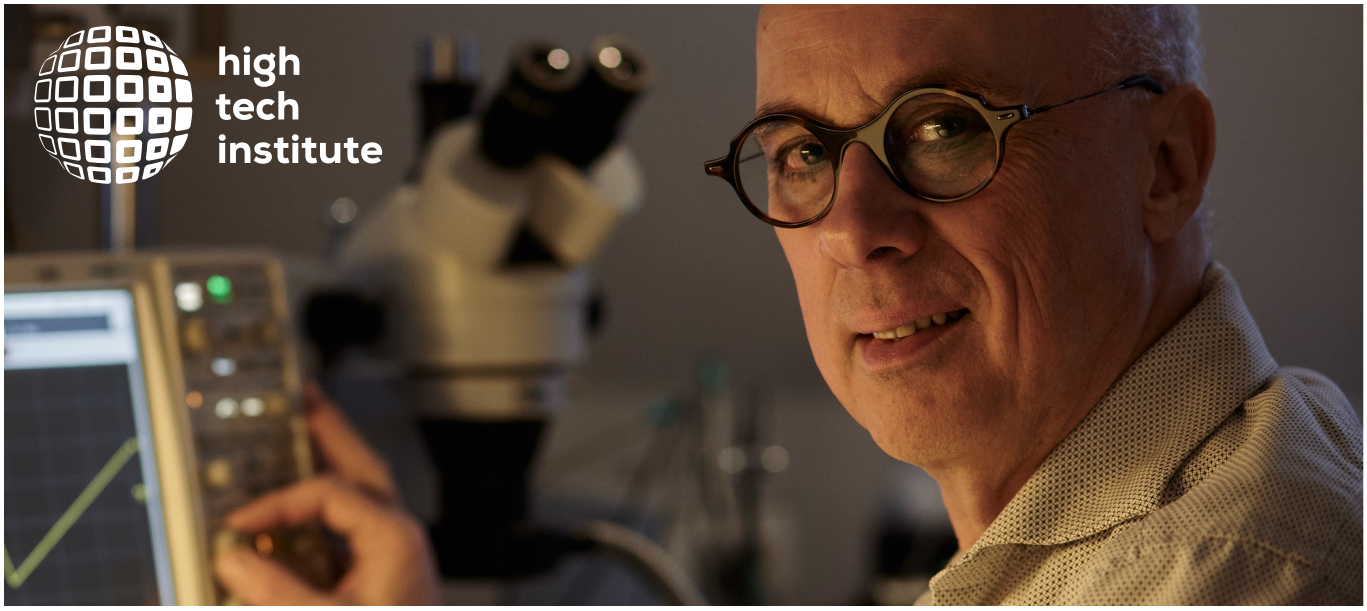
TRAINING BROCHURE

Design of analog electronics - analog IC design training



Provisional reservation

Book now

high tech institute

Design of analog electronics – analog IC design

Price: € 5,650 excl. VAT *

Duration: 22 weekly half days

Contact: training@hightechinstitute.nl, +31 85 401 3600

Intro

This course is the follow-up course of the course “Design of analog electronics - Analog Electronics 1”. It addresses the design of application-specific amplifiers with discrete transistors or in IC technology.

Included in the course price are the course book and the use of the symbolic simulator SLiCAP (Read more here).

The course will be organized **either**:

- through weekly half day online Zoom meetings **OR**
- for the theoretical part through weekly half day online Zoom meetings followed by the practical part through a number of consecutive classical course days in the Netherlands during which the theory is applied in design cases with intensive guidance by the lecturer.

In both situations course participants require a laptop with three packages installed: Maxima CAD (Computer Algebra System), Python (under Windows: Anaconda) and LTSpice. All packages are free and open source and available for Windows, Linux and MacOS.

Objective

After the course, the participant will be able to:

- Specify and design an analog integrated circuit comprising application-specific amplifiers and DC references;
- Design amplifiers, level shifts and voltage and current references with discrete transistors or in BiCMOS or in CMOS technology.

Intended for

Designers with little or no experience in analog circuit design as well as for experienced analog circuit designers who want to improve their skills.

Education: At least BSc in physics or electrical engineering. Prior knowledge: linear algebra, matrices, complex numbers, transformations, network theory and of the knowledge and skills learned through course module DAE-AE1.

Certification

Participants will receive a High Tech Institute certificate after completing homework and final assignment of this training.

Course leader

Hans Vink MSc

Trainers

Anton Montagne MSc

** Prices are subject to change. Price correction will be applied at the end of the year.*

Keep me posted

Program

Day 1: IC processes and device modeling
BiCMOS technology:

- Modeling of semiconductor devices
- Device operation and simulation models
- Models for hand calculations

Day 2: Principle of amplification
1. Available power gain and biasing of active components
2. Biasing techniques:

- Principle
- AC and DC coupling
- Negative-feedback biasing
- Model-based biasing
- Auto-zero biasing

Day 3: CE and CS amplifier stages

- Chopper stabilised biasing;
- Available power gain;
- Noise behavior;
- Linearity;
- Dynamic behavior;
- Output drive capability.

Day 4: Application of balancing techniques

- Differential stages;
- Push-pull stages;

Day 5: Application of negative feedback
1. Balanced and unbalanced local-feedback stages
2. Balanced and unbalanced model-based feedback amplifier stages:

- Current mirrors
- Voltage mirrors
- Variable-gain stages

Day 6: Design of multiple-stage amplifiers

- Overview amplifier properties and design techniques (see also DAE-AE1);
- Design of cascaded amplifiers;
- Design of over-all feedback amplifiers;

Day 7: DC References

- Design method for voltage- and current references;
- Design of current references;
- Design of voltage references;

Day 8-10: The final exercise comprises the design of an application-specific amplifier in BiCMOS technology
Attention needs to be paid to the following aspects:

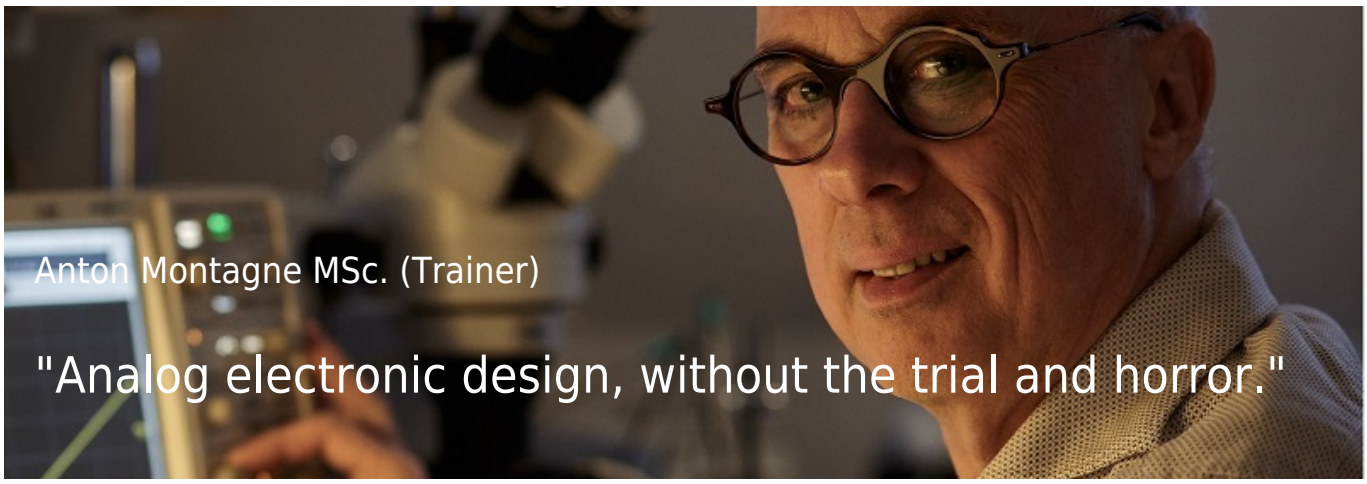
- Desired type of amplifier regarding the application;
- Noise behavior;
- Load drive capability, linearity and overdrive recovery;
- Dynamic behavior and frequency stability
- Temperature stability;
- Minimisation of the influence of interference signals;

Day 11: Presentation of the results of the final assignment by the participants and group discussion

Methods

Lectures, practical training, home-work and final assignment.

Read the interview:



Remarks from participants:

- 'During the training, we learned how to design step by step while understanding the reasoning behind each one of them. I found this design approach highly useful and therefore I would recommend the training strongly.' > Ugur Bagci , ASML
- 'I have learned a lot from this course, thanks!' > Xiaoliang Han , NXP Semiconductors
- 'Very good course, learnt a lot, pleasant.' > Edgar Olthof , NXP Semiconductors