List of minimum Tools & Equipments for a batch of 30 students			
Programme Title : KGCE in Automobile Engineering			**Notional Hours: 2880**
Automobile Workshop			
LIST OF TOOLS AND EQUIPMENT			
SL No.	**Name of the Tool & Equipment**	**Specification**	**Quantity**
1	Hammer ball peen	0.5 kg	6 nos.
2	Hammer Ball Peen	0.75 Kg	6 nos.
3	Hammer Chipping	0.25 Kg	2 nos.
4	Mallet		2 nos.
5	Plastic Hammer		2 nos.
6	Screw driver Blade	20 cm. X 9 mm.	6 nos.
7	Screw driver Blade	30 cm. X 9 mm.	6 nos.
8	Philips Screw Driver set of 5 pieces	100 mm to 300 mm	6 nos.
9	Screw driver set		2sets
10	Electrician Screw Driver	250 mm	6 nos.
11	Steel rule	30 cm inch and metric	6 nos
12	Spanner D.E. set of 12 pieces	6mm to 32mm	6 nos.
13	Spanner, ring set of 12	6mm to 32 mm.	6 nos
14	Spanners socket with speed handle, T-bar, ratchet and universal set of 28 pieces with box	up to 32 mm	6 nos
15	Allen Key set of 12 pieces	2 mm to 14 mm	2 nos
16	Combination Pliers	300 cm.	6 nos
17	Nose Pliers	25cm	2 nos
18	Circlip pliers Expanding and contracting	15cm and 20cm	4 each
19	Adjustable spanner (pipe wrench)	350 mm	2 nos
20	Electrician Screw Driver	250 mm	6 nos
21	Electrician Screw Driver	250 mm	6 nos.
22	Wire cutter and stripper	400x200x150	6 nos
23	Calliper inside with spring	15 cm	6 nos
24	Callipers outside with spring	15 cm	6 nos
25	Dividers with spring	15 cm	6 nos
26	Centre punch	10 cm	2 nos
27	Micrometer, outside 0 - 25 mm	0 - 25 mm	6nos
28	Micrometer, inside 25 - 50 mm	25 – 50mm	6nos
29	Adjustable spanner	20mm	2nos
30	Spark plug spanner	14mm	2nos
31	File flat , bastard	20 cm	6nos
32	File, half round, second cut	20cm	6nos
33	File, Square second cut	20 cm	6 nos.
34	File, Square round	30 cm	4 nos.
35	File, triangular , second cut	15 cm	4 nos.
36	Files assorted sizes and types including safe edge file (20 No's)		2set
37	Flat File , second cut	25 cm	6 nos.
38	Flat File , bastard	35 cm	4 nos

SL No.	Name of the Tool & Equipment	Specification	Quantity
39	Grease Gun		1no
40	Hacksaw frame	adjustable 20-30 cm	10 nos
41	Growler		2nos
42	Hand operated crimping tool/wire	(i) up to 4mm (ii) up to 10mm	2 each
43	Multi meter digital	LCD Display	6nos.
44	Piston ring compressor		2nos
45	Piston Ring expander and remover.		2nos
46	Piston Ring groove cleaner.		2nos
47	Scraper Flat	25 cm	2 nos.
48	Scraper half round	25 cm	2 nos.
49	Scraper Triangular	25 cm	2 nos.
50	Scriber with scribing black universal		2nos
51	Set of stock and dies -Metric		2sets
52	Stud extractor set of 3		2sets
53	Stud remover with socket handle		1nos
54	Tachometer (Counting type)		1mnos
55	Thread pitch gauge Metric		2nos
56	Timing light		2nos
57	Torque wrenches	5-35 Nm, 12-68 Nm & 50-225 Nm	1 each
58	Tyre pressure gauge with holding nipple		2nos
59	Universal puller for removing pulleys, bearings		1nos
60	Vacuum gauge	0 to 760 mm of Hg.	2 nos
61	Valve Lifter		2nos
62	Valve spring compressor universal		2nos
63	Vice grip pliers		2nos
64	Vernier calliper	0.02mm	6 nos
65	Wire Gauge (metric)		2 nos
66	Hand vice	Up to 37 mm	2 nos
67	Hollow Punch set of seven pieces	6mm to 15mm	2 set
68	Lifting jack screw	3 ton, 5ton & 20 Ton	1 each
69	Magnifying glass	75mm	2 nos
70	Oil can	0.5/0.25 liter capacity	4 nos
71	Belt Tensioner gauge		1 no
72	Cleaning tray	45x30 cm.	6 nos
73	Compression testing gauge	standard accessories	2 nos.
74	Copper bit soldering iron	0.25 Kg	2 nos.
75	Cylinder bore gauge	20 to 160 mm	1 no.
76	Drift Punch Copper	15 Cm	2 nos
77	Drill twist (various sizes)	1.5 mm to 8 mm by 0.5mm	4 nos.
78	Electric Soldering Iron	230 V 60 watts 230 V 25 watts	2 each
79	Engineer’s square	Blade size 15 cm	4 nos.
80	Injector testing set	(Hand tester)	1 no.
81	Prick Punch	15 cm	4 nos
82	type	0.01 mm	4 nos

SL No.	Name of the Tool & Equipment	Specification	Quantity
83	V' Block 75 x 38 mm pair with Clamps		2 nos
84	Work bench	12cm Jaw	6 nos.
85	stand	3 ton capacity with tripod Stand	1 no.
86	Arbor press hand operated	2 ton capacity	1 no.
87	Hydraulic jack HI-LIFT type	3 ton capacity, and 5 Ton capacity	1each
88	Multi Scan Tool To scan Engine, ABS & EBD, AT, SRS, Body Control and immobilizer	Should perform automotive sensor simulation test specially designed to diagnose and simulate vehicle sensor faults for sensors like MAP sensor, Intake air temperature sensor, TP sensor etc.	1no
89	Valve grinding tool suction type		2nos
90	Valve spring lifter		2nos
91	Valve seat cutting tools complete with guide and pilot bar (all angles)		1no
92	Cell tester		2nos
93	Hydrometer		2nos
94	AC alternator slip ring puller	Variable	1 no.
95	Air blow gun with standard accessories	interchangeable nozzles	1 no
96	Air ratchet	with standard accessories	2 nos
97	Air impact wrench	with standard accessories.	2 nos.
98	Gauge, wheel alignment universal		1no
99	Anvil		1no
100	Sledge hammer 1 Kg		1nos
101	Portable electric drill Machine	Upto 10mm (heavy duty)	1 no.
102	Punch Letter 4mm (Number)		2sets
103	Straight edge gauge 2 ft.		2nos
104	Thermostat		2nos
105	Radiator cut section-cross flow	Radiator with sectioned side tanks, radiator core.	1 no.
106	Radiator cut section-down flow	Radiator with sectioned upper & lower tanks, radiator core and cap.	1 no
107	Radiator pressure cap	LMV	2 nos.
108	Auto Electrical test bench	For checking Dynamo, Alternator & Starter. With minimum2HP AC Motor, Digital Voltmeter & ammeter.	1no
109	Battery –charger	Capable to charge batteries from 5AH – 150AH	1no

SL No.	Name of the Tool & Equipment	Specification	Quantity
110	Car Jet washer with standard accessories	Minimum3 Phase 1HP 1400RPM Motor, 3 Reciprocating Plungers with pressure regulator & gauge. 8m Water hose with pressure adjustable brass nozzle.	1no
111	Chain Pulley Block with tripod stand	3 ton	1 no
112	liner	1 each	
113	Different type of Engine Bearing model	10 Different types	1 set
114	Different type of piston model	5 Different Types	1 set
115	Fuel feed pump for Diesel	Hand operated Plunger Type	1 no
116	Fuel injection pump (Diesel) inline	4/6 cylinders RSV Mechanical Pneumatic Governor Type.	1 no
117	Injector – Multi hole type, Pintle type		4each
118	Fuel injection pump VE pump / Distributor fuel rotary pump (DPC) pumps / along with special tools and accessories		1each
119	Automotive oil pump for dismantling and assembling.		2nos
120	Starter motor axial type, pre-engagement type & Co-axial type		1each
121	Tandem master cylinder with booster		2 nos
122	Turbocharger cut sectional view	Latest WGT type to show	1 no.
123	Working model of Air Brake Assembly	Two brake drums, vehicular air compressor driven by suitable Electric Motor, air dryer, brake chamber. stop light, different valves, air pressure gauges. With all accessories.	1no
124	Alternator assembly used for LMV	Alternator (>50 Amp)	1 no.
125	Carburetor – Solex, Mikuny for dismantling and assembling	Solex, Mikuny	1 Each
126	Cut section Model of Mock layout of a motor car –electrical system working model	Wiring with parts and accessories of a car to be arranged according to the electrical circuit of a car. Working of Self-starter, Alternator, Wiper Motor, Horn, lighting system, sparks from plug to be shown with Distributor & battery. Should be mounted on suitable table	1 no.
127	Cut section models of shock absorbers		1nos

SL No.	Name of the Tool & Equipment	Specification	Quantity
128	Cut section working model of automatic transmission Gear box	Sectioned to show the internal mechanism of forward and reverse speeds.	1 no.
129	Cut section working model of centrifugal clutch assembly.	Centrifugal Clutch sectioned to show the internal details	1 no.
130	Cut section working model of Diaphragm clutch assembly.	Diaphragm Clutch sectioned to show the internal details	1 no.
131	Cut section working model of Single plate clutch assembly	Single plate Clutch sectioned to show the internal details	1 no
132	Demonstration board of electronic Ignition system, ignition coil	With HT coil, HT wires, Spark Plugs, ignition switch, coil, distributor, battery, and wiring.	1 no.
133	Demonstration board of MPFI system	With injectors, rail, inlet manifold, throttle body, distributor, ECU, purge valve, sensor, crank pulley, fuel tank module.	1 no.
134	Disc brake in working condition with caliper assembly with all parts	Exhibiting Brake disc, Caliper assembly, tandem master cylinder, brake hoses, oil bottle, pedal, etc.	1 nos
135	Drum brake assembly in Working Condition	Brake drum, tandem master cylinder, oil container, brake hose, brake pedal.	1no
136	Front axle (Rzeeppa Joint) with stand for Dismantling and assembly	Rzeppa joint of LMV.	1 no
137	Full floating axle and semi-floating axle assembly	Drum & axle casing should be with all components in working condition.	1 no.
138	Synchronous Gear box with stand for Dismantling and assembly	Gearbox with 5 Forward & 1 Reverse Gear	1 no.
139	Functional/experiment model of different type of sensors.	With Different type of sensors like Throttle Position Sensor, Manifold Absolute Pressure Sensor, Engine Coolant Temperature Sensor, Vehicle Speed Sensor, Oxygen Sensor, Crankshaft Position Sensor, Camshaft Position Sensor, Intake Air Temperature Sensor, Mass Air Flow Sensor, Knock Sensor with ECU.	1 no.
140	Steering assembly –	1. Rack & Pinion with steering wheel, column, tie rod end.	1each
	1.Rack & pinion	2. Worm & Roller steering assembly with drop arm.	

SL No.	Name of the Tool & Equipment	Specification	Quantity
	2.Worm & roller	3. Recirculating Ball steering with pitman shaft and drop Arm.	
	3. Recirculating ball	4. Hydraulic working power steering with steering wheel, column, flow pipe, hydraulic pump, oil reservoir.	
	4.Power steering	5. Electric Assisted Power Steering with Rack and pinion, Electric Motor and Motor Control Module	
	5. Electric Assisted Power Steering		
141	Tandem master cylinder with booster	Working model	1 no.
142	Tubed tyre of car, trucks & motorcycle		1each
143	Tubeless tyre of cars & trucks		1each
144	Tyre & split rim wheel assembly		1no
145	Working Model of power windows	Showing parts like door, glass with motor and its gear arrangement and operating switch.	1no
146	Working model of torque converter	Model of LMV	1 no.
147	Trolley type portable air compressor	Belt driven compressor along with accessories	1 no.
148	Diesel Engine – CRDI - 4 stroke Engine, Assembly(In working condition) with fault simulation board	Latest 4 Stroke 4 cylinder turbo charged CRDI Engine, with ECM, BCM and sensors, wiring, fuel feed, cooling system& instrument cluster. Fault setting bank for minimum 8 sensors and with diagnostic socket &Scanner to read the faults. Engine management circuit diagram to be printed on the panel board.	1no
		Diagnostic socket &Scanner to read the faults. Engine management circuit diagram to be printed on the panel board.	
149	Cut section of 4/6 cylinder diesel engine in moving condition to show movement of internal parts	6 cylinder diesel engine in working condition to show movement of internal parts	1 no.

SL No.	Name of the Tool & Equipment	Specification	Quantity
150	Diesel Engine six Cylinder in running condition	Latest Diesel Engine CRDI 4 Stroke 6 Cylinders, Turbocharged Engine in running condition. All sensors, wiring, fuel feed, cooling system & instrument cluster	1no
151	Air bag simulator	Driver & Co Driver Air Bags, Seat belts with front seats, crash sensors, air bag ECU, Wiring Harness	1no
152	Air conditioning service Unit (Car)	Suitable for R134A. Recovery with vacuum pump, automatic drain & stop after recovery.	1no
153	Four stroke petrol engine with CNG setup-working condition	Latest 4 Stroke 3/4 cylinder MPFI Engine in running condition 800-1600cc with ECM, BCM and all sensors, wiring, fuel feed system, cooling system& instrument cluster with CNG/ Petrol selection switch on Panel.	1no
154	Heavy Commercial vehicle	Fitted with Latest 06 cylinder CRDI diesel engine with all parts and accessories. (without body on frame)	1no
155	MPFI petrol engine with swivelling stand along with special tools for dismantling and assembling	Latest 4 Stroke 3/4 cylinder MPFI Engine in running condition 800-1600cc with ECM, BCM and all sensors, wiring, fuel feed system, cooling system & instrument cluster.	1no
156	Petrol Engine(2-stroke) Motor Cycle/Scooter along with special tools and accessories	Cut Section of 2 Stroke 2 W Engine Single Cylinder	1no
157	Transfer case with stand for Dismantling and assembly.	To show the gear mechanism of forward and reverse speeds.	1 no.
158	Tube/ tyre vulcanizing machine	220 V , Heater Capacity 400W x 2 With different types of Die &Mould	1 no.
159	Two post car lift – capacity 4000 kg	Hydraulic Type with Mechanical Arms Locking.	1 no
160	Tyre Changer Machine	Motorized Pneumatic Type, Rim clamping facility, and bead breaking facility with air inflating device.	1 no.

SL No.	Name of the Tool & Equipment	Specification	Quantity
161	Ultrasonic Injection cleaning equipment	Flow analysis & spray pattern test, leak test, auto programming mode, ultrasonic test with timer, Min 500 ML Lit SS Tank with Lid, SS Stand.	1nos
162	Wheel alignment Machine –computerized 3D	Latest machine for four wheel alignment. With connected camera , IR Lighting Source min. 8mm, Reflector metal based, should work in sunlight	1no
163	Wheel balancing machine	For wheel balancing of LMV. Motor 0.5 HP Shaft Diameter min 38mm. Hardened flange assy. Balancing catch nut of metal	1no
164	Working Condition Petrol MPFI Engine Assembly with fault simulation board	Latest 4 Stroke 3/4 cylinder MPFI in running condition,800-1600cc with ECM, BCM and all sensors, wiring, fuel feed system, cooling system & instrument cluster with Fault setting bank for minimum 6 sensors with diagnostic socket &Scanner to read the faults. Engine management circuit diagram to be printed on the panel board.	1 no
165	Air conditioned CRDI Vehicle in running condition -LMV	New vehicle with CRDI engine, 04 strokes, 04 cylinders, BS-IV, fitted with air condition.	1 no
166	Automotive exhaust 5 gas analyser (petrol & Diesel) and Diesel Smoke meter (Optional)	Exhaust 5 Gas Analyser Petrol ARAI approved to check CO, CO2, O2, and HC& NO.	1 no
The list of equipments which can be incorporated in training if there is a MOU with an Industry			
1	Tube/ tyre vulcanizing machine	220 V , Heater Capacity 400W x 2 With different types of Die &Mould	1 no.
2	Tyre Changer Machine	Motorized Pneumatic Type, Rim clamping facility, and bead breaking facility with air inflating device.	1 no.

SL No.	Name of the Tool & Equipment	Specification	Quantity
3	Ultrasonic Injection cleaning equipment	Flow analysis & spray pattern test, leak test, auto programming mode, ultrasonic test with timer, Min 500 ML Lit SS Tank with Lid, SS Stand.	1nos
4	Wheel alignment Machine –computerized 3D	Latest machine for four wheel alignment. With connected camera , IR Lighting Source min. 8mm, Reflector metal based, should work in sunlight	1no
5	Wheel balancing machine	For wheel balancing of LMV. Motor 0.5 HP Shaft Diameter min 38mm. Hardened flange assy. Balancing catch nut of metal	1no
6	Automotive exhaust 5 gas analyser (petrol & Diesel) and Diesel Smoke meter (Optional)	Exhaust 5 Gas Analyser Petrol ARAI approved to check CO, CO2, O2, and HC& NO.	1 no

Common facility for all programmes in an Institution			
CLASS ROOM FURNITURE			
1	Instructors table		1 no.
2	Instructors chair		1 no.
3	Students chair with writing pads/bench-desk arrangement		for 30 students
4	Almirah		1 no
5	Black/White board	1200 x 900 mm	1 no.
6	Instructors Laptop with internet facility	Windows with MS office package	1 no.
7	LCD Projector		1 no
IT LAB *			
1	Table & Chair for Instructors		Sufficient
3	Students chair with writing pads/bench-desk arrangement		for 30 students
4	Steel almarah / cup board		1 no.
5	Black/White board	1200 x 900 mm	1 no.
6	Desktop with internet facility	Windows with MS office package (Latest configuration)	10 nos.
7	LCD Projector		1 no
8	Printer	A4 Size	1 no.
9	Computer table		Sufficient number for arranging 10 computers

* Common for up to 5 programmes or 5 batches in an Institution. For Institutions with more than 5 programmes or 5 batches there shall be proportionate increase in number of computers and related furniture.