



Systematic Analog Design Using The gm/ID Design Methodology

A Modern Designer-Oriented Perspective



Course Overview

The gm/ID design methodology has been around for over 20 years and promoted by several prominent figures in the analog IC design community. However, many designers still do not know how to benefit the most from it, do not have a systematic understanding of how it works, or apply it without having a solid grasp of its principles and potential. Furthermore, the increased complexity of nanometer transistor models has widened the gap between simple analytical design equations and SPICE simulation results. Consequently, analog design is tending towards a trial-and-error process on simulation tools, which calls for a new paradigm that restores the designer's intuition, boosts productivity, and makes analog IC design a systematic and optimized process. This new paradigm can be attained by the seamless integration of the gm/ID design methodology with precomputed look-up tables (LUTs). Not only does it provide the designer with an intuitive, orthogonal, and normalized design knob, but also it enables fast and accurate evaluation of circuit sizing scenarios without a simulator. The designer is empowered to explore, visualize, and understand the design space boundaries in a systematic setting, thus supporting informed design decisions that are difficult to attain with fully automated, black-box sizing tools. This course will help you uncover the full potential of the gm/ID methodology, understand it inside out, and discover a new paradigm for analog IC design.

How to Register

- Please fill [this form](#)

Course Duration

- 18 hours of recorded live lectures (the videos and all course contents are in English)

Course Fees

- Standard rate: ~~300 USD~~ **90 USD**
- Full-time student rate: ~~450 USD~~ **FREE**

What Is Included

- Playback of recorded live lectures (access to playback of the lectures will be provided for one year)
- Lecture slides (pdf)
- Graded quizzes
- Graded design exercises
- Optional homework assignments
- Course forum for discussions and Q&A
- Access to the Analog Designer's Toolbox (ADT) full version for 6 months



- Simulation files to replicate the practical demonstrations during the course

Target Audience

- Professional analog designers at junior and senior levels.
- Students aspiring to an analog design career. A previous exposure to an analog IC design course in the undergraduate or graduate level is expected.

Why Is This Course Different?

This course has unique aspects that differentiate it from conventional analog IC design courses:

1. Focusing on the “analysis by inspection” skills and developing the “designer’s intuition”.
2. Verifying hand-analysis and theoretical concepts using practical simulation results.
3. Design examples of practical analog CMOS circuits to achieve target specifications using modern design methodologies.
4. Learn to design “from-scratch” as well as modifying existing designs.

Course Certificate

An official course completion certificate from Master Micro can be provided if:

1. The student registers with the **Standard rate** without using Full-time student offers or discount codes.
2. The student successfully completes all course quizzes and exercises.

Course Plan

Day	Topic
1	Mastering the MOSFET large signal behavior
2	Mastering the MOSFET small signal behavior
3	Designer-oriented analog circuit analysis
4	Analog design methodologies
5	Systematic design of current mirrors
6	Systematic design of single stage amplifiers



7	Systematic design of cascode amplifiers
8	Systematic design of feedback amplifiers
9	Systematic design of two-stage amplifiers

Instructor Bio

Dr. Hesham Omran taught analog design to thousands of students and designers and gave talks about systematic analog design and the gm/ID methodology to 100+ top universities and semiconductor companies. He received the B.Sc. (with honors) and M.Sc. degrees from Ain Shams University, Cairo, Egypt, in 2007 and 2010, respectively, and the Ph.D. degree from King Abdullah University of Science and Technology (KAUST), Saudi Arabia, in 2015, all in Electrical Engineering. From 2008 to 2011, he was a Design Engineer with Si-Ware Systems (SWS), Cairo, Egypt, where he worked on the circuit and system design of the first miniaturized FT-IR MEMS spectrometer (NeoSpectra), and a Research and Teaching Assistant with the Integrated Circuits Lab (ICL), Ain Shams University. From 2011 to 2016 he was a Researcher with the Sensors Lab, KAUST. He held internships with Bosch Research and Technology Center, CA, USA, and with Mentor Graphics, Cairo, Egypt. In 2016, he rejoined the ICL, Ain Shams University, where he is currently an Associate Professor. He created the Mastering Microelectronics YouTube channel specialized in microelectronics education in the Arab world with 15k+ subscribers. He co-founded Master Micro in 2020 to develop the Analog Designer's Toolbox (ADT), a novel EDA tool that defines a new paradigm for analog IC design. Dr. Hesham has received several awards including the Egyptian State Encouragement Award for Engineering in 2019, Ain Shams University Encouragement Award for Technology in 2022, the Design Automation Conference (DAC) Innovator's Award in 2022, and the UNESCO AIFozan Award for Young Scientists in STEM in 2023. He has published 50+ papers in international journals and conferences. His research interests are in the design of analog and mixed-signal integrated circuits, and especially in analog and mixed-signal CAD tools and design automation.