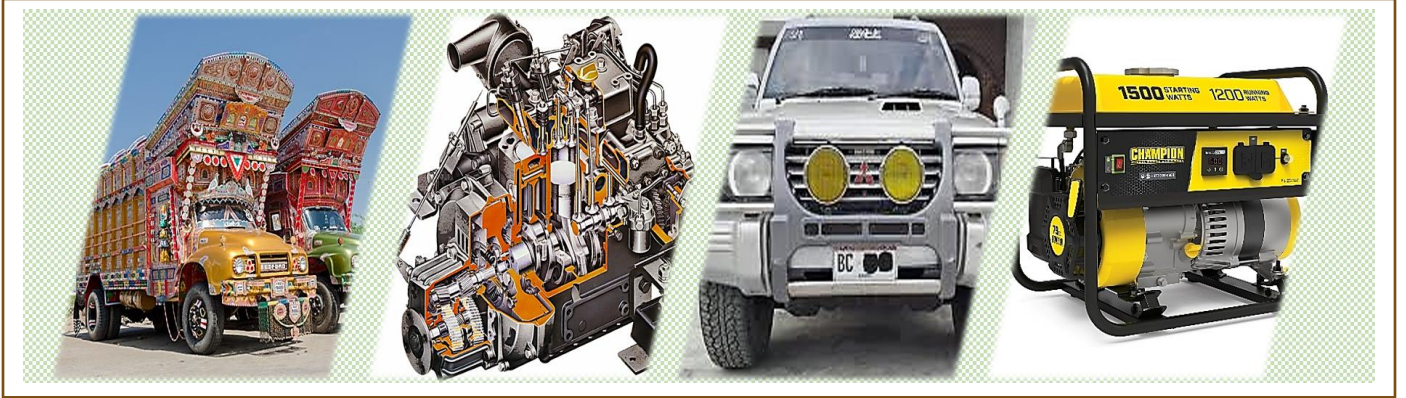


# Diesel Mechanic

# ڈیزل میکانک



**06 Months**

## Specific objectives:

After the end of the course, trainees should be able to:

- Apply safety measure and take precautions to prevent accidents including environment protection.
- Diagnose, remove & repair faults in diesel engine;
- Diagnose, remove and repair faults in braking system;
- Diagnose, remove and repair faults in transmission system;
- Diagnose, remove and repair faults in steering & suspension system.

## Training parameters:

<b>Course code</b>	--
<b>Entry level</b>	Matriculation
<b>Age group</b>	18 – 35 years
<b>Medium of instructions</b>	English, <i>Urdu, Sindhi</i>
<b>Course duration</b>	04 Months
<b>Contact hours</b>	480 Hrs
<b>Daily contact hours</b>	04
<b>Per class trainees</b>	20 Maximum

## **Knowledge requirement:**

After the completion of the course, the trainee should be able to:

- Apply safety measure and take precautions to prevent accidents, including environment protection.
- Demonstrate the use of hand tools, measuring tools & power tools.
- Define the vehicle's differs system working in it.
- Explain the operation and construction of four stroke cycle engine of diesel vehicles.
- Explain various systems of diesel engine e.g. lubrication, cooling, exhaust, ignition and fuel system.
- Describe the principal and operation of power train.
- Explain steering and suspension systems.
- Explain the braking system.

## **Skill requirement:**

After the completion of the course, the trainee should be able to:

- Apply safety measure and take precaution to prevent accidents including environment protection.
- Remove and repair water pumps radiator, cooling system, hoses and other cooling system components.
- Diagnose and repair faults in fuel system.
- Remove, clean and replace air-filter.
- Remove & re-fit fuel injection nozzle & heater plug for diesel engine.
- Remove & re-fit fuel injection pumps.
- Remove & re-fit clutch system.
- Remove & re-fit gear box & power train.
- Remove / overhaul & re-fit break system.
- Remove & re-fit suspension system.
- Top overhaul diesel engine.

## Scheme of studies:

S. No.	Topic	Time (Hours)		
		Theory	Practical	Total
1	Safety precaution	03	10	13
2	Using of tools	10	20	30
3	Maintenance	00	30	30
4	Engine (diesel)	30	100	130
5	Cooling system	10	50	60
6	Power train	20	85	105
7	Steering, break & suspension	17	95	112
<b>Total</b>		90	390	<b>480</b>

## Detail of topics:

S. No.	Topic	Time (Hours)		
		Theory	Practical	Total
1	<b>Safety precautions</b>	03	10	13
2	<b>Using of tools</b> <ul style="list-style-type: none"> <li>• Introduction &amp; uses of hand tools</li> <li>• Introduction &amp; uses of measuring tools</li> <li>• Introduction &amp; uses of cutting tools</li> </ul>	10	20	30
3	<b>Maintenance</b> <ul style="list-style-type: none"> <li>• Use of cleaning liquids &amp; chemical &amp; precautions</li> <li>• Lubrications, grease &amp; their properties</li> <li>• Changing engine oil &amp; filter</li> <li>• Lubrications of bearing joints &amp; grease points &amp; care of grease nipples</li> </ul>	00	30	30
4	<b>Engine (Diesel)</b>	30	100	130

S. No.	Topic	Time (Hours)		
		Theory	Practical	Total
	<ul style="list-style-type: none"> <li>• Construction of engine parts</li> <li>• Four stroke principals and operation</li> <li>• Two stroke principals and operation</li> <li>• Remove &amp; installing engine</li> <li>• Disconnect cables, wires &amp; lines</li> <li>• Remove water rouses &amp; radiator</li> <li>• Remove engine from car</li> <li>• Installing engine in car</li> <li>• Dismantling engine</li> <li>• Clean and check parts</li> <li>• Re-assemble engine</li> <li>• Cylinder</li> <li>• Remove valve</li> <li>• Check valve, valve guide, seats &amp; valve stems</li> <li>• Cylinder block</li> <li>• Remove piston</li> <li>• Remove crank shaft</li> <li>• Fuel system</li> <li>• Purpose, types and function of Fuel pump</li> <li>• Replace and check filters</li> <li>• Check fuel lines for leakage</li> <li>• Bleed the system</li> <li>• Remove, repair, test and install fuel injector</li> </ul>			
5	<p><b>Cooling system</b></p> <ul style="list-style-type: none"> <li>• Remove, test &amp; install thermostat</li> <li>• Replace water pump</li> <li>• Adjust fan belt</li> <li>• Types of cooling system</li> </ul>	10	50	60
6	<p><b>Power train</b></p> <ul style="list-style-type: none"> <li>• Operation &amp; Fault diagnoses of clutch</li> <li>• Remove, overhaul &amp; install the clutch</li> <li>• Check &amp; adjust bearing clearances</li> <li>• Gear box</li> <li>• Gear box (synchromesh)</li> <li>• Operation of automatic &amp; synchromesh gear box</li> <li>• Remove, repair and install gear box</li> </ul>	20	85	105

S. No.	Topic	Time (Hours)		
		Theory	Practical	Total
	<ul style="list-style-type: none"> <li>• Operation &amp; construction of differential</li> <li>• Types, functions, straight, on &amp; on turn</li> <li>• Remove and install differential</li> <li>• Assess &amp; adjust differential</li> </ul>			
<b>7</b>	<p><b>Steering, break &amp; suspension</b></p> <ul style="list-style-type: none"> <li>• Steering types, construction &amp; operation including geometry &amp; adjustment of steering &amp; suspension (Chamber caster &amp; toe in)</li> <li>• Removal, repair &amp; installing steering box, racks and other components/parts including power steering</li> <li>• Removal, repair, re-installation &amp; adjustment of steering &amp; suspension components</li> <li>• Break system</li> <li>• Diagnose of faults, remove &amp; repair of master cylinders &amp; components/parts of break system</li> <li>• Removal &amp; re installation of break shoe and disk pads</li> <li>• Changing of pads and bleeding the system</li> <li>• Repair and adjust parking breaks</li> </ul>	17	95	112
<b>Total</b>		90	390	<b>480</b>

### Tools & equipment:

Following tools & equipment are prescribed for 20 trainees:

S. No.	Tool or equipment	Quantity
<b>1</b>	Torque wrench (wretched type)	10 sets
<b>2</b>	Oil filter wrench	10 sets
<b>3</b>	Screw drivers, Flat (4", 6", 8" & 12")	10, each
<b>4</b>	Screw drivers, Philips (4", 6", 8" & 12")	10, each

<b>S. No.</b>	<b>Tool or equipment</b>	<b>Quantity</b>
<b>5</b>	Circlips pliers (External & internal)	10 sets
<b>6</b>	Nose pliers (20 cm)	10 sets
<b>7</b>	Grip pliers (10")	10 sets
<b>8</b>	Combination pliers (20 cm)	10 sets
<b>9</b>	Break spring pliers (10")	10 sets
<b>10</b>	Flat pliers (smooth, 15 -30 cm)	20 sets
<b>11</b>	Flat file (15-30 cm)	20 sets
<b>12</b>	Hammer (Ball peen, 250-500gm)	10 sets
<b>13</b>	Hammer (cross peen, 1000-5000gm)	10 sets
<b>14</b>	Hammer (Mellet, Rubber)	10 sets
<b>15</b>	Hammer (Mellet, plastic)	10 sets
<b>16</b>	Hand hacksaw (30cm)	10 sets
<b>17</b>	Steel foot rule (12cm)	10 sets
<b>18</b>	Hollow punch (1-12mm)	10 sets
<b>19</b>	Center punch	10 sets
<b>20</b>	Piston ring compressor (4" & 6")	02 sets
<b>21</b>	Valve compressor (C type, large)	02 sets
<b>22</b>	Bearing puller	02 sets
<b>23</b>	Hydraulic floor jack (03 ton)	02 sets
<b>24</b>	Hydraulic trolley jack (03 ton)	02 sets
<b>25</b>	Safety stand (small, large and medium)	04 each
<b>26</b>	Service creeper	10 sets
<b>27</b>	Bench vice (8")	20 sets
<b>28</b>	Work bench (wooden)	10 sets
<b>29</b>	Parts tray (MS container)	05 each
<b>30</b>	Vernier caliper (0.1-150mm)	10 each
<b>31</b>	Micrometer (outside, 25-50 & 50-75mm)	05 sets
<b>32</b>	Dial indicator	02 sets

<b>S. No.</b>	<b>Tool or equipment</b>	<b>Quantity</b>
<b>33</b>	Feeler gauge (10 leaves in mm)	10 sets
<b>34</b>	Digital tachometer (for diesel pulls)	02 sets
<b>35</b>	Bench grinder (garage stand)	02 sets
<b>36</b>	Drill machine (Pedestal type)	01 sets
<b>37</b>	Power drill machine (Portable)	02 sets
<b>38</b>	Lube oil can (pressure type)	10 sets
<b>39</b>	Hammering screw driver set	05 sets
<b>40</b>	Puller (for wheel drum, hammer type)	10 each
<b>41</b>	Scraper (Triangular type of flat)	10 each
<b>42</b>	Cleaning brush (wire type)	02 each
<b>43</b>	Magnet rod (pick up tool)	02 each
<b>44</b>	Compression gauge	01 each
<b>45</b>	Diesel timing gun	01 each
<b>46</b>	Radiator pressure cap tester	01 each
<b>47</b>	Wheel spanner (cross type)	04 each
<b>48</b>	Flat chisel (150-250mm)	10 each
<b>49</b>	Line scribe	10 sets
<b>50</b>	Twist drill (parallel shank, 0.5 to 18mm)	10 sets
<b>51</b>	Hand shears (medium size)	05 sets
<b>52</b>	Air compressor (regular gauge size)	10 set
<b>53</b>	Suction leakage gauge	01 each
<b>54</b>	Engine hoist (03 ton)	01 each
<b>55</b>	Fuel flow meter	01 each
<b>56</b>	Injector comparator or calibrator	01 each
<b>57</b>	Piston ring mounting pliers	01 each
<b>58</b>	Piston ring groove cleaner	01 each
<b>59</b>	Nozzle test stand	01 each
<b>60</b>	Zeroing calibrator indicator	01 each

<b>S. No.</b>	<b>Tool or equipment</b>	<b>Quantity</b>
<b>61</b>	Injector concentricity tester	01 each
<b>62</b>	Injector leakage tester	01 each
<b>63</b>	Phasing and calibration machine	01 each
<b>64</b>	Nozzle cleaning kit	01 each
<b>65</b>	Injector Pressure tester	01 each
<b>66</b>	Ridges Remer	01 each
<b>67</b>	Diesel fuel pump stand	01 each
<b>68</b>	Deisel engine analyzer	01 each
<b>69</b>	Tool lockers (for trainees)	01 each
<b>70</b>	Model of 4 stroke diesel engine	01 each
<b>71</b>	Model of 2 stroke diesel engine	01 each
<b>72</b>	Diesel engine complete (Toyota, Hino)	03 each
<b>73</b>	Diesel vehicle (Toyota 1600 cc)	01 each
<b>74</b>	Diesel vehicle (Honda civic)	01 each
<b>75</b>	Steel cabinet	05 each
<b>76</b>	Universal coil spring compressor	02 each
<b>77</b>	Engine Vacuum gauge	02 each
<b>78</b>	Hydro meter	02 each
<b>79</b>	Battery cell tester	05 each
<b>80</b>	Battery (12 Volt 136AH)	06 each
<b>81</b>	Tool box (tally type, empty)	10 each
<b>82</b>	Open end spanner (06-32mm)	10 sets
<b>83</b>	Open & ring spanner set (06-32mm)	10 sets
<b>84</b>	Ring spanner set (06-32mm)	10 sets
<b>85</b>	Universal socket head spanner (06-22mm)	10 sets
<b>86</b>	Socket set (06-42mm)	10 sets
<b>87</b>	Adjustable wrench (04", 10")	10 sets
<b>88</b>	Pipe wrench (04")	10 sets

S. No.	Tool or equipment	Quantity
89	Allen key set (02-18mm)	10 sets

### Employability of graduates:

After completion of the course, the trainees can find employment opportunities in the following sectors under the supervision of skilled auto mechanics:

1. Automobiles workshops & dealers;
2. Car manufacturing units;
3. Government departments;
4. Self employment.

**Note:** Trainees completing training will require further on-the-job training under the supervision of experienced mechanic or attend further training course.

### Minimum Qualification of Instructor:

1. Three years of Diploma of Associate Engineer in auto & diesel technology with four years working experience;
- or
2. Two-years proficiency certificate with 8 years relevant experience.

### Examination and certification:

The testing & certification shall be carried out by the Trade Testing Board, Government of Sindh.