

### Whom will the course benefit:

Persons interested to learn digital signal processing techniques with applications to speech and image processing

### Course Objectives:

To provide an overview of topics in basic and advanced digital signal processing techniques with applications to speech and image processing

### Course Contents:

- Introduction to discrete linear systems linearity, linear convolution, cyclic convolution, stability
- Sampling theory, system functions, z-transforms, A/D and D/A conversion, Discrete-Time Fourier Transform and Linear Time Invariant Systems, Discrete Fourier Transform, relationship of DFT to DTFT, fast computation of DFT
- Digital filter design-Finite impulse response (FIR) filters, Infinite impulse response(IIR) Filters, Structures and properties of FIR and IIR filters and review
- Multirate Digital Signal Processing
  - a) Interpolation and Decimation
    - i. Frequency Interpretation
    - ii. Implementation using Polyphase Structures
    - iii. Multistate Implementation
  - b) Multirate Filter Banks
    - i. Uniform Filter Banks
    - ii. Quadrature Mirror Filter Banks
    - iii. Digital Wavelet Transform
- Linear algebra and orthogonal transforms, and cover DCT, DST, and rectangular transforms, non-orthogonal Gabor transform
- Applications of DSP in speech processing, Introduction to CDF, PDF for a random variable, expectation, uniform and Gaussian distribution, Linear prediction, homomorphic filtering

- Applications of optimization in image processing- Basics of Convex optimization, L1 minimization and sparsity-driven algorithms, Convex models and algorithms for image restoration

### Course Organization:

The course will consist of lectures by IISc faculty.

### Eligibility:

The course is meant for faculty of AICTE – recognized engineering colleges. Selected teachers will be paid TA at actual subject to the limit of Three tier AC train/bus fare by the shortest route from the place of work to Bengaluru and back. **However, the maximum TA payable is Rs.3000/-.** They will be provided with a daily allowance of Rs.500/- per day (for 5 days only) towards boarding and lodging as per QIP rules, and will be supplied with the course materials. **The lodging charges will be Rs.300/- per day. Local participants will be paid DA @ Rs.150/- per day for 5 days.**

In addition, a few seats are available on payment basis for non-sponsored (self-support) teachers, scientists from R&D organizations, practicing engineers from industry and others interested in this course. **A course fee of Rs.10,000/- will be charged to these participants.** This will entitle them to participate in the course and receive the course material. Single room **accommodation** is available on the Institute campus at the **Hoysala Guest House.** The participants have to request in advance along with the registration form for such accommodation. The lodging charges will be **Rs.1000/- per day**, for self-sponsored college teachers and **Rs.1500/- per day** for other participants, subject to availability of accommodation

**CENTRE FOR CONTINUING EDUCATION<sup>\*</sup>**  
**Indian Institute of Science**  
**Bengaluru – 560 012**

**QIP Short Term Course**  
**On**  
**“Digital Signal Processing And Applications”**

**27<sup>th</sup> February-3<sup>rd</sup> March, 2017**

### Registration Form

**(Please mail to reach before 20 January, 2017)**

1. Name.....
2. Age:..... Sex: Male/Female
3. Office address .....
4. Landline No. with STD code:.....
5. Mobile No. ....
6. Email ID:.....
7. Academic Qualifications  
Degree subject year University  
Diploma/B.Sc./B.A.....  
B.E/B.Tech/M.Sc. ....  
M.E/M.Tech./M.Phil.....  
Ph.D. Completed/Pursuing/Intend pursuing:.....  
Thesis title/Proposed Research Area:.....

8. Teaching Experience.....(Years)  
 9. Industry Experience .....(Years)  
 10. Courses taught/professional responsibilities.....  
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 .....  
 11. Accommodation required Yes / No  
 12. Self-support candidate : Rs. 10,000/-  
 Demand Draft No.....dated.....

*Please mail the filled-in application form to:*

The Officer-in-Charge,  
 Centre for Continuing Education  
 Indian Institute of Science  
 Bengaluru - 560 012  
 Telephone: 080-23600911, 22932055/2491  
 Email: so@cce.iisc.ernet.in/  
 office@cce.iisc.ernet.in

**To reach on or before: 20<sup>th</sup> January, 2017**

Intending participants may use the attached application form or a xerox copy of the same. Applicants from AICTE recognized colleges are required to submit their applications sponsored by their colleges.

Non-sponsored (self-support) teacher applicants /others should send their application along with a **DD for Rs.10,000/-** drawn in favour of **“Registrar, Indian Institute of Science, Bengaluru - 560012”** payable at Bengaluru.

**Deadlines:**

Receiving completed application: **20<sup>th</sup> January, 2017**

Intimation of selection: **26<sup>th</sup> January, 2017**

I agree to abide by the rules of the QIP courses. If selected, I shall participate in the course for the entire duration.

Date:  
 Place:

Signature

The applicant Mr/Ms.....  
 .....  
 from our institution will be permitted to attend the QIP Short Term Course on **“Digital Signal Processing And Applications ”** to be held during **27<sup>th</sup> February-3<sup>rd</sup> March, 2017** at the Indian Institute of Science, Bengaluru, if selected. He/she will be granted necessary leave of absence.

Place:  
 Date:

Signature of Head of the  
 Department

Signature and Seal of the  
 Principal of the Institution

**(Xerox copy of this form may also be used)**

## QIP Short Term Course

On

### “Digital Signal Processing And Applications ”

**27<sup>th</sup> February-3<sup>rd</sup> March, 2017**

Coordinator

**Dr. Prasanta Kumar Ghosh**  
 Dept. of Electrical Engineering

Sponsored by  
 AICTE, NEW DELHI



Centre for Continuing Education  
 Indian Institute of Science  
 Bengaluru – 560 012  
 Website: cce.iisc.ernet.in