Introduction
to
SPCOM Group
(Signal Processing, Communication & Networks)
@ IIT Kanpur

Abhishek Gupta, EE
SPCOM Research Areas

Related Sub-areas
- Control
- Power
- Robotics
- Photonics
Faculty in SPCOM (Communications)

**A. Banerjee**
Cognitive radio, Error control coding, Wireless communications, Optical communications

**R. K. Bansal**
Universal data compression with applications, Sequential detection of a change in distribution, robust detection, Ergodic theory and large deviation theory-applications, Stochastic processes

**K. Vasudevan**
Digital communications, Coherent & non-coherent receivers, Synchronization, Channel estimation, Diversity techniques

**R. Budhiraja**
Communications and Signal Processing, Wireless systems design.

**A Gupta**
Stochastic Geometry, Wireless Communication, 5G, mmWave and Modern Wireless, Visible light networks Molecular Communication
Faculty in SPCOM (COM+SP)

A. K. Jagannatham

Govind Sharma
Signal Processing in Communication Systems, Video signal processing, Medical image processing

Ketan Rajawat
Optimization, Distributed optimization, Localization and visualization, Network monitoring, Transceiver optimization, Wide area estimation and tracking, Stochastic optimization

A. K. Chaturvedi
Communications theory and Systems, Mobile communications, massive MIMO, 5G systems
Faculty in SPCOM (SP)

**Naren Naik**
Nonlinear tomography, Numerical solutions of propagation and scattering problems, Subsurface imaging, Biomedical imaging

**Rajesh Hegde**
Speech Signal Processing and Recognition (with emphasis on Indian Languages), Speaker and Language Identification, Affective Speech Processing, Multimodal signal processing, Pervasive and Ubiquitous Computing, Applied Signal Processing in wireless networks, IT in Emergency Response

**Nishchal Verma**
Intelligent Data Mining Algorithms and Applications, Health Monitoring and Intelligent Fault Diagnosis Systems, Machine Learning Algorithms, Computer Vision, Bioinformatics, Smart Grid, Intelligent Informatics, Brain Computer / Machine Interface, UAV

**Pradip Sircar**
Signal processing and systems, Communication theory, Computational methods
Faculty in SPCOM (SP: Image & Video)

K. S. Venkatesh

Signal processing,
Image and Video processing,
Computer vision with applications in Robotics,
Signal and System Theory
Faculty in SPCOM (Networks)

Y. N. Singh
Fiber optics and Fiber optics networks,
Telecom networks,
All optical packet switching
SPCOM Group: Courses

• Must credit total 8 courses, 4 per semester
• In Sem-I, two courses are compulsory (for Mtech program)
  – EE 605: Introduction to Signal Analysis
  – EE 621: Representation and Analysis of Random Signals
• Free to choose the remaining two courses
• Generally 5-10 courses available
• What to choose?
SPCOM Group: Electives Sem I

- EE602A  Statistical Signal Processing-I  R HEGDE
- EE607A  Wavelet transform for SP  P Sircar
- EE622A  Communication Theory  A Banerjee
- EE667A  Information Theory  R K Bansal
- EE670A  Wireless Communications  A Jagannatham
- EE673A  Digital Communication Networks  Y N Singh
- EE677A  MIMO Wireless Communications  R Budhiraja
How to decide what course to take?

1. Determine your research area
   (SP? COM? SP+COM? NET? ML? etc.)

2. Determine who you would like to work with?
   (3/4 out of 15)

3. Look at the courses to be offered next semester

4. DO NOT: take courses based on grading history or personality of the instructor
SPCOM Group: Choosing Electives

Take courses keeping your eventual advisor(s) and area in mind
1. SP+COM: 602, 622, 624, or 673, 670
2. COM: 622, 667, 670, 677
3. Coding: 624, 622, 667
4. NET: 629, 673
5. Image: 604, 601, 602, or 607
6. SP (others): 604, 601, 602, 607, or 698G
   etc...
SPCOM Group:

Electives *generally* offered in Sem-II

- **EE600** Mathematical Structures of Signals & Systems  
  Instructor: KS Venkatesh

- **EE609** Convex Optimization in Sig. Proc. and Communications  
  Instructor: K Rajawat

- **EE622** Communication Theory  
  Instructor: K Vasudevan

- **EE623** Detection and Estimation Theory  
  Instructor: G Sharma

- **EE626** Topics in Stochastic Processes  
  Instructor: RK Bansal

- **EE627** Speech Signal Processing  
  Instructor: R Hegde

- **EE628** Topics in Cryptography and Coding  
  Instructor: A Banerjee

- **EE643** Smart Antenna for Mobile Communication  
  Instructor: P Sircar

- **EE646** Photonics Networks and Switching  
  Instructor: YN Singh

- **EE658** Fuzzy Set, Logic & Systems and Applications  
  Instructor: NK Verma

- **EE670** Wireless Communications  
  Instructor: A Jagannatham

- **EE698S** Analysis of Modern Wireless Networks (Stochastic Geometry)  
  Instructor: A. Gupta

* + EE 698 Courses!!