO), Puneet Mittal

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MODULES TOPICS-

- **Introduction and Tools Overview**: Introduction to 5G (progression of communication channels from 1G to 5G, usage, timeline, market); Basics of RF Communication; Setup of Scikit-RF and CppSim RF Simulator
- **5G MIMO Architecture and System Simulation**: MIMO in 5G, MIMO for TX and RX, Basic 5G System Setup and visualization using a simulator
- **RF ASIC Concepts** 1: Two port Networks, Stability, Equivalent Device Models, Impedance Matching, Biasing
- **RF Simulations**: Hands of tutorial for Doing Impedance Matching and bias-T development using Scikit-RF
- **RF ASIC Concepts** 2: PDK Development, Layout Issues, Packaging Issues and package selection, Testing
- **Power Amplifier Design**: Basics of PA, different classes, performance matrix, design of one topology for 5G
- **Power Amplifier Simulations:** Design and Simulations of a couple of PA topologies using a Scikit-RF.
- **LNA Design:** LNA Basics, Design Topologies, Trade-Off Space for LNA
- **LNA Simulations:** Design and Simulations of a couple of LNA topologies using a Scikit-RF.
- **RF Channel Architecture and Simulations:** Different Channel Architectures and their feasibility from 5G perspective, Simulations of channel using CppSim RF System Simulator

9. Python Programming   7 Sept – 18 Sept 2020

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

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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.

10. Digital Tools for Writing, Authoring and reviewing manuscripts   21 Sept – 2 Oct 2020

EXPERTS/SPEAKERS- (i) Dr. C. P. Ravikumar, Texas Instruments (Confirmation awaited) (ii) Prof. Yogananda C. S., Chairman TUG-group (consent awaited), (iii) Mr. Gaurav Nolakha, Google USA; (iv) Dr. M. Ravi Kumar, MNITJ, (v) Dr. Arka P. Mazumdar, MNITJ, (vi) Dr. Amit M. Joshi, MNITJ (vii) Prof. V. Sahula, MNITJ

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MODULES TOPICS-

- Technical Writing and Research Methodology:
- Language support tools- Grammarly, Draft
- Introduction to Typesetting in Latex; Writing a technical report in Latex- outline & Contents
- Mathematical style- Mathematics in Science and Technology

- Writing manuscript in Latex- working with figures, tables
- Technical Reports, Manuscripts, Thesis
- Making presentation in Latex, Beamer
- Reviewing manuscripts; Responding to reviewer's comment

- Bibliography management, Mendeley, JabRef
- Publishing in print and for the Internet
- Online tools- CV, Sharelatex, OverLeaf, Author Kits
- Agile Classroom: Teaching, Learning

11. Cyber Security	5 Oct – 16 Oct 2020

EXPERTS/SPEAKERS- - (i) Prof. R. K. Shymsunder, IIT Bombay, (ii) Prof. Krishna Shivlingam, IITM , (iii) Dr. Mayank Agarwal, IITPatna, (iv) Dr. Somanath Tripathi, IIT Patna, (v) Dr. Rajiv Mishra, IIT Patna, (vi) Sri Ch A S Murthy, CDAC Hyderabad (vii) Rtd Prof. Aditya Bagchi, ISI Kolkata (confirmation awaited) (viii) Prof.   Bruhadeshwar Bezawada, MEC, Hyderabad (ix) Hari Babu P. Associate Director, C-DAC Bangalore
Confirmation awaited-, Prof. S. K. Nandi, IITG
Expert from Host Institute: (i) Dr. M P Singh, NIT P, (ii) Prof. M. S. Gaur, IITJammu, (iii) Dr. Amit Kumar Singh, NIT P; (iv) Dr. Emmanuel S Pilli, MNITJ (v) Dr. Ramesh Babu Battula, MNITJ

Principal Coordinator		Co- Principal Coordinator	
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NIT Patna	MNIT Jaipur	NIT Patna

MODULES TOPICS-

- **Wireless Vulnerabilities** - 802.11 Wireless Vulnerabilities, Hacking Wi-Fi networks By Passing Windows logon system,
- **Software Security** - Buffer overflow, Integer overflow, Format string vulnerabilities
- **Software Security** - Buffer overflow, Integer overflow, Format string vulnerabilities

- **Web Security** - SQL injection, XSS, CSRF, etc.
- **Web App Penetration Testing**, Data security in cloud, Big data and cyber security; Network Security - DNS, ICMP, ARP attacks, IP Sec, BGP Sec, etc., Browser based attacks
- **Security Tools** - DVWA, Snort, Metasploit , Wireshark, NMAP, Nessus, Openssl, etc.

- **Security in IoT**, Tools for cyber security
- **Basic Cryptography** and its importance in Cyber security, Cryptography Hash functions
- **Blockchain** based IOT Security
- **IDS**- Intrusion Detection System
- Cyber Security Assurance and Law, Cyber Forensics

Various courses from IIT Kanpur in Intelligent Self Paced Education (iSPED) mode are being offered in this pandemic period till September 2020. The courses are made available to faculty for free for a limited duration under FDP. Participants may please ignore the price mentioned on the URL for the courses, and join the courses of their choice.

12. Computer System Security (https://ict.iitk.ac.in/product/computer-system-security/)

EXPERTS/SPEAKERS-
Prof. Sandeep Shukla (https://www.cse.iitk.ac.in/users/sandeeps/)

Principal Coordinator

Prof. Sandeep Shukla
https://www.cse.iitk.ac.in/users/sandeeps/

MODULES TOPICS-

- Introduction, Interview with Prof.Sandeep Shukla; Learning objectives, Sample Attacks, The Marketplace for vulnerabilities, Error 404 Hacking digital India part 1 chase
- Control Hijacking, More Control Hijacking attacks integer overflow, More Control Hijacking attacks format string vulnerabilities, Defense against Control Hijacking
- Confidentiality Policies, Confinement Principle, Detour Unix user IDs process IDs and privileges

- VM based isolation, Confinement principle, Software fault isolation, Rootkits, Intrusion Detection Systems
- Secure architecture principles isolation and leas, Access Control Concepts
- Web security landscape, Web security definitions goals and threat models, HTTP content rendering, Browser isolation, Security interface, Cookies frames and frame busting

- Major web server threats, Cross site request forgery & scripting, Finding vulnerabilities, Secure development
- Basic cryptography, Public key cryptography, RSA public key crypto, Digital signature Hash functions; Email security certificates, Transport Layer security TLS, IP security, DNS security
- Internet infrastructure, Summary of weaknesses of internet security, Link layer connectivity and TCP IP connectivity

13. Full Stack Developer
(https://ict.iitk.ac.in/product/full-stack-developer-html5-css3-js-bootstrap-php-with-mysql/)

EXPERTS/SPEAKERS-
Rahul Garg, software industry experience of over 21 years

Principal Coordinator

Rahul Garg, software industry experience of over 21 years

MODULES TOPICS-

- Introduction to HTML, CSS, JavaScript & BootStrap, Welcome to Bootstrap, Getting started with the first Bootstrap app, Creating Bootstrap image, CSS Box model, Adding heading, Adding Textboxes, Adding Buttons, Positioning as per the requirement, Adjusting the borders
- Introduction to the Project, Creating the Navigation bar, Understanding Breakpoints and BootStrap Grid system, Creating the Paragraph, Creating Bootstrap cards, Creating Footer

- Creating a blog, Completing the header, Pseudo Elements, Pseudo Classes, Creating navigation bar and jumbotron, Creating cards, Creating Main content, Completing the project
- Introduction to CSS Flexbox, Creating the Header using Flexbox, Using Alignments with Flexbox, Flex Property in CSS
- Factory Pattern in JavaScript, Design Patterns in JS, Closures, Events in JavaScript, Creating a sample application with events, Creating a simple Photo App with JS Events

- Creating a simple to-do list app, Event Propagation, Local Storage, JavaScript Timing functions, Web Workers in JavaScript, Call, Apply, Bind, Functions in JavaScript, this keyword, JavaScript Chaining
- Introduction to Asynchronous Programming, AJAX in JavaScript, Logging data from AJAX requests, JavaScript Callback functions, Promises in JavaScript, Generators in JavaScript, Generators Advanced, IIFE, Block Scope, Hoisting, Prototype in JavaScript
- Summary & Conclusion

14. Android Development (https://ict.iitk.ac.in/product/learn-android-through-19-projects/)

EXPERTS/SPEAKERS-
Rahul Garg, software industry experience of over 21 years

Principal Coordinator

Rahul Garg, software industry experience of over 21 years

MODULES TOPICS-

- UI Layouts and Controls, UI Design using XML Code, Implementing, Interface on Activity, Create a Currency Converter Application
- Introduction of ImageView, Android User Permissions, Http URL Connection, AsyncTask, Progress Dialog, Toast
- User Interface Design (Relative Layout), Open Weather Map APIs, APIs Request, JSON Parsing, Create a Weather Conditions App
- Working with Camera, Modifying Media Helper, Working with Video Recording App
- Introduction Intent Filters, Working with Intent Filters, Introduction to Broadcast Receiver

- Working with Broadcast Receiver, Run the Caller App
- Introduction to Services, Working with Services, Introduction to Intent Services, Working with Intent Service part
- Introduction to Snackbar Floating, Action Button, Working with Snackbar Floating Action Button, Creating Theme, Working with Floating EditText Label, Working with Table Layouts
- Working with Menu, Design Preferences for Application, Handling Location Preferences change, Getting Location from Shared Preferences

- Basics Firebase Admob, Integrating, Firebase Admob, Working with, Banner Ads, Working with Interstitial Ads
- Basics Content Provider, Working With Contacts Content Provider, Introduction Loader API, Creating, Cursor Loader, Loading Contacts In ListView, Creating Content Provider, Writing Query To Content Provider
- Introduction Google Maps, Running Application, Adding Runtime Permission, Running Request, Location Update, Map Type, Working With Maps
- Introduction of Bluetooth API, Listing Paired Device, Scanning Nearby Devices

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

IIT Roorkee
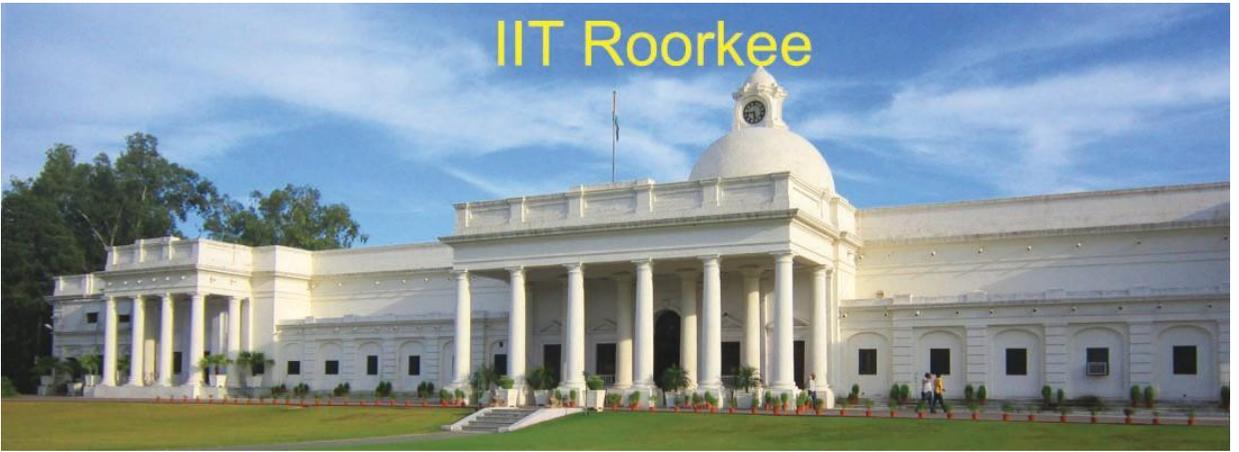
IIT Guwahati

NIT WARANGAL

MNIT Jaipur

NIT Patna
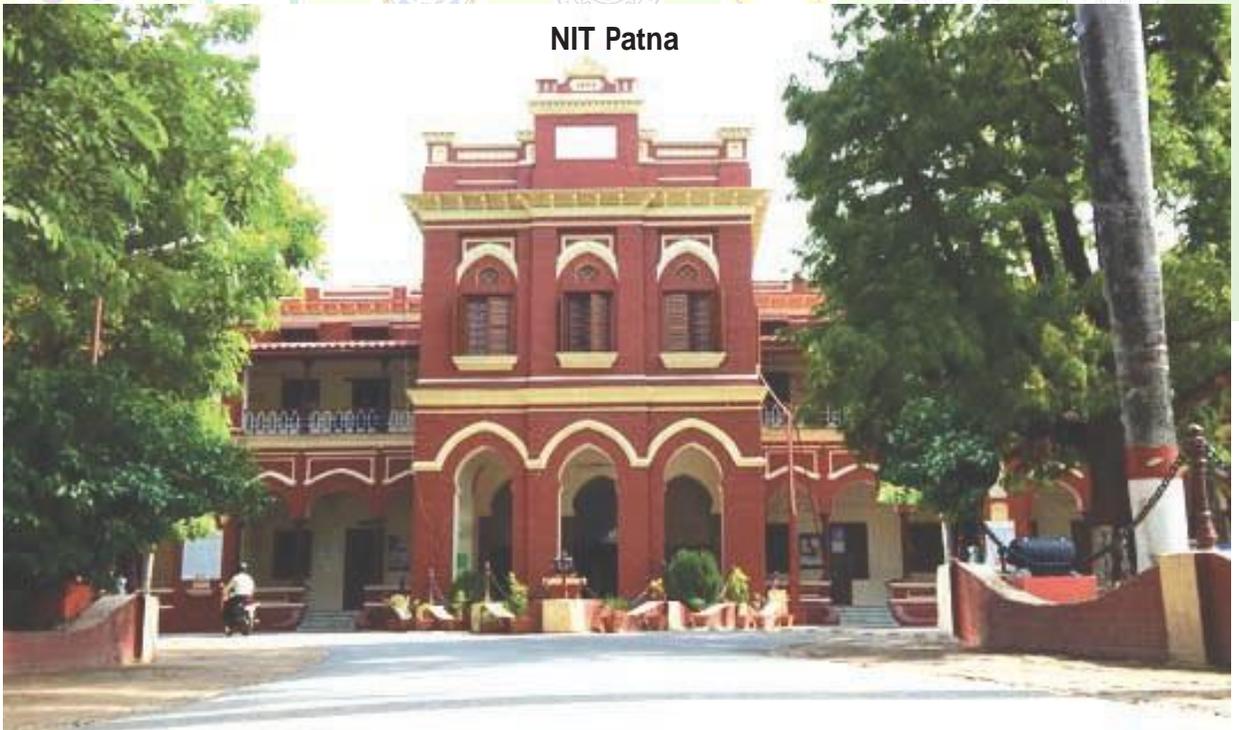
PDPM IIITDM Jabalpur

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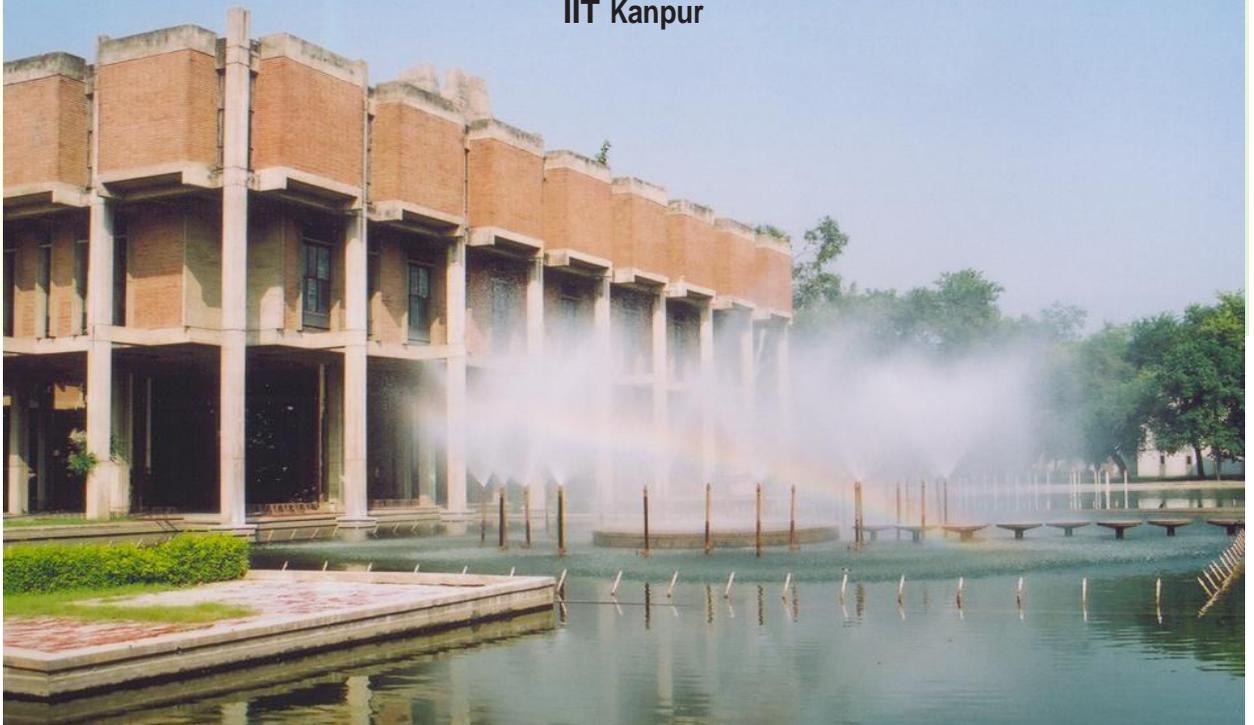
FARMING DATA
Vast farm data is stored on cloud, fed to advanced analytics engine, and used by agro-input companies to customize serving and farmers to make timely operating decisions to enhance yield and profitability.

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
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