BS4 Braking Components and Operation

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 the advanced principles of automotive braking systems, with the research activities based upon on screen material.

Assessment questions are incorporated into each task and a series of job sheets that are printed out by the student are used to guide them through the related shop activities on real vehicle systems.

This module consists of a comprehensive series of computer aided instruction assignments that enable students to learn the advanced principles and applications of braking systems.

The dynamic computer aided instruction provides interactive animations and high-resolution graphics that help the student understand the topics being delivered.

In addition to providing the underpinning knowledge on braking systems, the module also provides a series of practical tasks. These are presented to the student as a series of job sheets, which will require access to a vehicle in a fully equipped automotive workshop.

Typical topic areas include:

- Pedal height measurement.
- Brake fluid storage.
- Brake fluid handling.
- Master cylinder operation.
- Brake line inspection.
- Brake line fabrication.
- The brake warning light system.
- Bleeding brake systems.
- Vacuum supplies.
- Wheel bearing construction and operation.
- Wheel studs.

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:

- Measuring and adjusting pedal height.
- Select, handle, store, and install brake fluids to proper levels.
- Check master cylinder for internal and external leaks and proper operation.
- Investigate brake fluid and brake servos.
- Remove, bench bleed, and reinstall master cylinder.
- Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; tighten loose fittings and supports.
- Fabricate and install brake lines (double flare and ISO types).
- Inspect, test, and replace components of a brake warning light system.
- Bleed (manual, pressure, vacuum or surge) brake system.
- Flush hydraulic system.
- Test pedal free travel with and without engine running.
- Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster.
- Inspect the vacuum-type power booster unit for vacuum leaks.
- Diagnose wheel bearing noise, shimmy, and vibration concerns.
- Remove, clean, inspect, repack, and install wheel bearings.
- Inspect and replace wheel studs.

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The items supplied with this instructional module include:

- BS4 Instructor's Guide
- BS4 On-Screen Multimedia Manual CD-ROM
- BS4 Video Materials CD-ROM
- BS4 Voice-Overs CD-ROM
- NATEF Instructor's Resources CD-ROM
- Test & Measuring Equipment Interactive Instructor CD-ROM
- Book – Modern Automotive Technology by James E. Duffy
- Book – Auto Brakes Technology by Johanson & Stockel
- Health and Safety Sheet

Additional items required:

- Computer
- Access to Printer
- Axle Stands
- Ball Joint Press and other Special Tools
- Bearing Seal and Race Driver Set
- Bench Press 10 Ton
- Brake Bleeder Vacuum
- Brake Bleeding Equipment
- Brake Piston Compressor
- Cleaning Equipment
- Cleaning Fluid
- Combination Spanner Set
- Leak Detection Equipment
- Multimeter
- Pipe Flaring Tool
- Pipe Wrench
- Tape Measure
- Torque Wrench
- Vacuum Gauge
- Vehicle Hoist - 2 or 4 Post Ramp
- Vehicle Lifting / Jacking Equipment
- Grease (Consumable Item)
- Various Hand Tools

NATEF task list areas addressed:

- III-D3 P-2
- III-E3-2 P-3
- IV-C3-2 P-1
- V-A1 P-1
- V-A2 P-1
- V-B2 P-2
- V-B3 P-2
- V-B4 P-1
- V-B6 P-2
- V-B7 P-2
- V-B8 P-1
- V-B11 P-3
- V-B12 P-1
- V-B13 P-3
- V-E1 P-2
- V-E2 P-2
- V-E3 P-2
- V-F1 P-1
- V-F2 P-1
- V-F5 P-3
- V-F6 P-1
- V-F7 P-1
- V-F8 P-1
- V-F9 P-2

Module Facts

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	No.	Average time
Assignments	15	90 minutes
Extension Activities	31	60 minutes
	Total	53 hours

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