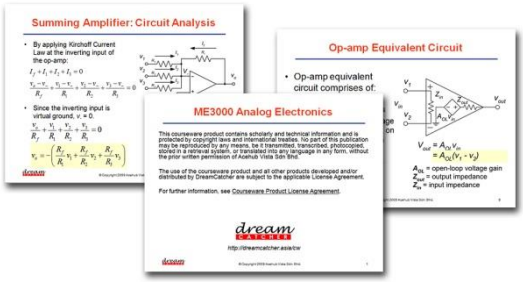
ME3000

Analog Electronics Courseware

~Complete Resources for Lecturers~

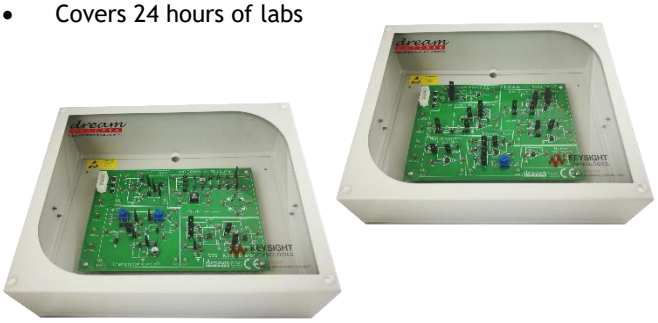
Teaching slides

- Editable Microsoft® PowerPoint® slides
- Covers 45 hours of teaching



Training kit

- Analog electronics kit
- Lab sheets & model answers
- Problem-based assignments
- Covers 24 hours of labs



Target university subject	Target year of study	Prerequisite(s)
Analog Electronics	1st or 2nd year undergraduate	None

The ME3000 is a ready-to-teach package in semiconductor fundamentals, circuit analysis, and electronic device applications. It is a lecturer resource with teaching slides, training kits, lab sheets, and problem-based assignments.

Designed to impart knowledge in

- Semiconductor fundamentals
- Analog electronic devices
- Analog circuit analysis
- Typical applications of electronic devices
- Measurement instruments usage

Benefits of the ME3000 courseware

- The analog electronics kit consists of the Diode & Transistor and Op-Amp modules, which contain jumpers and discrete component holders for students to select and insert different components, allowing them to characterize the behavior of diodes, transistors, op-amps, active filters, and amplifiers.
- Unlike breadboards, the modules do not require loose parts, resulting in minimum parts and inventory management.
- The on-board circuits can be viewed easily, allowing students to understand how circuits are built and connected.
- The provided PSpice design files can be used as reference designs for assignments and to perform circuit simulations using EDA software, such as the demo version of Cadence OrCAD software.
- Lab sheets are specially designed to expose students to basic instruments such as power supplies, function generators, oscilloscopes, and multimeters.

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Teaching Slides

More than 500 editable Microsoft PowerPoint teaching slides are provided, covering 45 hours of teaching for one full semester. The slides cover the following topics:

- P-N Junction & Semiconductor Diodes
- Bipolar Junction Transistor
- DC Biasing
- Transistor Modeling
- Small-Signal Analysis
- Frequency Response of a BJT Amplifier
- Design of a Small-Signal BJT Amplifier
- Field-Effect Transistors Part I: Types and Characteristics
- Field-Effect Transistors Part II: Biasing
- Field-Effect Transistors Part III: Small-Signal Analysis
- Operational Amplifiers
- 555 Timer-based Multivibrators
- Oscillators
- Voltage Regulators

Training Kit

Analog electronics kit

The training kit hardware consists of the Diode & Transistor module and Op-Amp module.

Diode & Transistor Module

- Diode circuit
- Transistor circuit
- Class A tuned amplifier
  - 555 multivibrator

Op-Amp Module

- 1st order active filter
- 2nd order active filter
- Buffer
- Inverting/summing amplifier
- Non-inverting amplifier
- Differential amplifier

PSpice design files of selected circuits are provided

Accessories

The following accessories are provided with the training kit.

Item	Quantity
Power supply cable	1
Jumper cable with grabber clips	6
BNC(m)-to-grabber clip cable	1
Antistatic wrist strap	1

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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. The labs can use either conventional benchtops or USB modular instruments.

Lab Sheet	Required Items Power Supply, Digital Multimeter, Oscilloscope & Function Generator
Diode Characteristics	√
Rectifier Circuits	√
BJT Characteristics	√
DC Biasing	√
Practical Op-Amp Circuits	√
RF Class A Tuned Amplifiers	√
555 Multivibrator Circuits	√
Active Filters	√

Problem-based assignments

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

- Basic Signal Conditioning Using Op-Amp Circuits
- Low Pass Active Filter Design
- 555 Multivibrator Circuits

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 ME3100 and ME3200.

Training Kit Hardware Specifications

	Diode & Transistor Module		Op-Amp Module	
	Min	Max	Min	Max
Electrical				
Voltage supply (+5 V)	4.5 V	5.5 V		
Voltage supply (+15 V)	13.5 V	16.5 V	13.5 V	16.5 V
Voltage supply (−15 V)			−16.5 V	−13.5 V
Current supply (+5 V)	7.0 mA	10.0 mA		
Current supply (+15 V)	1.0 mA	3.0 mA	6.0 mA	8.0 mA
Current supply (−15 V)			7.0 mA	20.0 mA
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	ME3000-100
Training Kit	1 set	ME3000-200
Teaching Slides + Training Kit	1 user license + 1 set	ME3000-300
Instruments	where applicable	Purchase separately

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

For more information or enquiries:

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