



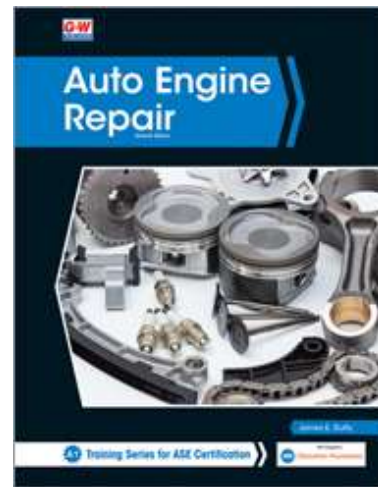
**Correlation of  
Auto Engine Repair, Duffy  
(Goodheart-Willcox Publisher ©2021)  
to the**

**2022 ASE Education Foundation Master Automobile Service Technology (MAST) Task  
List**

The following chart correlates the *Auto Engine Repair* textbook and shop manual (©2021) to the 2022 ASE Education Foundation Master Automobile Service Technology (MAST) Task List.

The correlation below lists the ASE Education Foundation Master Automobile Service Technology Tasks, priority levels, corresponding page numbers from the *Auto Engine Repair* textbook, and corresponding job numbers from the *Auto Engine Repair Shop Manual*.

For more information on the ASE Education Foundation standards, please visit [www.aseeducationfoundation.org](http://www.aseeducationfoundation.org).



**ENGINE REPAIR**

For every task in Engine Repair, the following safety requirement must be strictly enforced:

- Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

| Task Number and Description                                                                                                                                                                                                                                          | Priority | G-W Content                                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------------------------------------------------------------------|
| <b>I. ENGINE REPAIR</b><br><b>A. General</b>                                                                                                                                                                                                                         |          |                                                                     |
| 1. Research vehicle service information such as fluid type, internal combustion engine operation, vehicle service history, service precautions, technical service bulletins, and recalls including vehicles equipped with advanced driver assistance systems (ADAS). | P-1      | Textbook: pg. 9-25, 264, 279-280, 349-358,<br>Shop Manual Jobs 2, 3 |

**Auto Engine Repair—ASE Education Foundation MAST Task List Correlation Chart—page 2**

| <b>Task Number and Description</b>                                                                                                                    | <b>Priority</b> | <b>G-W Content</b>                                                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------------|
| 2. Retrieve and record DTCs, OBD monitor status, and freeze frame data; clear codes and data when directed.                                           | P-1             | Textbook: pg. 312-315, 352, 353<br>Shop Manual Job 4                          |
| 3. Verify operation of the instrument panel engine warning indicators.                                                                                | P-1             | Textbook: pg. 284-285, 287, 292<br>Shop Manual Jobs 11, 15                    |
| 4. Inspect engine assembly for fuel, oil, coolant, and other leaks; determine needed action.                                                          | P-1             | Textbook: pg. 265, 268-270, 287, 385<br>Shop Manual Jobs 10, 15               |
| 5. Install engine covers using gaskets, seals, and sealers as required.                                                                               | P-1             | Textbook: pg. 510-512<br>Shop Manual Jobs 5, 6, 30, 31, 32, 33, and 36        |
| 6. Verify engine mechanical timing.                                                                                                                   | P-1             | Textbook: pg. 240-247, 367, 502-510<br>Shop Manual Jobs 27, 28                |
| 7. Inspect, remove, and/or replace engine mounts.                                                                                                     | P-1             | Textbook: pg. 375, 376, 536-537, 540<br>Shop Manual Jobs 7, 8                 |
| 8. Identify service precautions related to service of the internal combustion engine of a hybrid electric vehicle.                                    | P-2             | Textbook: pg. 120-121<br>Shop Manual Job 1                                    |
| 9. Remove and reinstall engine on a newer vehicle equipped with OBD; reconnect all attaching components and restore the vehicle to running condition. | P-2             | Textbook: pg. 402-408, 536-541<br>Shop Manual Jobs 16, 17, 31, 32, 33, 34     |
| <b>I. ENGINE REPAIR</b>                                                                                                                               |                 |                                                                               |
| <b>B. Cylinder Head and Valve Train</b>                                                                                                               |                 |                                                                               |
| 1. Identify cylinder head and valve train components and configurations.                                                                              | P-1             | Textbook: pg. 212-236                                                         |
| 2. Remove cylinder head; inspect gasket condition; install cylinder head and gasket; tighten according to manufacturer's specification and procedure. | P-1             | Textbook: pg. 409-411, 466-469, 470-472, 519-521<br>Shop Manual Jobs 24, 2732 |
| 3. Clean and visually inspect a cylinder head for cracks; check gasket surface areas for warpage and surface finish; check passage condition.         | P-1             | Textbook: pg. 368-369, 466-470<br>Shop Manual Jobs 5, 24                      |
| 4. Inspect valve actuating mechanisms for wear, bending, cracks, looseness, and blocked oil passages (orifices); determine needed action.             | P-2             | Textbook: pg. 491-496<br>Shop Manual Jobs 25, 28                              |
| 5. Adjust valves (mechanical or hydraulic lifters).                                                                                                   | P-2             | Textbook: pg. 392, 528-529<br>Shop Manual Job 29                              |

| <b>Task Number and Description</b>                                                                                                                                                                                                                                                                                | <b>Priority</b> | <b>G-W Content</b>                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------------------------------------------------------------------|
| 6. Inspect and replace camshaft and drive belt/chain; includes checking drive gear wear and backlash, end play, sprocket and chain wear, overhead cam drive sprocket(s), drive belt(s), belt tension, tensioners, camshaft reluctor ring/tone-wheel, and valve timing components; verify correct camshaft timing. | P-1             | Textbook: pg. 491–496, 502–509,<br>Shop Manual Jobs 28, 31,         |
| 7. Inspect valve springs for squareness and free height comparison; determine needed action.                                                                                                                                                                                                                      | P-3             | Textbook: pg. 367, 485<br>Shop Manual Jobs 24, 25                   |
| 8. Replace valve stem seals on an assembled engine; inspect valve spring retainers, locks/keepers, and valve lock/keeper grooves; determine needed action.                                                                                                                                                        | P-3             | Textbook: pg. 223, 490–491<br>Shop Manual Jobs 24, 30               |
| 9. Inspect valve guides for wear; check valve stem-to-guide clearance; determine needed action.                                                                                                                                                                                                                   | P-3             | Textbook: pg. 219, 366, 472–474<br>Shop Manual Job 24               |
| 10. Inspect valves and valve seats; determine needed action.                                                                                                                                                                                                                                                      | P-3             | Textbook: pg. 223, 474-485<br>Shop Manual Jobs 24, 26               |
| 11. Check valve spring assembled height and valve stem height; determine needed action.                                                                                                                                                                                                                           | P-3             | Textbook: pg. 485-488<br>Shop Manual Job 27                         |
| 12. Inspect valve lifters and hydraulic lash adjusters; determine needed action.                                                                                                                                                                                                                                  | P-2             | Textbook: pg. 230–231, 362–363<br>Shop Manual Job 25                |
| 13. Inspect and/or measure camshaft for runout, journal wear, and lobe wear.                                                                                                                                                                                                                                      | P-3             | Textbook: pg. 362, 491–493<br>Shop Manual Jobs 25, 28               |
| 14. Inspect camshaft bearing surface for wear, damage, out-of-round, and alignment; determine needed action.                                                                                                                                                                                                      | P-3             | Textbook: pg. 362, 493-494<br>Shop Manual Jobs 24, 25, 28           |
| <b>I. ENGINE REPAIR</b>                                                                                                                                                                                                                                                                                           |                 |                                                                     |
| <b>C. Engine Block Assembly</b>                                                                                                                                                                                                                                                                                   |                 |                                                                     |
| 1. Identify engine block assembly components and configurations.                                                                                                                                                                                                                                                  | P-1             | Textbook: pg. 183-207                                               |
| 2. Remove, inspect, and/or replace crankshaft vibration damper (harmonic balancer).                                                                                                                                                                                                                               | P-1             | Textbook: pg. 248, 375, 408, 512<br>Shop Manual Jobs 17, 23, 31, 33 |
| 3. Disassemble engine block; clean and prepare components for inspection and reassembly.                                                                                                                                                                                                                          | P-2             | Textbook: pg. 414–417, 434-436<br>Shop Manual Job 17                |
| 4. Inspect engine block for visible cracks, passage condition, core and gallery plug condition, and surface warpage; determine needed action.                                                                                                                                                                     | P-2             | Textbook: pg. 370, 422–424<br>Shop Manual Job 18                    |
| 5. Inspect and measure cylinder walls/sleeves for damage, wear, and ridges; determine needed action.                                                                                                                                                                                                              | P-2             | Textbook: pg. 426–434<br>Shop Manual Job 20                         |
| 6. Perform deglazing and cleaning of cylinder walls.                                                                                                                                                                                                                                                              | P-2             | Textbook: pg. 429–432<br>Shop Manual Job 20                         |

| <b>Task Number and Description</b>                                                                                                                                                                                                                                                                         | <b>Priority</b> | <b>G-W Content</b>                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------|
| 7. Inspect and measure camshaft bearings for wear, damage, out-of-round, and alignment; determine needed action.                                                                                                                                                                                           | P-2             | Textbook: pg. 362, 491-492, 493–494<br>Shop Manual Jobs 18, 24, 25      |
| 8. Inspect crankshaft for straightness, journal damage, keyway damage, thrust flange and sealing surface condition, and visual surface cracks; check oil passage condition; measure end play and journal wear; check crankshaft position sensor reluctor ring (where applicable); determine needed action. | P-2             | Textbook: pg. 375, 437-442, 447<br>Shop Manual Jobs 18, 31              |
| 9. Inspect main and connecting rod bearings for damage and wear; determine needed action.                                                                                                                                                                                                                  | P-3             | Textbook: pg. 372, 374-375, 452–453<br>Shop Manual Jobs 18, 21          |
| 10. Identify piston and bearing wear patterns that indicate connecting rod alignment and main bearing bore problems; determine needed action.                                                                                                                                                              | P-2             | Textbook: pg. 447–449<br>Shop Manual Jobs 18, 21                        |
| 11. Inspect and measure piston skirts and ring lands; determine needed action.                                                                                                                                                                                                                             | P-2             | Textbook: pg. 448<br>Shop Manual Job 22                                 |
| 12. Determine piston-to-bore clearance.                                                                                                                                                                                                                                                                    | P-2             | Textbook: pg. 449<br>Shop Manual Jobs 22, 31                            |
| 13. Inspect, measure, and install piston rings.                                                                                                                                                                                                                                                            | P-2             | Textbook: pg. 203, 372, 454–455<br>Shop Manual Job 22                   |
| 14. Inspect auxiliary shaft(s) (balance, intermediate, idler, counterbalance, and/or silencer); inspect shaft(s) and support bearings for damage and wear; determine needed action; reinstall and time.                                                                                                    | P-2             | Textbook: pg. 461<br>Shop Manual Job 23                                 |
| 15. Assemble engine block.                                                                                                                                                                                                                                                                                 | P-1             | Textbook: pg., 436–437, 442–447, 455–461, 516-532<br>Shop Manual Job 31 |
| <b>I. ENGINE REPAIR</b>                                                                                                                                                                                                                                                                                    |                 |                                                                         |
| <b>D. Lubrication and Cooling System</b>                                                                                                                                                                                                                                                                   |                 |                                                                         |
| 1. Identify lubrication and cooling system components and configurations                                                                                                                                                                                                                                   | P-1             | Textbook: pg. 259-265, 278-286                                          |
| 2. Perform engine oil and filter change; use proper fluid type per manufacturer specification; reset maintenance reminder as required.                                                                                                                                                                     | P-1             | Textbook: pg. 287-289<br>Shop Manual Job 9                              |
| 3. Perform cooling system pressure and dye tests to identify leaks; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, heater core, and galley plugs; determine needed action.                                                                             | P-1             | Textbook: pg. 265–270<br>Shop Manual Job 35                             |
| 4. Identify causes of engine overheating.                                                                                                                                                                                                                                                                  | P-1             | Textbook: pg. 265-266<br>Shop Manual Job 35                             |

**Auto Engine Repair—ASE Education Foundation MAST Task List Correlation Chart—page 5**

| <b>Task Number and Description</b>                                                                                                                                       | <b>Priority</b> | <b>G-W Content</b>                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------|
| 5. Inspect, replace, and/or adjust drive belts, tensioners, and pulleys; check pulley and belt alignment.                                                                | P-1             | Textbook: pg. 88-89, 267,<br>Shop Manual Jobs 35, 37  |
| 6. Inspect and test coolant; drain and recover coolant; flush and/or refill cooling system; use proper fluid type per manufacturer specification; bleed air as required. | P-1             | Textbook: pg. 268, 273–274<br>Shop Manual Jobs 35, 36 |
| 7. Inspect, remove, and replace water pump.                                                                                                                              | P-2             | Textbook: pg. 271–272<br>Shop Manual Jobs 35, 38      |
| 8. Remove, inspect, and replace thermostat and gasket/seal.                                                                                                              | P-1             | Textbook: pg. 272-273<br>Shop Manual Job 40           |
| 9. Remove and replace radiator.                                                                                                                                          | P-2             | Textbook: pg. 271<br>Shop Manual Job 39               |
| 10. Inspect and test fan(s), fan clutch (electrical or mechanical), fan shroud, and air dams; determine needed action.                                                   | P-1             | Textbook: pg. 262-264, 267<br>Shop Manual Job 35      |
| 11. Perform oil pressure tests; determine needed action.                                                                                                                 | P-1             | Textbook: pg. 287–288<br>Shop Manual Job 14           |
| 12. Inspect auxiliary coolers; determine needed action.                                                                                                                  | P-2             | Textbook: pg. 284-285<br>Shop Manual Job 35           |
| 13. Inspect, test, and/or replace oil temperature and pressure switches and sensors.                                                                                     | P-1             | Textbook: pg. 285, 287<br>Shop Manual Job 11          |
| 14. Inspect oil pump gears or rotors, housing, pressure relief devices, and pump drive; determine needed action                                                          | P-2             | Textbook: pg. 289–291<br>Shop Manual Job 23           |