



# REAL-TIME DIGITAL SIGNAL PROCESSING

## PROF. RATHNA G N

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IISc Bangalore

**PRE-REQUISITES :** BE/B.Tech/MSc with basic knowledge of signal processing

**INTENDED AUDIENCE :** Engineering Students/Teachers

**INDUSTRY SUPPORT :** TI

### COURSE OUTLINE :

The course helps in understanding of theory, design, applications, and implementations using hands-on experiments for the effective learning of real-time DSP technologies.

### ABOUT INSTRUCTOR :

Prof. Rathna G N is Principal Research Scientist at EE, IISc. She is teaching DSP System Design and Real-Time Signal processing along with Wireless Sensor Networks and Real-Time Systems.

### COURSE PLAN :

**Week 1:** Introduction to Real-Time Signal Processing, Analog Interface, DSP hardware, DSP System Design, Experiments and program examples.

**Week 2:** signal concepts, Introduction to random variables, Fixed point and Quantization effects, overflow and solutions, experiments and program examples.

**Week 3:** Design and Implementation of FIR filters

**Week 4:** Design and Implementation of IIR filters and structures: cascaded for implementation in hardware and quantization effects.

**Week 5:** Frequency analysis and DFT with practical applications of FFT, Spectrum Analysis, and implementation in filters, quantization effects.

**Week 6:** Cross correlation, autocorrelation and implementation

**Week 7:** Introduction to Random Process, LMS algorithm and implementation consideration and practical applications applications.

**Week 8:** Digital Signal generation and program examples

**Week 9:** Implementation of Echo, reverberation, Graphic equalizer.

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**Week 11:** Introduction to Digital Image processing, fast DCT implementation in hardware.

**Week 12:** Introduction to Digital Image processing, fast DCT implementation in hardware.