

# Network Information Theory

## Overview

Network information theory deals with how to communicate information over a network with multiple sources and multiple destinations. In this course we will first review basics of information theory and point to point communications. Subsequently, we will study fundamental limits on simple multi-user channels such as broadcast, multiple-access, interference and relay channels and optimal coding schemes that achieve these limits.

<b>Course Information</b>	<b>Duration:</b> March 15 <sup>th</sup> -March 24 <sup>th</sup> 2018 <b>Total Contact Hours:</b> 30 hours in 10 days <b>Course Website:</b> <a href="http://www.iitk.ac.in/ee/wireless/">http://www.iitk.ac.in/ee/wireless/</a>
<b>Modules</b>	<b>A: Introduction to information theory: Mar 15 - Mar 19, 2018</b> <b>B: Introduction to network information theory: Mar 20 - Mar 24, 2018</b>
	<ul style="list-style-type: none"> <li>▪ Practicing communications engineers</li> <li>▪ Graduate students pursuing research in information theory and communications</li> <li>▪ Teachers of engineering colleges.</li> </ul> <b>Pre-requisite:</b> Prior knowledge in Probability Theory, Linear Algebra and Digital Communications is needed.
<b>Fees</b>	<p>The participation fees for taking the course is as follows:</p> <p><b>Industry/Research Organizations: Rs. 10000 + 18% GST (Total: Rs. 11800)</b>  <b>Academic Institutions (Faculty): Rs. 5000 + 18% GST (Total: Rs. 5900)</b>  <b>Academic Institutions (Students): Rs. 2000 + 18% GST (Total: Rs. 2360)</b>  <b>Academic Institutions (SC/ST Students): Rs. 1000 + 18% GST (Total: Rs. 1180)</b></p> <p>Students have to submit a letter from their institute as proof of full time student enrollment. SC/ST students will have to submit a valid Caste/Tribe Certificate.</p> <p>The above fee entitles participants to attend all the lectures. Boarding, lodging and meal charges are not included in the fees. The participants will be provided shared accommodation in Visitor's Hostel/Visitor's Hostel Extension on payment basis.</p>

## The Faculty



**Gerhard Kramer** is Alexander von Humboldt Professor and Chair of Communications Engineering at the Technical University of Munich (TUM). He received the B.Sc. and M.Sc. degrees in electrical engineering from the University of Manitoba, Canada, in 1991 and 1992, respectively, and the Dr. Sc. Techn. Degree from the ETH Zurich, Switzerland, in 1998. From 1998 to 2000, he was with Endora Tech AG in Basel, Switzerland, and from 2000 to 2008 he was with the Math Center at Bell Labs in Murray Hill, NJ. He joined the University of Southern California (USC), Los Angeles, CA, as a Professor of Electrical Engineering in 2009. He joined TUM in 2010.

Gerhard Kramer's research interests are primarily in information theory and communications theory, with applications to wireless, copper, and optical fiber networks. He is an IEEE Fellow and served as the 2013 President of the IEEE Information Theory Society. He was elected to the Bavarian Academy of Sciences and Humanities in 2015.



**Adrish Banerjee** received his Bachelors degree from Indian Institute of Technology, Kharagpur and Masters and Ph.D. degree from University of Notre Dame, Indiana. He is currently an Associate Professor in the Department of Electrical

Engineering at Indian Institute of Technology, Kanpur. He is a recipient of Microsoft Research India young faculty award, Institute of Engineers India young engineer award, and IETE-Prof. Sreenivasan Memorial Award-2016. His research interests are in the physical layer aspects of wireless communications, particularly error control coding, cognitive radio and green communications.

## Course Co-ordinator:

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