

15th “Teaching the Teachers” WORKSHOP | THREE-DAY INTENSIVE Analog IC Design

Fundamentals to Selected Advanced Concepts

1 Pakistan Engineering Council, CPD Point will be awarded

Overview: This three-day intensive workshop is intended for industry professionals, university faculty, and advanced graduate students interested in developing a deeper, physically intuitive understanding of analog CMOS IC design.

Beginning with fundamental principles and progressing to selected advanced concepts, the workshop emphasizes analytical methods, physical insight, and optimal design strategies. Particular attention is given to important concepts and practical insights that are often overlooked or insufficiently emphasized in conventional treatments.

The presentation is structured to accommodate participants with varying levels of experience in analog IC design, while offering deeper insights and advanced perspectives of value to experienced designers and educators. Even familiar circuit structures are revisited from new analytical and physical perspectives.

Speaker Biography: Asad Abidi received the B.Sc. degree in Electrical Engineering from Imperial College, London in 1976, and the Ph.D. from the University of California, Berkeley in 1981. He worked at Bell Laboratories, Murray Hill, until 1985, and then joined the faculty of the University of California, Los Angeles, where he is Distinguished Professor of Electrical Engineering. With his students he has developed many of the radio circuits and architectures that enable today’s mobile devices.

Professor Abidi has received the 2008 IEEE Donald O. Pederson Award in Solid-State Circuits and the 2012 and 2022 Best Paper Awards from the IEEE Journal of Solid-State Circuits. He was elected Fellow of IEEE in 1996, Member of the US National Academy of Engineering in 2007, and Fellow of TWAS, the World Academy of Sciences, in 2010. At present he is also the Abdus Salam Chair Professor at LUMS.



Core Topics & Curriculum of the Workshop

- 1. The Differential Amplifier:** As one of the most important building blocks of analog ICs, the differential amplifier deserves a thorough understanding. This module develops its essential properties through bilateral symmetry, revealing the physical limits of common-mode and power-supply noise rejection. Both static and dynamic large-signal behavior are examined, together with their implications for circuit design.
- 2. Feedback, Loop Gain, and Distortion:** Transistors are inherently nonlinear, yet high-fidelity analog signal processing demands exceptional linearity. This module examines how negative feedback suppresses distortion and improves linearity, going beyond conventional small-signal approximations. Particular emphasis is placed on intuitive and systematic methods for determining loop gain, even in complex circuits.
- 3. Switched-Capacitor Circuits and Charge Redistribution:** This module develops a systematic approach to the analysis and design of switched-capacitor circuits, including charge-redistribution

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amplifiers and D/A converters. Special emphasis is placed on the application of Kirchhoff's Current Law to capacitor circuits, stray-insensitive design, optimization for minimum settling time, and exact noise analysis.

4. Dynamics of Regenerative Latches and Comparators: A new visual framework is introduced for understanding the dynamics of regenerative circuits. This approach provides physical insight into the behavior of latches and comparators, including metastability, setup and hold time constraints, thermal noise, and comparator offset voltage.

Who should attend?

- **Industry Professionals:** Engineers currently working in the semiconductor and IC design sectors.
- **Academic & Lab Staff:** Faculty members and engineers teaching electronics courses or conducting electronics lab sessions.
- **Researchers:** Engineers actively engaged in IC design research and development.
- **Graduate Students:** MS and Ph.D. candidates enrolled in IC design or related electronics programs.
- **Practitioners & Enthusiasts:** Self-driven IC design practitioners and passion-led engineering enthusiasts.

Registration Fees:

Participant Category	Fee (PKR)	Notes
Industry Professionals	PKR 12,500	25% Group Discount for group of 5 or more
Faculty / Lab Engineers	PKR 5,000	See Accommodation Note
Students	PKR 1,500	For graduate & undergraduate students

Workshop Package Includes:

- **Training Materials:** Writing pads, color pens, and related supplies.
- **Meals & Refreshments:** Tea breaks and working lunches provided throughout the workshop.
- **Accommodation Note:** Regular registration fees do not include accommodation. However, complimentary shared accommodation on the FAST-NU Campus is available for outstation faculty members on a first-come, first-served basis (limited to approximately 10 guests).

Attendees are also welcome to arrange their own lodging. There are numerous hostel options nearby in sectors H-13 and G-11. FAST-NU can assist you in finding suitable hostel or guest room accommodations upon request, though any associated costs must be covered individually and are not included in the registration fee.

Selection & Preferences:

Seats are limited, and participants will be selected based on their relevance and suitability for the program. Per the guidance of Prof. Abidi, preference will be given to industry applicants.

For Registration: Please fill the Google Form.

<https://forms.gle/vii4bqrN99e9RYGW7>



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