ME3100
Analog Circuit Design Courseware
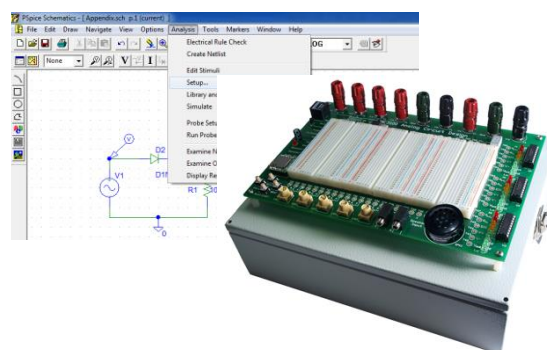
Teaching slides	Training kit
• Editable Microsoft® PowerPoint® slides • Covers 45 hours of teaching	• Analog circuit design kit • Lab sheets & model answers • Problem-based assignments • Covers 24 hours (hardware) + 21 hours (PSpice) of labs
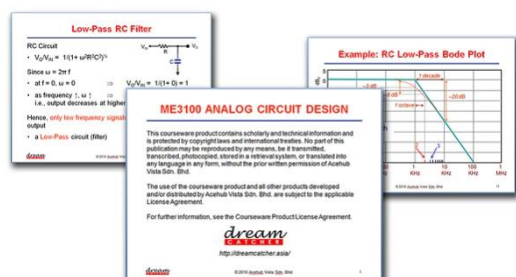
Target university subject	Target year of study	Prerequisite(s)
Analog Circuit Design	3rd or final year undergraduate	Analog Electronics

The **ME3100 is a ready-to-teach package in practical analog circuit analysis, design, and applications. The lab experiments use a problem-based approach, allowing students to learn and solve practical analog circuit design tasks. It is a lecturer resource with teaching slides, training kits, lab sheets, and problem-based assignments.**

Designed to impart knowledge in

➢ Analog circuit analysis
➢ Passive and active components
➢ BJT & FET circuit analysis and design

➢ Practical op-amp design
➢ Active filter design
➢ PSpice and Measurement instruments usage

Benefits of the ME3100 courseware

➢ The analog circuit design kit consists of various standard circuits that can be used as building blocks to develop complete designs without starting from scratch.
➢ The embedded audio player provides the flexibility to generate simple to complex audio signals.
➢ Open-ended questions in the lab sheets allow students to enhance their engineering problem-solving skills. This approach enables students to enhance their skills in circuit design proactively.
➢ The lab sheets enable students to appreciate different design considerations and approaches by allowing them to experiment with different components.
➢ Students experience both circuit design using PSpice and actual components to further strengthen their design knowledge and skills.

![Teaching Slides icon]
Teaching Slides

More than 400 editable Microsoft PowerPoint teaching slides are provided, covering 45 hours of teaching for one full semester. The slides cover the following topics:

- Component Characteristics for Resistor, Capacitor, and Inductor
- Resistor-Capacitor-Inductor Based Circuits
- Review of Practical Circuit Analysis Techniques
- Diode Characteristics and Applications
- Bipolar Junction Transistor and MOSFET Circuits Design

- Op-Amp Based Circuits Design
- Active Filter Design and Implementation
- Case Studies 1: Wide Bandwidth Amplifier Design
- Case Studies 2: High Precision Voltage Regulator Design

Training Kit

Analog circuit design kit

The training kit hardware consists of standard on-board components and a prototyping area.

Standard On-board Components

- Audio Speaker
- Embedded Audio Player
- LED Audio VU Meter
- Analog Potentiometer
- Seven Segment Display
- Insulation Transformer
- Various test points for measurements
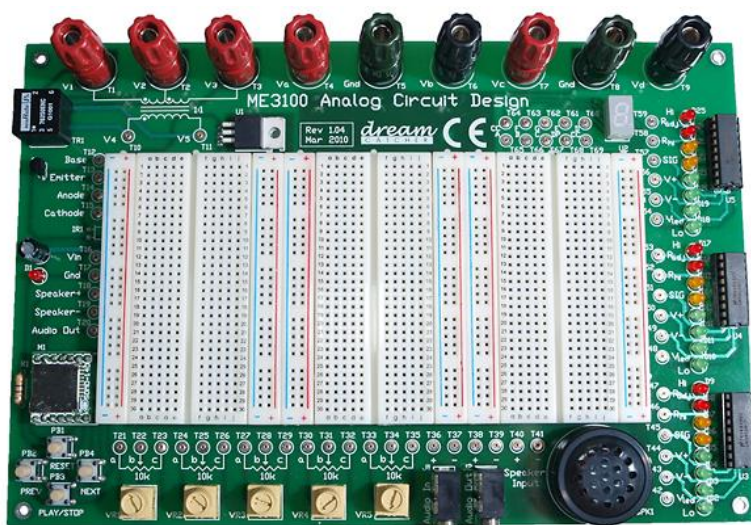
Prototyping Area

- Breadboard with three standard miniature blocks, with 1200 holes for connections

Accessories

The following accessories are provided with the training kit.

Item	Quantity
Power supply cable	1 set
BNC(m)-to-banana clip cable	1
Electronic components	1 set
Antistatic wrist strap	1

ES France - Département Tests & Mesures
127 rue de Buzenval BP 26 - 92380 Garches

Tél. 01 47 95 99 45
Fax. 01 47 01 16 22

e-mail : tem@es-france.com
Site Web : www.es-france.com

Lab sheets

The training kit includes 8 lab sheets in editable Microsoft Word format. Each lab requires 3 hours to complete. Model answers are provided with all lab sheets.

Lab Sheet	Required Items	
	Option 1 Power Supply, Function Generator, Multimeter, and Oscilloscope	Option 2 Pspice
Introduction to PSpice		√[1]
Designing a Voltage Regulator	√	√[1]
Designing an IR Transceiver Circuit	√	(Phototransistor Coupler)
Designing a BJT-based Amplifier	√	√[1]
Designing a FET-based Amplifier	√	Not available
Designing Op-Amp-based Precision Circuits	√	√[1]
Designing an Audio Equalizer	√	√[1]
Designing a High Sensitivity IR Detector	√	Not available
Designing a High Precision Voltage Regulator	√	√[1]

[1]: a dedicated set of lab sheets for using PSpice is included

Problem-based assignments

The problem-based assignments below allow students to enhance their problem-solving skills.

- High Sensitivity RTD Sensing
- Ultrasonic Range Finder

Instruments

The recommended instruments from Keysight Technologies, to be purchased separately, are listed below. You may choose between two families of basic instruments: benchtop or modular.

Instrument[1]	Benchtop Family[2]
Power Supply	2 outputs:up to +/- 15V and current rating of 0.5A
Function Generator	Frequency up to 10 MHz
Oscilloscope	Bandwidth up to 20 MHz
Multimeter	Any handheld or bench-top multimeter

[1] Refer to the Lab sheets section for the instrument selection.
[2] These instruments are also the recommended model for ME3000 and ME3200.

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Training Kit Hardware Specifications

		Analog Circuit Design Kit	
	Min	Typical	Max
Electrical			
Input Supply			
Voltage (variable, 0 – 15 Vdc)	0 V		15.5 V
Current		1.0 A	
Embedded Audio Player			
Sampling rate	6 kHz		32 kHz
microSD memory slot capacity			4 GB
Voltage supply	2.7 V		3.6 V
Idle current		8 µA	
Built-in Speaker			
Frequency response	500 Hz		2000 Hz
Impedance		8 ohm	
Power rating		0.15 W	
General			
EMC designed to		IEC61326-1:2005 / EN61326-1:2006	
		· CISPR11:2003/EN55011:2007	
		· IEC 61000-4-3:2002 / EN 61000-4-3:2002	
Warranty			1 year

Ordering Information

Description	Package	Product Number
Teaching Slides	1 user license	ME3100–100
Training Kit	1 set	ME3100–200
Teaching Slides + Training Kit	1 user license + 1 set	ME3100–300
Instruments	where applicable	Purchase separately

Training courses related to the subject matter are available on request. Visit dreamcatcher.asia for details.

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