Faculty Development Programme on

Fundamentals of Computer Networks and Security

(24th May - 02nd June, 2017)

Organized through NKN

by

Electronics & ICT Academies

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

Preamble:

"Electronics & ICT Academy" is an initiative of MeitY, MCIT, GoI set up at some selected institutes in India. Such academies at IIT Guwahati, IIT Roorkee, IIITD&M Jabalpur, MNIT Jaipur, NIT Patna and NIT Warangal together conduct a 10-day Faculty Development Programme (FDP) on **Fundamentals of Computer Networks and Security** during **24th May – 02nd June, 2017**. Experts from IITs, NITs, IIITs and other premier institutes will deliver lectures through National Knowledge Network (NKN) and participants at above stated institutes can interactively learn from these lectures. In addition, local course coordinators at respective institutes will take care of practical and practice sessions. Each E&ICT Academy is given with some jurisdiction states in India. The role of academies are to offer faculty development programmes in standardized courses and emerging areas of Computer Science, Electronics, Information Communication Technologies; training & consultancy services for Industry; Curriculum development for Industry; CEP for working professionals; Advice and support for technical incubation and entrepreneurial activities.

About Fundamentals of Computer Networks and Security course:

Computer Network and Security is a core course in Computer Science & Engineering and Electronics & Communication Engineering. In 80 hours, during ten days, this FDP covers Introduction to Data Communication, protocols, principles of network application, design aspect of DNS, Email, TCP/IP, Design of TCP/UDP, IP address design, different routing algorithm, ICMP, IGMP, ARP, RARP, security issues at different layers of protocols. In addition, soft skills, pedagogical principles and case study presentations by participants are also part of this programme. Pointers to some research issues will also be provided.

Though Computer Network and Security course is widely offered through various modes, this FDP through NKN set the objectives to train the faculty to teach the course with deeper understanding of all the concepts with gained practical exposure. Rich experience of the speakers at premier institutes will make the participants to feel the difference.

Participants are encouraged to list their expectations in their e-mail to the Global Coordinator.

Course Topics:

S No	Module Name	Topics
1.	Introduction (Dr. Kakali Chatterjee, Nit Patna)	Introduction to Data Communication, Protocols and Standards: Protocols, Standards, Standards Organizations, Internet Standards, Packet Switching, Circuit Switching, A Network of Networks; Understanding of Delay, Loss and Throughput in the packet-switched networks; Protocols layers and their service model: OSI, TCP/IP, X.25; TCP/IP vs OSI
2.	Principles of Network Applications (Dr. Kakali Chatterjee, NIT Patna)	Principles of Network Applications; The Web and HTTP; File Transfer: FTP; Electronic Mail in the Internet: SMTP; DNS -The Internet's Directory Service; Peer-to-Peer Applications
3.	Overview of Layers (Dr. Santosh Biswas, IIT Guwahati)	TCP/IP and OSI Model, Protocol Layers: Hierarchy, Services
4.	Link Layer (Dr. Santosh Biswas, IIT Guwahati)	Introduction and Services; Error-Detection and Correction Techniques; Multiple Access Links and Protocols, Link-Layer Addressing and ARP, Ethernet, Link-Layer Switches, PPP
5.	Addressing at layers (Dr. Santosh Biswas, IIT Guwahati)	Physical Addresses, Logical Addresses, Port Addresses, Specific Addresses
6.	Introduction of transport layer (Prof. M S Gaur, MNIT Jaipur)	Introduction and Transport-Layer Services, Relationship Between Transport and Network Layers, Overview of the Transport Layer in the Internet, Multiplexing and Demultiplexing
7.	Connectionless Transport (Prof. M S Gaur, MNIT Jaipur)	UDP, UDP Segment Structure, UDP Checksum, Principles of Reliable Data Transfer, Building a Reliable Data Transfer Protocol, Pipelined Reliable Data Transfer Protocols, Go-Back-N, Selective Repeat, Hybrid
8.	Connection-Oriented Transport (Prof. M S Gaur, MNIT Jaipur)	TCP, TCP Connection, TCP Segment Structure, Round-Trip Time Estimation and Timeout, Reliable Data Transfer, Flow Control, TCP Connection Management
9.	Principles of Congestion Control (Prof. M S Gaur, MNIT Jaipur)	Causes and the Costs of Congestion, Approaches to Congestion Control, Network-Assisted Congestion-Control Example: ATM ABR Congestion Control, TCP and UDP Fairness
10.	The Internet Protocol (IP) (Dr. Ruchir Gupta, IIITDM Jabalpur)	Forwarding and Routing, Network Service Models, Virtual Circuit and Datagram Networks, Virtual-Circuit Networks, Datagram Networks, What's Inside a Router?, Generation of routers, Input Processing, Switching, Output Processing, Where Does Queuing Occur? Forwarding and addressing in the Internet, Datagram Format, IPv4 Addressing (classful and classless), IPv4 vs IPv6, Subnetting, Supernetting, masking
11.	Routing Algorithms (Dr. V K Jain, IIITDM Jabalpur)	The Link-State (LS) Routing Algorithm, The Distance-Vector (DV) Routing Algorithm, Hierarchical

		Routing, Routing in the Internet, Intra-AS Routing in the Internet: RIP, Intra-AS Routing in the Internet: OSPF, Inter-AS Routing: BGP, Broadcast and Multicast Routing, Broadcast Routing Algorithms, Multicast, Internet Control Message Protocol (ICMP), IGMP, ARP, RARP
12.	Security at Layers (Prof. K Ramesh, NIT Warangal)	Security Services: Introduction of Message Confidentiality, Message Integrity, Message Authentication, Message Nonrepudiation, Security threats, Entity Authentication **Network Layer Security:** IP Security (IPSec): Two Modes, Two Security Protocols, Security Association, Internet Key Exchange(IKE), Virtual Private Network. **Transport Layer Security**: SSL Services and Security Parameters, Sessions and Connections, Four Protocols. **Application Layer Security:** Email Security, S/MIME, PGP: Security Parameters, Services, PGP Algorithms, PGP Certificates, Proxy Server Firewall.
13.	Pedagogy Principles (Local conduction by Academy)	Course objectives, Module objectives, Unit objectives, Bloom's taxonomy - knowledge levels, Pedagogy Tool demo
14.	Soft Skills (Local conduction by Academy)	Listening, Writing, Communication Skills. Comprehension, Technical Report Writing, Team Work Principles, Personality Development, Etiquette in Organizations.
15.	Case Study presentations by participants (Local conduction by Academy)	Case study presentation by team of participants

Course Outcomes:

- Able to analyse the different design aspects of transport layer, application layer, and Network Layers
- Expertise with the protocols of computer networks to assist in network design and implementation
- Acquire knowledge of security in different layers.
- Will be able to understand knowledge of computer networks through hands-on experience.

Who can apply: The programme is open to the teachers of engineering colleges, Degree Colleges, MCA colleges, Polytechnic colleges and other allied disciplines. Industry personnel working in the concerned/allied discipline can also attend.

Registration Fee Particulars:
Faculty members: Rs 3000/- Only
Persons from Industry: Rs 9000/-Only

Boarding and Lodging will be provided at free of cost by Academy. No Travel Allowance will be paid to the participants.

Participants belonging to States/ UTs	Local Coordinator	Contact Details	Demand Draft should be drawn in favor of
Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura, Sikkim	Dr Santosh Biswas IIT-Guwahati (M: 9957561026)	santosh_biswas@iitg.ernet.in	Payment (DD): Registrar, IIT Guwahati Payable at Guwahati or On-line mode (Preferred) Name: IIT Guwahati R&D E&ICT ACADEMY Account no. 36071160089 IFSC: SBIN0014262
Madhya Pradesh, Chhattisgarh, Maharashtra, Telangana, Andhra Pradesh, Karnataka, Goa states and Andaman and Nicobar Islands, Puducherry UTs	Dr. Ruchir Gupta / Dr. V.K. Jain, IIITDM Jabalpur (M: 9425156958/9425156298)	rgupta@iiitdmj.ac.in, vkjain@iiitdmj.ac.in	Payment (DD): 'Electronics and ICT Academy, IIITDMJ' payable at Jabalpur On-line mode (Preferred) Name: Electronics and ICT Academy, IIITDMJ Account no. 50302042708 IFSC: ALLA0212433
Rajasthan, Gujarat, Dadra & Nagar Haveli, Daman & Diu	Dr. Emmanuel S. Pilli, MNIT Jaipur (M:9549658131)	espilli.cse@mnit.ac.in	Electronics and ICT Academy, MNIT Jaipur, Payable at Jaipur
Bihar, Jharkhand, Odisha, West Bengal	Dr. Ditipriya Sinha, NIT Patna (M: 7277233920)	ditipriya.cse@nitp.ac.in	"Director, NIT Patna" payable at Patna

Jammu and Kashmir, Himachal Pradesh, Uttarakhand etc.	Dr. Sateesh K. Peddoju IIT Roorkee (M:01332-285647)	drpskfec@iitr.ac.in	"Dean SRIC IIT Roorkee" payable at Roorkee

Note: Participants belonging to any other states other than the states mentioned above can apply to any of the nearest academies as per their choice.

Selection: Only 50 participants will be selected based on first-cum-first-serve basis for each academy offering this programm and 10 more participants from industry will also be allowed. The list of selected participants will be communicated through e-mail. In addition, the selected list of participants will be notified in E&ICT websites.

Important dates:

Last date for submission of application: 2nd May 2017

Selection-list intimation/display before: 10th May 2017

APPLICATION FORM

FACULTY DEVELOPMENT PROGRAMME

ON

Fundamentals of Computer Networks and Security

24th May - 02nd June, 2017

1. Name of the Applicant:
2. Gender: Male / Female
3. Designation:
4. Institution:
5. Email:
6. Mobile No:
7. Payment Mode:

   Demand Draft Number:

   NEFT/ UTR No (if Applicable):

   Bank Name: Date of payment:
8. Address for Correspondence
9. Educational Qualifications with specialization:
10. Subjects taught so far:
11. No. of refresher courses/workshops attended:
12. Experience (in years)
    Teaching: Research: Industry:
13. Accommodation required: YES / NO
14. Do you belong to reservations SC/ST (YES/NO): If YES, please specify* * Attach photo copy

Declaration

The information provided is true to the best of my knowledge. If selected, I agree to abide by the rules and regulations of the FDP and shall attend the course for the entire duration. I also undertake the responsibility to inform the Coordinator in case, I am unable to attend the course.

Signature of the Applicant

SPONSORSHIP CERTIFICATE

Mr /Mr /Ms. …… is an employee of our Institute/Organization and is hereby sponsored to participate in the FDP on **"Fundamentals of Computer Networks and Security"** sponsored by Electronics & ICT Academy during 24th May - 02nd June, 2017at NIT Patna.

Place:
Date:

Signature of Head of Institution
(with seal)

Participating Academies and Coordinator Details:

Institute	E&ICT academy website	Local Coordinator	e-mail
NIT Patna	http://nitp.ac.in/ict/	Dr. Ditipriya Sinha	ditipriya.cse@nitp.ac.in +91-7277233920
IIT Roorkee	http://eict.iitr.ac.in/	Dr. Sateesh K. Peddoju	drpskfec@iitr.ac.in +91-1332-285647
MNIT Jaipur	www.mnit.ac.in/eict	Dr. Emmanuel S. Pilli	espilli.cse@mnit.ac.in +91-9549658131
IIITD&M Jabalpur	http://ict.iiitdmj.ac.in/	Dr. Ruchir Gupta / Dr. V.K. Jain	rgupta@iiitdmj.ac.in, vkjain@iiitdmj.ac.in +91-9425156958, +91-9425156298
IIT Guwahati	https://www.iitg.ernet.in/eictacad/	Dr. Santosh Biswas	Santosh_biswas@iitg.ernet.in +91-9957561026

Global Coordinator:
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Supported by
Ministry of Electronics and Information Technology (MeitY)
Ministry of Communication and Information Technology,
Govt. of India

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