

EES1 Electrical/Electronic Fundamentals



This is an integrated instructional module designed specifically to operate within an "Instructional Pod" environment. It provides a 15-assignment study program that has been designed for use within the AutoLAB program for core learning. The module package includes hardware, software, and curriculum materials sufficient to complete the learning activities.

The curriculum incorporates continuous assessment through questions. When used in conjunction with a ClassAct networked management system, this provides instant feedback of student performance.

Each assignment is split into at least two tasks and they start with a series of questions designed to track inventory, and ensure that any missing pieces can be located. The tasks are designed to teach electrical/electronic fundamentals, with the research activities based upon on screen material.

This module has been designed to provide a hands-on training facility that covers:

- Electrical safety.
- DC circuits.
- AC circuits.
- Electromagnetism.
- Semiconductor devices.

Trouble-shooting techniques are taught using switched faults, providing hands on experience of standard industrial troubleshooting procedures.

The student uses multimeters and an oscilloscope for troubleshooting and system signal measurements.

Typical topic areas include:

- Electrical safety and equipment familiarization.
- The basic DC circuit.
- Resistance and Ohm's law.
- Series/parallel and variable resistors.
- AC measurements.
- Capacitor charging, discharging and timing.
- CR circuits.
- Permanent magnets and the electromagnet.
- Electromagnetic induction.
- Transformers.
- DC motors and generators.
- Relays.
- Diodes.
- Diode rectification circuits.
- Transistors.
- Transistor amplifiers.

The module guides the student through task-oriented instruction. The tasks include hands-on practical activities. Each task has a theoretical summary that explains the concepts and automotive applications involved.

The computer presented training material is compatible with the ClassAct classroom management system that can track student progress during these tasks and will report back immediately to instructional staff if a student falls below a predetermined standard or takes too long to perform a task.

Each assignment is designed around a list of performance objectives. These lists include academic, technical, and occupational objectives. The assignments are written in such a way as to enable a student to attain the performance objectives, with the assessment questions linked to these in order to provide a measure of true competency.

The performance objectives are used by the ClassAct management system to generate a comprehensive portfolio of student competency reports. The module includes a default competence report addressing the latest NATEF standards.

Typical activities include:

- Identify electrical safety and potential hazards.
- Investigate simple DC circuits.
- Identify and investigate resistor color-coding and Ohm's law.
- Investigate series/parallel and variable resistors.
- Investigate AC waveforms and their characteristics.
- Investigate capacitor charge, discharge and timing.
- Investigate capacitors and resistors on an AC supply.
- Investigate a capacitor/resistor circuit.
- Investigate permanent magnets and the electromagnet.
- Investigate electromagnetic induction and the solenoid.
- Investigate the operation of transformers.
- Investigate the operation of DC motors and generators.
- Identify and investigate the operation of a relay.
- Identify and investigate the operation of diodes.
- Identify and investigate the operation of diode rectification circuits and the Zener diode.
- Identify and investigate the characteristics of transistors.
- Identify and investigate the operation of simple transistor amplifiers.

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The items supplied with this instructional module include:

- EES1 Instructor's Guide
- EES1 On-Screen Multimedia Manual CD-ROM
- EES1 Voice-Overs CD-ROM
- NATEF Instructor's Resources CD-ROM
- Test & Measuring Equipment Interactive Instructor CD-ROM
- D3000 PS9.0X Base Unit and Accessory Kit
- D3000 9.5 Experiment Card
- D3000 9.6 Experiment Card
- D3000 9.8 Experiment Card
- D3000 9.20 Experiment Card and Accessory Kit

Additional items required:

- Computer
- Access to Printer
- Digital Multimeter
- Oscilloscope
- Signal Generator

NATEF task list areas addressed:

- VI-A4 P-1
- VI-A6 P-1
- VI-A8 P-1
- VI-A9 P-1
- VI-A10 P-1

Module Facts

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	No.	Average time
Assignments	15	90 minutes
Extension Activities	12	60 minutes
Total		35 hours



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