सत्यमेव जयते

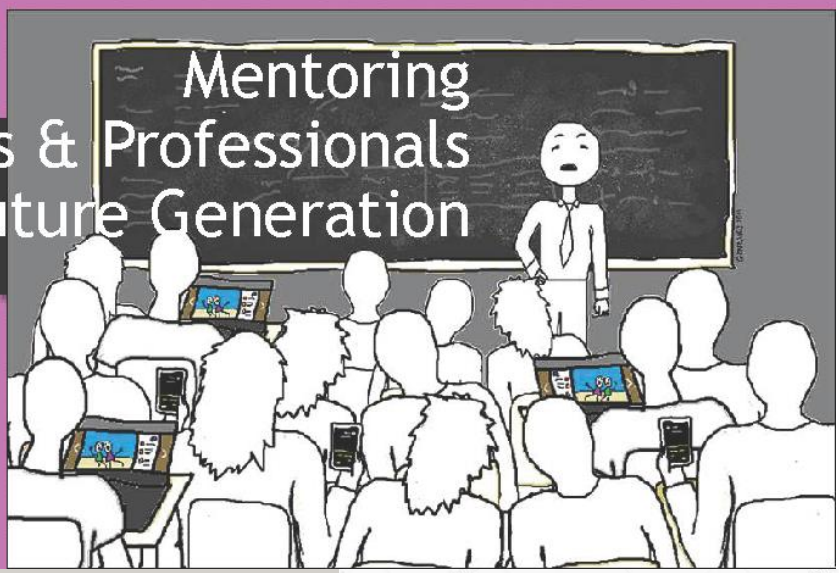
National Knowledge Network

Ministry of Electronics & Information Technology

Digital India
Power To Empower

Government of India Initiative for Employability Enhancement

Mentoring Academicians & Professionals for Future Generation



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

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

Programme brochure for Summers 2022

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. After internal reviews in Ministry, revised cost and targets for the Electronics and ICT Academies in both the Categories for a period of seven years 4 months are as follows.

Category	Total Outlay	Internal Revenue	Grants-in-Aid from	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 up to financial year 2022-23 (Sept'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 2023. 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/ un-employed
- Design, Develop and Deliver specialized modules for specific research areas
- Providing advice and support for technical incubation and entrepreneurial activities

About Summer Courses

Online Training Programmes in core areas of Electronics and Information & Communication Technology (ICT) streams have been planned by academies for delivery during Summers (i.e., Jun- Sep 2022). All these Summer courses will be offered through online live web-conferencing, with instructor led live talks delivered by eminent experts from IITs, NITs, IIITs and other premier institutes/industries, even from within our country and abroad. 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 respective coordinator at anyone of the seven Academies, participating in that programme.
* Government of India norms will be followed for SC/ST/EWS category participants.
* The application form is to be submitted in the online mode to the 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, this Summers, Jun - Sep 2022, each of 6/10 days duration.

Names of courses in Summers 2022	Starting date	Completion date	Names of courses in Summers 2022	Starting date	Completion date
Trends in Robotics & Automation	4 Jul	15 Jul 2022	From Zero to Chip Design Workshop using OpenPOWER cores (IBM)	8 Aug	19 Aug 2022
Additive manufacturing & 3D printing	18 Jul	29 Jul 2022	Advanced Optimization Techniques and Hands-on with MATLAB/SCILAB	8 Aug	19 Aug 2022
Cyber Security	18 Jul	29 Jul 2022	Curriculum Development in the Light of NEP 2020	8 Aug	19 Aug 2022
Android Programming	18 Jul	29 Jul 2022	Introduction and Applications of NLP and IOT	16 Aug	20 Aug 2022
Research methodology and authoring/reviewing Manuscripts	25 Jul	5 Aug 2022	Programming using MATLAB	22 Aug	2 Sep 2022
Smart Healthcare Technologies: Opportunities & Challenges	25 Jul	5 Aug 2022	Medical Image Processing	22 Aug	2 Sep 2022
Fundamentals of 5G & beyond wireless systems	1 Aug	5 Aug 2022	Open source FPGAs	22 Aug	2 Sep 2022
Malware Analysis with data science	1 Aug	12 Aug 2022			

Following are the programmes being offered as Self-Paced in this Summers, Jun - Sep 2022, by IIT Kanpur Academy.

Introduction to Compilers	Programming in Python	Computer System Security	Smart Grid Technology	https://ict.iitk.ac.in

Target Beneficiaries:

Interested Faculty/students of engineering/other institutions & professionals from our country as well as from outside India are eligible to attend these Summers courses. Additionally, faculty of non-engineering background are also invited to attend FDP on ICT Tools and techniques for Teaching Learning Process & Institutes. Industry persons and student 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 the academy. Selected participants will be communicated through email / notified in E&ICT Academy websites. There is no limit on the number of participants, however, othe nly first 1000 participants would enjoy duplex both way video/audio. The 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 credits 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 4 hours per day.

Accommodation & Travel

There is no provision as well as no 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 programmes. However, candidates from India/SAARC/African countries are required to pay a mandatory examination fee of Rs. 500/- (faculty/PhD-scholars/students) OR Rs. 1000/- (others), and US$ 60 or £ 50 from other countries 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	Link for payment
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- https://ict.iiitdmj.ac.in/
MNIT Jaipur	Online registration at web site of Academy, MNIT Jaipur- http://www.mnit.ac.in/eict
IIT Kanpur	Online registration at web site of Academy, IIT Kanpur - https://ict.iitk.ac.in
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 – Sep 2022 is as follows.

1. Trends in Robotics and Automation		4 – 15 Jul 2022
EXPERTS/SPEAKERS- Consent awaited (i) Prof. SK Saha, IIT Delhi; Prof. Ashish Dutta, IIT Kanpur; Prof. PM Pathak IIT Roorkee; Dr Ekta Singla, IIT Ropar; Prof. VK Gupta, IIITDM Jabalpur; Dr Ravi Joshi, TechMagic, Japan		
Principal Coordinator	**Joint- Principal Coordinators**	
Prof. V K Gupta IIITDM Jabalpur vkgupta@iiitdmj.ac.in M: 9425163037	Dr. Gagan Deep Meena, NIT Patna gagandeep.ee@nitp.ac.in	Prof. P.M. Pathak, IIT Roorkee, eict@iitr.ac.in M:+91-9412528151.
Joint- Principal Coordinators		
Dr. Arka Prokash Mazumdar, MNIT Jaipur apmazumdar.cse@mnit.ac.in M: 954 965 9129		
MODULES TOPICS-		
• Course Contents: Introduction to Robotics, Mechanics of Manipulator and wheeled mobile robots, • Introduction to sensors and actuators, Human Centered Robots, Introduction to Human Centered • Robotics, basic concepts and computational models of 3D sensing, robot learning and cognition to humans and environment events, Wearable robotics, Introduction to wearable robotics,	• Classifications of wearable robotics, Bio-inspiration and biomechatronics, Human biomechanics, • Electroencephalography (EEG), EMG, Soft robotics, Introduction to soft robotics, design principles of • soft robots, soft actuators, soft sensors, soft robot kinematics, control of soft robot, Unmanned	• perceive humans, understand human behaviour, and decision making and planning in response to • Aerial vehicles, Introduction, Modeling and Dynamics Formulation, Frame Rotations and • Representations, Dynamics of a Multirotor Micro Aerial Vehicle, UAV Control, Lab sessions for • concept and mechanism demonstration and programming for robotics.

2. Additive manufacturing & 3D printing 18 - 29 Jul 2022

EXPERTS/SPEAKERS- from IITs/NITs/IIITs and industry-

Principal Coordinators

Prof. Prashant K Jain, IIITDM Jabalpur pkjain@iiitdmj.ac.in M: +919425800310	Dr. Om Ji Shukla, NIT Patna omjishukla.me@nitp.ac.in Dr. Sonu Rajak sonu.me@nitp.ac.in	Prof. Varun Sharma, IIT Roorkee eict@iitr.ac.in M: +91-9412528151

Joint- Principal Coordinators

Dr. Jinesh Kumar Jain, MNIT Jaipur jineshjain.mech@mnit.ac.in M: 954 965 0284		

MODULES TOPICS-

• MATLAB User Interface, Basic Operations, Data Format, Handling Variables, Expressions and Matrices, Programming Basics for decision making, Conditional/logical Statement, Execution Control, Loops, 2D Plotting Visualization Using MATLAB, 3D Plots, modifying plots using property editor, Automating Plots using Functions, Handling data in MS Excel and text file	• Debugging a program, Algorithm development and Problem formulation, Building Graphical User Interface (GUI), Building GUIs with display of information, Developing GUI for Input/output functions, App development in MATLAB, Generating Executable Files and Stand-Alone Applications, Case Studies	• Overview and basics of Rapid Prototyping/Additive Manufacturing/3D printing, Need, Basic Principles and Steps in RP/AM/3DP, Process chain, Classification of Additive manufacturing processes, FDM and SLS Process, Applications and case studies, Data preparation, STL File Problems, STL File Manipulation and Repair Algorithms, STL file reading, repairing, slicing, contour generation, path planning, G&M code generation, open-source software for 3D printing, Machine Demonstration, Part printing, Recent research trends in RP/AM/3DP, interdisciplinary aspects in RP/AM/3DP, Bio Medical applications.

3. Cyber Security 18 – 29 Jul 2022

EXPERTS/SPEAKERS- Consent awaited- (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
Experts 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	Joint- Principal Coordinators	
Dr. E. S. Pilli, MNIT Jaipur espilli.cse@mnit.a.in M: 954 964 8131	Dr. Suyel Namasudra, NIT Patna suyel.cs@nitp.ac.in M: 9707046535	Dr Neelam Dayal, IIITDM Jabalpur neelam.dayal@iiitdmj.ac.in M: 9473619501
Joint- Principal Coordinators		
Dr. Meenakshi Tripathi mtripathi.cse@mnit.ac.in M: 954 965 4393		

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

4. Android Programming 18 – 22 Jul 2022

EXPERTS/SPEAKERS- Consent awaited- Shri Abhishek Bhargava from Ritvij Bharat Private Limited

Principal Coordinator	Joint- Principal Coordinators	
Dr. Gaurav Trivedi, IIT Guwahati trivedi@iitg.ac.in M: 80110 00783	Dr. Prabhat Kumar, NIT Patna prabhat@nitp.ac.in M:8406001700	Dr. Mahipal Jadeja, MNIT Jaipur mahipaljadeja.cse@mnit.ac.in M: 7376157421
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MODULES TOPICS-

• Introduction to JAVA Concepts▪	• Dalvik Virtual Machine▪	• Sensors
• Detailed introduction to SQL▪	• Emulator Android Virtual Device	• Location Based Services and Google Maps
• Introduction to Android, Basic UI Design	• Adapters and Widgets in Android	• Telephony Services

5. Smart Healthcare Technologies: Opportunities & Challenges 25 Jul – 5 Aug 2022

EXPERTS/SPEAKERS- 1. Prof. Saraju P. Mohanty, Professor, University North Texas, USA; 2. Prof. Shekhar Bhansali, Professor, Florida International University, USA; 3. Dr. Himanshu Thapliyal, Assoc Professor, University of Tennessee, USA; 4. Dr. Linga Reddy Cenkeramaddi, University of Agder, Norway; 5. Prof. Ram Bilas Pachori, Professor, IIT Indore; 6. Dr. Sanjeev Srivastava, Professor, IIT Bombay; 7. Dr. Shubhajit Roy Chowdhury, Associate Professor, IIT Mandi 8. Dr. Nitin Khanna, Associate Professor, IIT Bhilai; 9. Dr. Deepak Joshi, Assistant Professor, IIT Delhi; 10. Dr. K.C. Roy, Associate Professor, IIT Patna

Principal Coordinator	Principal Coordinator	
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MODULES TOPICS- To be Announced (IIT Guwahati)

- A. Continuous Health monitoring, Smart Healthcare components
- B: IoMT Based Approaches for Smart Healthcare, Wearable Smart Health Devices,
- C Biomedical Embedded Systems, Challenges & opportunities in smart Healthcare
- D. Preventive healthcare, Smart Health sensors, Assistive technologies

6. Research methodology and authoring/reviewing Manuscripts

25 Jul – 5 Aug 2022

EXPERTS/SPEAKERS- (i) Dr. C. P. Ravikumar, Texas Instruments (ii) Prof. Binod Mishra, IIT Roorkee, (iii) Prof. Kannan Moudgalya, IIT Bombay (consent awaited) (iv) Mr. C. V. Radhakrishnan, TUG & River-Valley (v) Prof. Yogananda C. S., Chairman TUG-group (vi) Dr. Prathap Haridoss, IIT Madras (consent awaited) & speakers from host institutes (vii) Dr. M. Ravi Kumar, MNITJ, (viii) Dr. Arka P. Mazumdar, MNITJ, (ix) Dr. Amit M. Joshi, MNITJ (x) Prof. V. Sahula, MNITJ

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MODULES TOPICS-

• Introduction to Research Methodology- Methodology vs Methods; Qualitative vs Quantitative Research; How to write a Literature Review; Synthesizing the research; Strategies to organize and evaluate sources; How to read a paper efficiently; Writing about Methods and Design; Rationale for the proposed design; Methodology for collecting data	• 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
• **Managing and Sharing Research Data-** How your research data can best be shared; Available tools and support to make this process as easy as possible; Improving its reusability of shared data		

7. Fundamentals of 5G and beyond wireless systems 1 – 5 Aug 2022

EXPERTS/SPEAKERS- Prof. Manav Bhatnagar (IITD), Prof. Abhay K. Sah (IITR), Prof. Anshul Jaiswal (IITR), Prof. Meenakshi Rawat (IITR)

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MODULES TOPICS-		
• The fundamental technologies related to multiple input multiple output (MIMO) Wireless Communications.	• Matlab based simulations for MIMO technologies • OFDM and introduction to 5G communication systems	• Fundamentals of Optical wireless Communication • Building blocks of Software defined radios for 5G communication and beyond

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

8. Malware Analysis with Data Science — 1 – 12 Aug 2022

EXPERTS/SPEAKERS- Dr. B K Murthy, Senior Director (Scientist G) and Group Coordinator R&D in IT and Digital India Corporation; 2. Dr. Gaurav Gupta, Scientist E, Ministry of Electronics and Information Technology; 3. Dr. M. P. Singh, NIT Patna; 4. Dr. Prabhat Kumar, NIT Patna; 5. Prof. Paramartha Dutta, Visva-Bharati University 6. Dr. Jyoti Prakash Singh, NIT Patna; 7. Dr. Bhaskar Mondal, NIT Patna; 8. Dr. Akshay Deepak, NIT Patna; 9. Dr. Amitava Nag, CIT Kokrajhar

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Dr. Bhaskar Mondal bhaskar.cs@nitp.ac.in M: 87978 77789		

MODULES TOPICS-

- Basic Static Malware Analysis: Fingerprinting, String Analysis etc.
- Reverse Engineering: x86 Disassembly with Ghidra/IDA Pro
- Basics of Dynamic Analysis: Sandbox Analysis, feature extraction
- Machine Learning Algorithms: Naïve Bayes', Support Vector Machine, Decision Tree
- Understanding Machine Learning–Based Malware Detectors
- Deep Learning Algorithms: Convolution Neural Networks, Recurrent Neural Networks, and its variants
- Building a Neural Network Malware Detector with Keras
- Android Malware Analysis

9. From Zero to Chip Design Workshop using OpenPOWER cores 8 - 19 Aug 2022

EXPERTS/SPEAKERS- Industry led programme by IBM, Mr. Ganeshan Narayanswamy

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MODULES TOPICS-

• Microwatt Introduction • Microwatt Simulation - With Samples to explore functionality • FPGA Implementation of Microwatt system • System on Chip (SoC) and its Components & Introduction to IP Cores	• Libre - SoC and its components • Libre - SoC Tool chain and Environment • Impact and use of Wishbone Bus and its protocols	• Exploring Core to Peripheral Communication • Exploring Memory to Memory Communication • Address Space Exploration • Porting of design on FPGA and programming it • Testing concepts - Introduction • Testing Open Source Environmental Setup • Components of IP Core verification

10. Advanced Optimization Techniques and Hands-on with MATLAB/SCILAB

8 – 19 Aug 2022

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. Sripama Saha, Associate Professor, Dept. of Computer Science and Engineering, IIT Patna 7) Dr Prashant K. Jain, IIITDMJ 8) Prof. Rajesh Kumar, MNIT Jaipur 9) Dr. Satyasai Jagannath Nanda, MNIT Jaipur

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Joint- Principal Coordinators		
Dr. G Pradhan gdp@nitp.ac.in M: 7979065008	Dr. Ila Sharma ila.ece@mnit.ac.in M: 954 965 0769	

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.

11. Curriculum development in the light of NEP 2020 — 8 – 19 Aug 2022

EXPERTS/SPEAKERS- Prof. DB Phatak, IIT Bombay; Prof. Manglasundar, IIT Madras; Prof. Dinesh Singh, University of Delhi; Prof. SG Deshmukh, IIT Delhi Prof. Sandeep Sancheti, VC, Marwadi University; Prof. Prem Kalra, DayalBagh Educational Institute; Prof. S K Verma, Deputy Director, NIT Patna; Prof. Puneet Tandon, IIITDM Jabalpur;

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MODULES TOPICS-

- Towards a More Holistic Education: Developing Intellectual, aesthetic, social, physical, emotional capacities in an integrated way. Transformative education.
- Curriculum Design for Optimal Learning Environments and Support to Students
- Multidisciplinary Elements in Curricula
- Elements of Social Responsibility and Community Engagement in the Curricula
- Inclusive Education and Equal Opportunities for All,
- Re-imagining Vocational Education
- Professional Education, Digital Technologies for Improved Learning Experience.
- Elements of Design Thinking and Innovation,
- Promoting Research based learning

12. Introduction & Applications of NLP and IoT — 16 – 20 Aug 2022

EXPERTS/SPEAKERS- Prof. Raksha Sharma, IIT Roorkee (Day 1 and Day 2); Prof. Rahul Thakur, IIT Roorkee (Day 3 to Day 5)

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Joint- Principal Coordinators		
Dr. Namita Mittal, MNIT Jaipur nmittal.cse@mnit.ac.in M: 954 965 4394		

MODULES TOPICS-

- Basics of Machine Learning and Natural Language Processing
- Corpus Analysis: Linguistic Point of view and Statistical Point of View
- Programming in Python: variable, string, array, dictionary, conditions, iterations
- Building Sentiment Analysis Model
- Language Models for: POS Tagging, Parsing, Stemming
- Linguisting Resources for NLP: WordNet, FrameNet, VerbNet, OpenIE
- Natural Language ToolKit for NLP
- Perform POS Tagging, Parsing, Stemming on the given corpus using NLTK
- Import WordNet in Python using NLTK
- Make your own POS Tag model for English
- Introduction to Internet of Things (IoT): Basics, definition, architectures, use-cases, IoT Hardware and Embedded Systems
- Experiments on Arduino microcontrollers. Digital/Analog Input and Output (Hands-on)
- IoT Networking Technologies: Bluetooth, WiFi, Zigbee, NB-IoT, LoRaWAN
- Experiments on various networking technologies, Cloud connectivity (Blynk, Arduino Cloud IoT etc.) and data collection (Hands-on)
- Introduction to edge/fog computing and related hardware (Raspberry Pi, Nvidia Jetson etc), federated learning. NLP for IoT
- Controlling IoT devices using voice assistants using Google Home/ Alexa (Hands-on)

13. Medical Image Processing — 22 Aug – 2 Sep 2022

EXPERTS/SPEAKERS- 1. Prof Chakravarthy Bhagawati, UoH Hyderabad; 2. Prof. C S Sastry, IIT Hyderabad; 3. Dr. M Srinivas, NIT Waranal; 4. Dr Dr. Argya Pal, USA; 5. Mr Subba Reddy Oota, WI Health Solutions

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Joint- Principal Coordinators		
Dr. M P Singh, mps@nitp.ac.in M-9431200106 Dr. Shyam Singh Rajput shyam.rajput.cs@nitp.ac.in	Dr. Yogesh Meena, MNIT Jaipur ymeena.cse@mnit.ac.in M: 954 965 4178	Dr M Srinivas, NIT Warangal, msv@nitw.ac.in M: 88970 64421

MODULES TOPICS-

- Introduction to Deep Learning, Convolutional Neural Networks, Deep Learning Models, Augmentation Methods and Image classification using CNN's.
- Generative Adversarial Networks (GAN's), Different type of GAN's and applications
- Sequence Models, RNN, LSTM, Bi-LSTM and Transformers for Medical Data Analysis. Medical Image Segmentation, FCN, Unet and ResUnet models. Object detection.
- Applications, Brest Cancer prediction, COVID Detection, Image Retrieval, Abnormality detection in hart beat data, Prediction of protein structure using ML, and BCI applications. Tomography..

14. Programming using MATLAB 22 Aug – 2 Sep 2022

EXPERTS/SPEAKERS- Dr. Pulak Mohan Pandey, Professor, IIT Delhi; Dr. Prashant K. Jain, Professor, IIITDM Jabalpur; Dr. Pavan K. Kankar, Associate Professor, IIT Indore; Dr. Amit Singh, Assistant Professor, MNIT Jaipur; Dr. Mohammad Taufik, Assistant Professor, MANIT Bhopal; Dr. Narendra Kumar, Assistant Professor, NIT Jalandhar; Dr. Ankit Nayak, Assistant Professor, Banasthali Vidyapeeth; Dr. Vilshal Francis, Assistant Professor, LPU Punjab; Dr. R B Pachori, Professor, IIT Indore

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MODULES TOPICS-

- Introduction to MATLAB User Interface, Basic Operations, Using MATLAB as Calculator, Handling Variables, Data Format, Expressions and Matrices, Conditional/logical Statement,
- Execution Control, Loops, Writing Functions,
- Modifying plots using property editor, Automating Plots, Building Graphical User Interface (GUI) Basics, Polynomials, curve fitting, and interpolations, Debugging and Troubleshooting programs,
- Data Input/Output in Various Format, 2D Plotting Visualization Using MATLAB, 3D Plots,
- Development Tools and Programming Techniques, Symbolic Math, Building GUI's with toolbars, sliders, toggle buttons, radio buttons, and other windows GUI options. Generating Executable Files and Stand-Alone Applications, MATLAB Applications demonstration.

15. Open Source FPGA — 22 Aug- 2 Sep 2022

EXPERTS/SPEAKERS- From IITs/NITs/IIITs and industry, research organizations; from Intel Inc.

Principal Coordinator	Joint- Principal Coordinators	
Dr. Gaurav Trivedi, IIT Guwahati trivedi@iitg.ac.in M: 80110 00783	Dr. C. Periasamy, MNIT Jaipur cpsamy.ece@mnit.ac.in M: 954 965 4235	Dr. Sangeeta Singh, NITP, sangeeta.singh@nitp.ac.in M:9479646111
Joint- Principal Coordinators		
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MODULES TOPICS-

• Introduction to Intel FPGAs and Quartus tool flow, FPGA design and Implementation hands on Lab – Remote console	• Introduction to High Level Synthesis, Intel HLS Compiler and System Integration, HLS Implementation, Software design with the new HLS Component system Introduction to Intel SoC FPGAs, Basic SoC lab demo with hands on	• Introduction to High-Speed design and High-Speed Interfaces, Challenges in high speed I/O, Serializer and De-serializer, DDR Interface and Transceiver design flow- Lab demo with hands on Embedded System Design using Cyclone V and ARM, SoC EDS design flow, Lab demo and hands on • Mini project using Intel SoC FPGAs

Various courses from IIT Kanpur in Intelligent Self-Paced Education (iSPED) mode are being offered in this the period from June till September 2022. The courses are 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.

16. Introduction to Compilers (https://ict.iitk.ac.in/product/introduction-to-compilers/)

EXPERTS/SPEAKERS-

Dr. Amey Karkare, IIT Kanpur,
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Principal Coordinator

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MODULES TOPICS-

• Introduction	• Overview of Compiler Phases	• Lexical Analysis
• Syntax Analysis	• Top-Down Parsing	• Bottom-up Parsing
• LR Parsers	• Semantic Analysis	• Attributes
• Type Systems	• Symbol Table	• Intermediate Representation
• Runtime Systems	• Code Generation	•

17. Python Programming – A Practical Approach (https://ict.iitk.ac.in/product/python-programming-a-practical-approach//)

EXPERTS/SPEAKERS-

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karkare@iitk.ac.in

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MODULES TOPICS-

- Introduction
- The Programming Cycle for Python
- Interacting with Python Programs
- Elements of Python
- Type Conversion
- Expressions
- Assignment Statement
- Arithmetic Operators
- Operator Precedence
- Boolean Expression
- Conditionals
- Expression Evaluation
- Float Representation
- Loops
- For Loop
- Nested Loops
- Break and Continue
- Function
- Parts of A Function
- Execution of A Function
- Keyword and Default Arguments
- Scope Rules
- Strings
- Indexing and Slicing of Strings
- More Slicing
- Tuples
- Unpacking Sequences
- Lists
- Mutable Sequences
- List Comprehension
- Sets
- Dictionaries
- Higher-Order Functions
- Sieve of Eratosthenes
- File I/O
- Exceptions and Assertions
- Assertions
- Modules
- Abstract Data Types
- Classes
- Special Methods
- Class Example
- Inheritance
- Inheritance and OOP
- Iterators
- Recursion
- Simple Search
- Estimating Search Time
- Binary Search
- Estimating Binary Search Time
- Recursive Fibonacci
- Tower Of Hanoi
- Sorting
- Selection Sort
- Merge List
- Merge Sort
- Higher-Order Sort

18. 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/)

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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

19. Smart Grid Technology (https://ict.iitk.ac.in/product/smart-grid-technology/)

EXPERTS/SPEAKERS-

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Principal Coordinator

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MODULES TOPICS-

Smart Grid Overview

- History of Smart Grid
- Conventional Grid Vs. Smart Grid
- Features of Smart Grid
- Critical Characteristics of Smart Grid
- Smart Grid Elements
- Forces behind Smart Grid Evolution
- Smart Grid Stake Holders
- Smart Grid Building Blocks
- Smart Grid Resources

Smart Grid Architecture & Design

- Conventional Power System Architecture
- IT Layer
- Communication Layer
- Distributed Architecture Design

Smart Grid Measurement

- Synchrophasor Technology
- Smart Meters and Advanced Metering Infrastructure
- Wireless Sensor Network (WSN)
- GIS/Google mapping
-

Smart Grid Communication

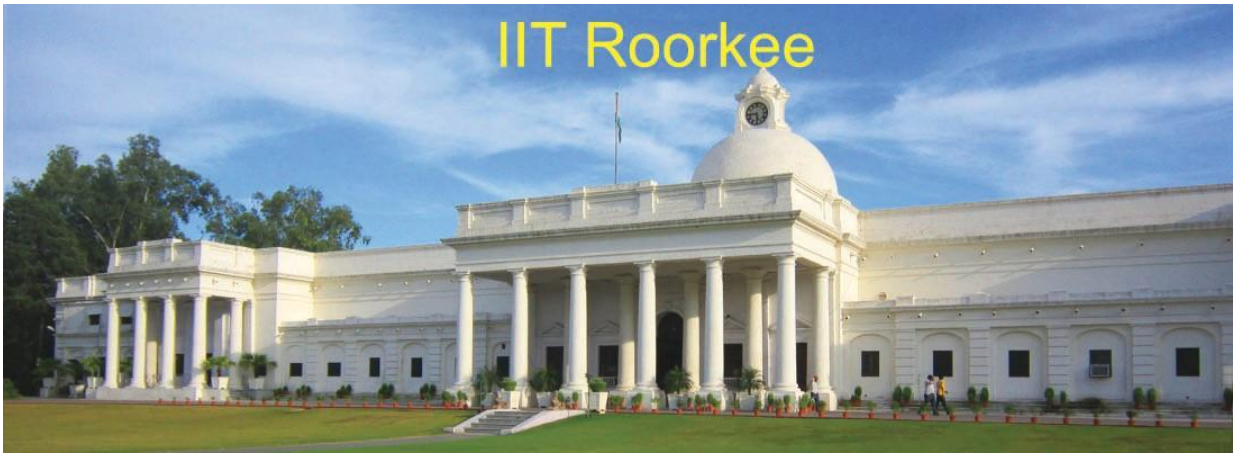
- Wired Communication (e.g., PLCC, Ethernet, Optical Fibre)
- Wireless Communication (e.g., WiFi, Zigbee, GSM/GPRS, WAN)
- Machine to Machine Communication

Smart Grid Standards and Protocols

- IEC 61850
- IEC 60870
- IEEE C37.118
- IEEE 1588
- IEC 62351; IEC 61970/ 61968
- IEC 62056; DNP 3.0

Interoperability & Associated Standard

- Interoperability issues in Smart Grid and its solutions
- Common Information Model
- Multispeak
- Green Button
- SunSpec
- SEP 2.0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WARANGAL


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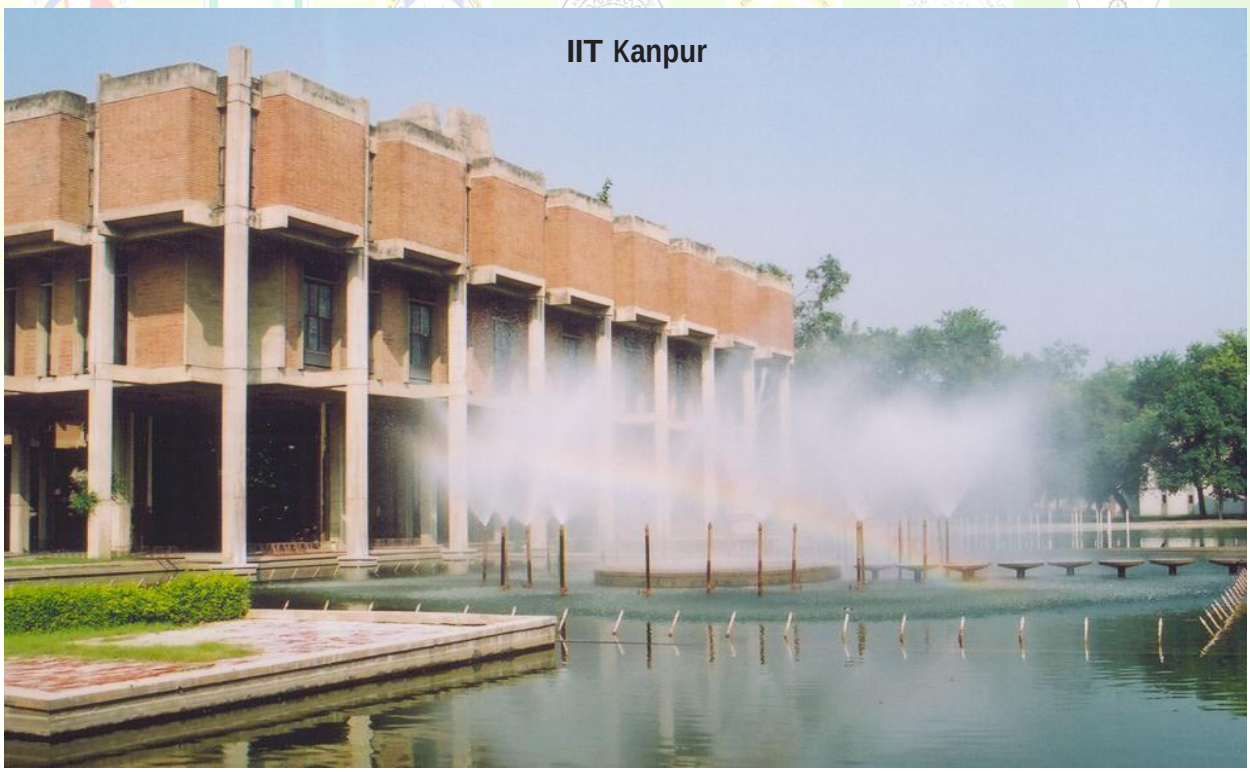
MNIT


NIT Patna

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



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