KNOWLEDGE INCUBATION FOR TEQIP, IIT KANPUR

Digital Communications and Networks

December 04 - 06, 2014

KIT, IIT Kanpur organized a three day workshop on Digital Communications and Networks in December 2014. It was organized with the aim of highlighting the most important concepts of digital communications and networks, especially from the perspective of UG teaching. Most of the participants were faculty members from the department of Computer Science or Electronics & Communications. The workshop focused on basics, and ideas that constitute the bedrock of modern communication systems. The purpose of the course was to emphasize on what is important from foundational point of view and what is required to be imparted to the students, so that he/she develops a deep interest in the subject.

Topics Discussed

- Digital Communication Systems
- Digital Modulation and Wireless Communications
- TCP and Queuing Theory for Networks
- Routing Protocols, MAC and Data Link Layer
- Information Theory
- Coding Theory

LIST OF SPEAKERS

- Ajit Chaturvedi, IIT Kanpur
- Prof. Aditya Jagannatham, IIT Kanpur
- Prof. Ketan Rajawat, IIT Kanpur
- Prof. YN Singh, IIT Kanpur
- Prof. RK Bansal, IIT Kanpur
- Prof. Adrish Banerjee, IIT Kanpur

PARTICIPATING INSTITUTES

Institute	Number of Participants
Jadavpur University	3
NIT, Raipur	1
MMMUT, Gorakhpur	1
IIEST, Shibpur	2
GBPEC, Pauri	4
IET Lucknow	10
BTKIT, Dwarahat	1
HBTI, Kanpur	7
MJP Rohikhand, Bareilly	4
Kurukshetra University	1
NIT, Kurukshetra	1
BIET, Jhansi	1
Jyothishmathi Institute of Technological Sciences	1
V R Siddhartha Engineering College	2
G.B Pant, Pantnagar	3
Sreenidhi Institute of Science & Technology, Hyderabad	1
St.Peter's Engineering College, Hyderabad	1
Total	**44**

Workshop Schedule

December 04, 2014

Time	Event
9:00 AM -9:30 AM	**Registrations/ Welcome**
9:30 AM – 11:00 AM	**Digital Communication Systems - I** *Prof. Ajit Chaturvedi*
11:00 AM – 11:30 AM	**Coffee break**
11:30 AM – 1:00 PM	**Wireless Communications I** *Prof. Aditya Jagannatham*
1:00 PM – 2:00 PM	**Lunch break**
2:00 PM – 3:30 PM	**Routing Protocols, MAC and Data Link Layer I** *Prof. Y.N Singh*
3:30 PM – 4:00 PM	**Coffee break**
4:00 PM – 5:30 PM	**Coding Theory I** *Prof. Adrish Banerjee*

December 5, 2014

Time	Event
9:30 AM – 11:00 AM	**Information Theory I** *Prof. R.K Bansal*
11:00 AM – 11:30 AM	**Coffee break**
11:30 AM – 1:00 PM	**TCP and Queuing Theory I** *Prof. Ketan Rajawat*
1:00 PM – 2:00 PM	**Lunch break**
2:00 PM – 3:30 PM	**Coding Theory II** *Prof. Adrish Banerjee*
3:30 PM – 4:00 PM	**Coffee break**
4:00 PM – 5:30 PM	**Wireless Communications II** *Prof. Aditya Jagannatham*
7:30 PM	***Workshop Dinner***

December 6, 2014

Time	Event
9:30 AM – 11:00 AM	**Digital Communication Systems – II** *Prof. Ajit Chaturvedi*
11:00 AM – 11:30 AM	**Coffee break**
11:30 AM – 1:00 PM	**Routing Protocols, MAC and Data Link Layer II** *Prof. Y.N Singh*
1:00 PM – 2:00 PM	**Lunch break**
2:00 PM – 3:30 PM	**Information Theory II** *Prof. RK Bansal*
3:30 PM – 4:00 PM	**Coffee break**
4:00 PM – 5:30 PM	**TCP and Queueing Theory II** *Prof. Ketan Rajawat*

Summary of Faculty Feedback

WORKSHOP SESSION

Questions	Excellent	Good	Ordinary
Clarity of communication about workshop	20	8	0
Organization of the sessions	18	10	0
Quality of lectures	21	7	0
Effectiveness of discussions	15	13	0
Effectiveness of learning experience	15	11	0
	Appropriate	Short	long
Duration of workshops	16	11	0
	Definitely	Maybe	No
Would you like to have more such sessions?	25	03	0
Would you like e-lectures by experts on special topics?	25	03	0

Suggest specific topic that you would like additional expert lectures on	Linear Algebra, Random Process, Reliability Analysis, Optimization Theory, Modeling and Simulation, Wireless Communication, MIMO-OFDM, Antenna, Microwave and Antenna Designing, Wireless Sensor Networks, Computer Networks, Digital Signal Processing, Data Security, Adaptive Key Management, Cryptographic Techniques, DSP and Embedded Systems, Polar Codes, Complex Networks, Data Structures Programming, Distributed System, Network Techniques, Data Mining, Distributed Algorithms for Networks, Computer Networks, Formal Method, Pie-Calculus, Modelling of Digital Communication, Image Processing, Software Quality Models, Cloud Computing, Mobile Communication.
Additional Suggestions	• Keep informing us about this type of workshops. • Requirement of research topic on digital signal processing. • Some tools and software should also be demonstrated that can help us in research as well as in teaching. • Some study material should be given before the class starts. • Some experimental session should also be in the workshops. • Cover fundamentals instead of compressing too many materials in a presentation. • Add some lab sessions to learn the theory in a better way. • It would be good if experts discuss few of their research papers or projects. • Early announcement of course and schedule.

TEACHING

Which subjects do you teach?	• Analog Communication • Digital Communication • Signals and systems • DCN • Computer Graphics, Networks. • MIMO-OFDM • Microwave Engineering, • Antenna • Computer Networks • Digital Signal Processing • Networks Security • Programming • Peripheral Device. • Discrete Mathematics • Theory of Computation • Computer Organization • Digital Logic Design • Satellite Communication • Biomedical Signal Processing • High Speed Network • Operating Systems • Distributed Systems • Advanced DBMS • Graph Theory • Numerical Method and Optimization Techniques • Image Processing. • Computer based Numerical and Statistical Techniques Computer • Web Technology • Software Engineering • Discrete Mathematics • C language • Computer Organization

What is average student to teacher ratio in your institute?	20:1 15:1 60:1 20:1 20:1 20:1 20:1 20:1 60:1 20:1 40:1 37:1 30:1 20:1 15:1 15:1 15:1 10:1			
Questions	YES		NO	
Do you have additional support for teaching (tutors, graders, teaching Assisttants, etc)?	15		11	
Do you give class projects for UG classes?	25		03	
Do you give class projects for PG classes?	10		10	
Do you have sufficient resources for laboratory courses?	13		12	
	Sufficient		Inadequate	
Is the library/journal/e-connection supportadequate?	09		15	
	Definitely	May be	No	
Would you like to have common (TEQIP) repository of course material ?	24	01	00	
Would you like to visit IITK to participate in and develop course material (existing or new)	25	02	00	
Would you like to participate in creation of the repository material (course files/lab. Manuals/question bank/etc)	24	03	00	
	e-courses	Workshops	Content	none
How can IITK effectively help you prepare for teaching?	20	24	10	00

How can TEQIP help improve your teaching?	• By organizing this type of workshops in all TEQIP founded institutes and other private colleges. • By focusing on the basics of the topic covered, which is important for teaching. • Use more mathematical aspect. • By providing such workshops and expert lectures. • It provide us new era to teach the students with subject and its futuristic analysis. • For making good knowledge about the specific topic and style of teaching. • Topic oriented lectures and some labs • By conducting faculty training program • By sharing common resources. • By deeply understanding the topics. • By e-courses • Providing funds for research and teaching activities. • By implementing the TEQIP policy in our

RESEARCH

Questions	Definitely	Maybe	No
Would you like to visit an IIT for a visiting-faculty/post-doctoral fellow ,if offered(via TEQIP)?	23	03	00
Would you like to share/use research infra-structure at IITK, if made available?	26	00	00
Would you like to conduct collaborative research with IITK?	26	00	00
Would you like lectures by experts (Indian and international) on niche research areas/topics?	26	00	00
Do you want special-topic conferences?	23	03	00

How can TEQIP help improve your research?	• TEQIP can make us aware of state of the art in recent research areas. • Faculty for IIT may deliver expert lecture on specific topics in institutes like ours. • By providing financial assistance for attending various courses, and workshop. • By giving opportunity to organized and participate in different workshop and conference. • Through making compulsory for associate with some faculty at IIT and learn the skills. • By funding. • Through gaining knowledge by field experts. • By giving permission to use research materials (research papers, labs etc) if IIT Kanpur. • Collaborative projects with IITs. • By providing some practical of the topics. • By introducing collaborative projects. • By giving support for attending conferences and workshops. • Through appropriate method of teaching and subject. • Sharing knowledge and e-resources. • Content should be provided for the lecture. • We want brief content of the delivered lecture. • Brief content with the delivered lectures (e-copy / hard copy) • By providing such workshop and expert lecture. • By focusing on the fundamental topics.

OUTCOME

This workshop gave all the participants a clear picture of essential building blocks required by any communication system. All the participants showed interest in more courses like this and suggested to include some practical sessions in such courses. After attending the workshop the participants had a better understanding of following:

- Foundations of digital communications.
- Theory of wireless communication system, difference between wireless and digital communication systems.
- How to introduce Data link control and Media access control to students.
- What should be the components of a good coding theory course for UG and PG students and which books can be used for this.
- Why routing is required and how does it happen.
- Teaching techniques of Information theory
- Concepts of Transmission Control Protocol & Queuing theory, how TCP works and how protocols are designed.