



SIGNALS AND SYSTEMS

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PRE-REQUISITES : Mathematics at 10+2 level

INTENDED AUDIENCE : 2nd year undergraduate students

INDUSTRIES APPLICABLE TO : All companies dealing with signal processing

COURSE OUTLINE :

This course will introduce the students to basics of signal processing and systems analysis. We will focus on continuous-time signals and systems, but also give an introduction to discrete-time signals and systems towards the end of the course. This is a very important course for all engineers working in the electronics and communications domain.

ABOUT INSTRUCTOR :

Dr. Kushal K. Shah completed his BTech in 2005 and PhD in 2009, both from the Electrical Engineering Department of IIT Madras. In 2009-10, he went to Weizmann Institute of Science in Israel for a post-doctoral fellowship. He joined Jawaharlal Nehru University (New Delhi) as an Assistant Professor in 2010 and in 2012, he was conferred with the GN Ramachandran fellowship by the university. In May 2012, he joined IIT Delhi as an Assistant Professor in the Electrical Engineering Department and moved to IISER Bhopal in August 2017 as an Associate Professor in the Department of Electrical Engineering & Computer Science. He was awarded the INAE Young Engineer Award in 2014. His primary research interests include Dynamical Systems, Signal Processing and Artificial Intelligence.

Prof. Hitesh Shrimali is an associate professor in the school of computing and electrical engineering. Before joining IIT Mandi, He did B.E. from Nirma Institute of Technology (Ahmedabad), M.Tech. from IIT Kharagpur and Ph.D. from IIT Delhi. His M.Tech. and Ph.D. theses were under the guidance of Prof. Amit Patra and Dr. Shouri Chatterjee respectively. After that he joined STMicroelectronics (Greater Noida) as a senior design engineer. After having 2 years of industrial experience, he worked with Università degli Studi di Milano as a post doctorate researcher, under the guidance of Prof. Valentino Liberali. During post-doctorate experience, he was also associated with INFN [Istituto Nazionale di Fisica Nucleare] Milano.

COURSE PLAN :

Week 1 : Mathematical Preliminaries

Week 2 : Types of Signals and Transformations

Week 3 : Fourier Transform of Continuous-Time Signals

Week 4 : Properties of Fourier Transforms

Week 5 : LTI Systems

Week 6 : Convolution and LTI System Properties

Week 7 : Laplace Transform

Week 8 : Laplace Transform Properties

Week 9 : Fourier Series of Continuous-Time Periodic Signals and Properties

Week 10 : Discrete-Time LTI Systems and Sampling

Week 11 : Discrete-Time Fourier Transform (DTFT)

Week 12 : Z-Transform