BANGLADESH TECHNICAL EDUCATION BOARD

Agargaon, Dhaka-1207

4-YEAR DIPLOMA-IN-ENGINEERING PROGRAM

SYLLABUS (PROBIDHAN-2016)

AUTOMOBILE TECHNOLOGY

TECHNOLOGY CODE: **662**

7th SEMESTER

DIPLOMA IN ENGINEERING

PROBIDHAN-2016

AUTOMOBILE TECHNOLOGY (662)

7th SEMESTER

Sl. No	Subject Code	Name of the subject	T	P	C	Marks				Total
						Theory		Practical		
						Cont. assess	Final exam	Cont. assess	Final exam	
1	66271	Service Station Operation & Estimating	2	6	4	40	60	50	50	200
2	66272	Automotive Instrumentation & Testing	2	3	3	40	60	25	25	150
3	66273	Automotive Trouble Shooting & Emission Control	2	6	4	40	60	50	50	200
4	66274	Vehicle Automation & Signaling	2	3	3	40	60	25	25	150
5	66275	Automotive Electrical & Electronics System -2	2	3	3	40	60	25	25	150
6	66276	Automotive Engineering Project	0	6	2	0	0	50	50	100
7	65853	Innovation & Entrepreneurship	2	0	2	40	60	0	0	100
Total			**12**	**27**	**21**	**240**	**360**	**225**	**225**	**1050**

66271 Service Station Operation & Estimating *T P C*
2 6 4

AIMS

To provide the students with an opportunity to acquire knowledge, skill and attitude in the area of automotive service station operation with special emphasis on:

- Fundamental of service station
- Planning and site selection of service station
- Organogram and management of service station
- Servicing & maintenance different systems of automobile.
- Engine tuning.
- Costing and Estimating.

SHORT DESCRIPTION

Fundamentals of service station; Planning and site selection of service station; Organogram of service station; Management of service station; Estimating and costing; Insurance claim; Tools and equipment: servicing and maintenance of automobile, Engine tuning, Tire construction & servicing; Costing & Estimating.

DETAIL DESCRIPTION

THEORY

1. Understand the fundamentals of service station.

1.1. Define service station.
1.2. Mention the purpose of service station.
1.3. Mention the classification of the service station.
1.4. Mention the services offered by different types of service station and garage.

2. Understand the planning and site selection of service station.

2.1. Mention the steps in planning a service station.
2.2. Mention the sections of an ideal service station.
2.3. State the factors to be considered before selecting a service station.
2.4. Describe a good site plan of a service station considering entry, exit and parking.
2.5. Draw the layout of a modern service station showing its different sections with dimensions.

3. Understand the Organogram of service station.

3.1. State the different types and number of employees required for an ideal service station.
3.2. Describe the organization chart of an ideal service station.
3.3. Define the terms: job description, job specification and personnel specification of the employees.
3.4. Prepare a job description, job specification and personnel specification of a diploma engineer employed in a service station.

4. Understand the management of service station.

4.1. Define the terms: management, store keeping, inventory, job card, bin card, goodwill and VAT.

4.2. Mention the functions of store keeping in a garage or service station.
4.3. Prepare various types of forms and job cards for better store recording.
4.4 Mention the laws and rules of taxation on automotive service work.
4.4. Mention the points for developing better goodwill between the customers and suppliers.
4.5. Mention the incentive measure necessary in service station operation.

5. Understand the estimating and costing of services in a service station.

5.1. Define estimating and costing.
5.2. Distinguish between estimating and costing.
5.3. Mention different types of costing of service in a service station.
5.4. Describe the process of job estimating and costing.

6. Understand the insurance claim process for service station.

6.1. Define insurance.
6.2. Mention the functions of insurance.
6.3. Explain the insurance of motor vehicle.
6.4. Explain the insurance of workshop equipment and injured employee.
6.5. Describe the insurance claim procedure.

7. Understand the tools and equipment for service station.

7.1. Mention the tools and equipment for different sections of service station.
7.2. Mention the special tools and equipment required for special services in the service station.
7.3. Describe the operation of air compressor, hydraulic bottle jack, hydraulic trolley jack, hydraulic lift and electric motor operated car lift.

8. Understand the servicing of automobile.

8.1. Describe the cleaning / washing and dryings procedure of a vehicle.
8.2 Mention the steps of polishing procedure of a vehicle body.
8.2. Mention the procedure of changing engine oil, gear oil, automatic transmission fluid (ATF), differential oil & oil filter.
8.3. State the procedure of greasing of automobile chassis.
8.4. Describe the servicing procedure of carburetor & EFI engine fuel system.
8.5. Describe the procedure of diesel engine fuel system servicing.
8.6. State the procedure of servicing engine cooling system.
8.7. Describe the procedure of servicing electrical equipment of a car.
8.8. Describe the servicing of automotive brake system.
8.9. Describe the servicing procedure of power transmission system and wheel alignment & balancing.

9. Understand the construction & servicing of tire.

9.1 Define tube & tubeless tire.
9.2 Mention the functions of tire.
9.3 Explain the parts of tire.
9.4 Explain Redial & Bias ply tire.
9.5 Mention advantages & disadvantages of redial and Bias ply tire.
9.6 Explain tire tread pattern.
9.7 Explain tire specification.
9.8 Mention the causes of abnormal tire wear.
9.9 Explain tire rotation procedure.
9.10 Explain tire trouble shooting.

10. Understand wheel balancing.

10.1 Define wheel balancing.

10.2 Classify wheel balancing procedure.

10.3 Mention the necessity of wheel balancing.

10.4 Describe the different type of wheel balancing procedure.

11. Understand the aspect of engine maintenance.

11.1 Define maintenance.

11.2 Outline the importance of engine maintenance

11.3 Mention the types of engines maintenance.

11.4 Explain the preventive maintenance of IC engine.

11.5 Explain the daily maintenance of IC engine.

11.6 Explain the routine/schedule maintenance of IC engine.

11.7 Explain the typical preventive daily schedule maintenance chart of IC engine.

12. Understand the aspect of engine tuning.

12.1 Define engine tuning.

12.2 Mention the necessity of engine tuning.

12.3 Describe the procedure of engine tuning.

13. Understand estimating and costing.

13.1 Define estimating and costing.

13.2 Describe the procedure of preparing estimating form.

13.3 Mention different factors of estimating.

13.4 Prepare estimating form.

13.5 Prepare Estimated cost of following items:

1) General servicing.

2) Engine overhauling.

3) Engine overheating.

4) Suspension overhauling.

5) Steering overhauling.

6) Transmission overhauling.

7) A/C overhauling.

8) Brake overhauling.

Practical:

1. Study the tools and equipment of service station.

1.1. Identify the tools and equipment for different types of work in a service station.

1.2. Identify the special tools and equipment for special work of service station.

2. Perform servicing hydraulic bottle jack or hydraulic trolley jack.

2.1. Identify the components of a jack.

2.2 Service a hydraulic bottle jack.

2.3 Service a hydraulic trolley jack.

3. Perform servicing of an electric motor operated car lift / hoist.

3.1. Identify the components of the lift.

3.2. Clean the required components.

3.3. Apply grease to required components.

4. Perform cleaning and greasing of a vehicle.

4.1. Clean the dirt from vehicle by cold water or steam.

4.2. Wipe the water particles from auto body.

4.3. Apply grease at different greasing point of the vehicle.

4.4. Apply polish on vehicle body.

5. Perform test and adjustment of IC engine.

5.1 Measure tappet clearance and adjust tappet clearance of a petrol/diesel engine.

5.2 Test engine timing belt-tension and adjust belt tension of a petrol/diesel engine.

5.3 Test engine fan belt-tension and adjust belt tension of a petrol/diesel engine.

6. Service the gasoline fuel system.

6.1 Identify the component of gasoline fuel system.

6.2 Remove & reinstall fuel filter.

6.3 Remove, clean and reinstall the air filter element

6.4 Clean and adjust the carburetor properly.

7. Service the fuel system of EFI engine.

7.1 Clean and test the injector of EFI engine.

7.2 Test the fuel pump performance of EFI engine.

8. Service the diesel fuel system.

8.1 Identify the components of the diesel fuel system.

8.2 Remove & reinstall the fuel filter(s).

8.3 Remove, clean and reinstall the air filter element.

8.4 Remove air from the fuel line.

8.5 Adjust the injection pressure.

9. Service the lubricating system.

9.1. Identify the components of lubricating system.

9.2. Drain the engine oil

9.3. Remove and reinstall the lube oil filter.

9.4. Flush the lubricating system.

9.5. Remove and reinstall the main engine oil seals.

9.6. Refill the engine oil.

10. Service the cooling system.

10.1 Identify the components of cooling system.

10.2 Adjust fan belt tension.

10.3 Test cooling system for leakage.

10.4 Flush the radiator.

10.5 Flush the water jacket.

10.6 Remove, test and install the thermostat valve.

10.7 Fill up the cooling system with coolant.

11. Service the ignition system.

11.1 Identify the components of ignition system.

11.2. Clean, align and adjust the CB point.

11.3 Clean the spark plug and adjust spark plug gap.

11.4. Test and adjust the ignition timing.

11.5 Test the condenser of ignition system.

11.6 Test the ignition coil of ignition system.

11.7 Test the spark intensity of the ignition system & test for missing cylinder.

12. Service the charging system.

12.1. Identify the components of charging system.

122. Test the alternator output.

12.3. Clean, toping up and test the condition of battery.

12.4. Charge the battery.

12.5. Test the alternator regulator for its workability.

13. Service the automotive brake system.

13.1. Identify the components of brake system.

13.2. Disassemble, clean and assemble a master cylinder.

13.3. Disassemble, clean and assemble the wheel cylinders.

13.4. Clean the brake shoe and brake drum.

13.5. Remove air from brake system.

13.6. Adjust the different clearances of brake system.

14. Perform the wheel alignment.

14.1. Inflate the entire wheel properly.

14.2. Test the camber angle, toe-in and toe-out on turn.

14.3. Adjust the camber angle, toe-in and toe-out.

15. Perform wheel balancing.

15.1. Remove and inflate the entire wheel properly.

15.2. Test the wheel for unbalance.

15.3. Balance the wheel with accurate weight.

16. Perform the tire rotation.

16.1 Draw the perfect tire rotation diagram.

16.2. Rotate the tire as per diagram.

16.3. Tighten the wheel properly.

16.4. Inflate the tire accurately and test with tire pressure gage.

17. Perform the tube repairing.

17.1. Remove the tube from tire.

17.2. Detect the place of leakage.

17.3. Clean and roughen the leakage surface.

17.4. Apply patch on leakage surface.

18. Repair the tubeless tire.

18.1. Detect the place of leakage.

18.2. Clean and roughen the leakage area.

18.3. Insert plug of accurate size.

REFERENCE BOOKS

1. Automotive Mechanics
   -Crouse and Anglin.

2 Audels Automobile Guides
   -Frederick E. Bricker.

3. Service Station Operation
   - Md. Radwanoor Rahman.

4. Garage and Service Station Hand Book
   - JOHN QUEENBOROUGH

5. Automobile Engineering
   - K. K Ramalingan.

66272 Automotive Instrumentation & Testing

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AIMS

To provide the students with an opportunity to acquire knowledge, skill and attitude in the area of automotive instrumentation and testing with special emphasis on:

- Fundamental of automotive instrument and instrumentation
- Dashboard instruments
- Common mechanical, electrical and electronic instrument used in automotive trouble diagnosis
- Combustion Analyzer
- Chassis dynamometer and engines Analyzer
- automotive battery testing and charging
- automotive electric system testing
- missing cylinder
- high pressure pump and injector testing

SHORT DESCRIPTION

Fundamentals of automotive instruments and instrumentation; Dash board instruments; Ammeter, voltmeter, Ohm meter, Tachometer, Compression tester, Combustion analyzer; Chassis dynamometer; Engine analyzer; Automotive battery testing and charging; Ignition system testing; Automotive electric starting system testing; Automotive charging system testing; Missing cylinder; High pressure pump testing of diesel engine; Injector testing.

DETAIL DESCRIPTION

Theory:

1. Understand the fundamentals of automotive instruments and instrumentation.

1.1. State the meaning of automotive instrument and instrumentation.
1.2. Mention the purpose of automotive instrumentation.
1.3 Mention the individual testing instruments used in the automotive field.
1.4 Mention the function of individual testing instruments used in the automotive field.
1.5. Mention the name of combined testing instruments used in automotive field.
1.6 Mention the function of combined testing instruments used in the automotive field.

2. Understand the concept of dashboard instruments.

2.1. Define dashboard and dashboard instrument.
2.2. Mention the name of instruments used in modern automotive car dashboard.
2.3. Mention the name of signal lights & buzzers used in modern automotive car dashboard & its use.
2.4. Describe the construction and operation of fuel gauge, oil pressure gauge and engine temperature gauge.
2.5. Describe the construction and operation of speedo meter, odometer, tripometer & tachometer.
2.6. Mention the function of trip computer.

3. Understand the features of ammeter, voltmeter and ohm meter (AVO meter).

3.1. Mention the function of ammeter, voltmeter and ohm meter (AVO meter).
3.2. Mention the types of ammeter, voltmeter and ohm meter (AVO meter).

3.3. Describe the construction of ammeter, voltmeter and ohm meter (AVO meter).

3.4. Describe the operation of ammeter, voltmeter and ohm meter (AVO meter).

3.5. Compare voltmeter and ammeter.

3.6. Differentiate between multimeter and AVO meter.

4. Understand the features of compression tester.

4.1. Mention the function of compression tester.

4.2. Describe the compression test procedure of a gasoline engine and diesel engine.

4.3. Evaluate the test result of compression test.

5. Understand the features of Exhaust gas analyzer.

5.1. Mention the function of exhaust gas analyzer.

5.2. Describe the using procedure of exhaust gas analyzer.

5.3. Describe the carburetor adjustment procedure according to exhaust gas analyzer reading.

5.4. Describe the adjustment procedure of HC and CO.

6. Understand the features of chassis dynamometer.

6.1. Mention the purpose of chassis dynamometer.

6.2. Mention the use of chassis dynamometer.

6.3. Describe the construction of chassis dynamometer.

6.4. Describe the operation of chassis dynamometer.

7. Understand the features of engine analyzer.

7.1 Define engine analyzer.

7.2. Mention the function of engine analyzer.

7.3. Mention the facilities of an engine analyzer.

7.4. Illustrate the printing sheet of a typical engine trouble diagnosis from a computerized engine analyzer.

7.5. Illustrate different types of oscilloscopes trace with possible troubles of electrical system.

8. Understand the concept of automotive battery testing and charging.

8.1 Mention the automotive battery testing processes.

8.2. Describe the different automotive battery testing processes.

8.3. Mention the causes of self discharge of lead acid battery.

8.4. Mention the battery charging methods outside the vehicle.

8.5. Describe different charging methods outside the vehicle.

8.6. State the meaning of maintenance free battery.

8.7. Mention the precautions for charging a maintenance free battery.

9. Understand the concept of ignition system testing.

9.1. Mention the causes of ignition failure.

9.2. Mention the troubles of ignition system.

9.3. Describe the testing procedure of ignition system components.

9.4. Outline the importance of correct ignition timing.

9.5. Describe the ignition timing test procedure with ignition timing light.

9.6. Describe the ignition timing adjustment process.

10. Understand the concept of automotive electrical starting system testing.

10.1. Define open winding, shorted turns and grounded core.

10.2. Describe the cranking voltage test procedure.

10.3. Describe the starting circuit test procedure.

10.4. Describe the solenoid switch hold in coil and pull in coil / winding test procedure.

10.5. Describe the disassemble procedure of a cranking motor.

10.6. Describe different components test procedure of cranking motor.

10.7. Describe the assemble procedure of a cranking motor.
10.8. Describe the performance test procedure of cranking motor and solenoid switch.
10.9. Describe the trouble-diagnosis chart of a cranking motor.

11. Understand the concept of automobile charging system testing.

11.1 Mention troubles of charging system.
11.2 Mention the terminals of alternators.
11.3 Describe the disassemble procedure of an alternator.
11.4 Describe the cleaning and visual inspection procedure of alternator components.
11.5 Mention the safety measure taken during charging circuit test.
11.6 Describe the test procedure of alternator components.
11.7 Describe the assemble procedure of alternator.
11.8 Describe the output test procedure of an alternator.

12. Understand missing cylinder.

12.1. Define missing cylinder.
12.2. Mention the causes of missing cylinder at different engine speed.
12.3. Describe the finding procedures of missing cylinder of a Gasoline and Diesel engine.

13. Understand the concept of high pressure pump testing of diesel engine.

13.1. Mention the purpose of high pressure pump testing.
13.2. State the meaning of phasing and calibration of high pressure pump.
13.3. Mention the methods of phasing a high pressure pump.
13.4 Describe the high pressure pump phasing procedure by pump test bench.
13.5 Mention the methods of calibration a high pressure pump.
13.6 Describe the calibration procedure of high pressure pump with pump test bench.
13.7 Describe the governor setting procedure.

14. Understand the concept of injector testing (Diesel and Gasoline)

14.1. Mention the purpose of injector testing.
14.2. Mention different types of injector testing.
14.3. Describe the various test procedure of injector testing.

PRACTICAL:

1. Observe the automotive dashboard instruments.

1.1. Identify the common instrument used in modern automotive car dashboard.
1.2. Identify the special instrument used in modern automotive car dashboard.
1.3. Remove the dash board from the car.
1.4. Remove total dashboard instruments.
1.5. Disassemble all the dashboard instruments to observe the construction.
1.6. Reassemble all the dashboard instruments.
1.7. Remount the dashboard instrument and dashboard in the car.
1.8. Test the workability of the dash board instruments.

2. Perform different measurement with AVO meter.

2.1. Measure DC &AC volt with volt meter.
2.2. Measure current of an electrical circuit with Ammeter.
2.3. Select ohmmeter and measure resistance or continuity of a coil.

3. Perform the cylinder compression test.

3.1. Start and warm up the engine.
3.2. Prepare the engine for compression test.
3.3. Remove all spark plug / injector from the engine.
3.4. Select the compressor tester.

3.5. Set the compressor tester.

3.6. Crank the engine and record the reading of each cylinder.

3.7. Analyze the reading and find out the problems.

4. Perform analysis by the exhaust gas analyzer.

4.1. Identify the components of exhaust gas analyzer.

4.2. Connect exhaust gas analyzer.

4.3. Start the engine & collect data.

5. Perform exhaust gas analysis with exhaust gas analyzer.

5.1. Identify the components of engine analyzer.

5.2. Connect the engine analyzer with engine.

5.3. Start the engine & collect data.

6. Perform the testing and charging of automotive battery.

6.1. Perform specific gravity test of automotive lead acid battery.

6.2. Perform high discharge test of automotive lead acid battery.

6.3. Charge two automotive lead acid battery using constant current method at slow rate.

6.4. Charge two battery using constant voltage method at slow rate.

6.5. Charge a battery using constant voltage method at high rate (booster charging).

6.6. Charge a sulfated battery at trickle charge rate.

7. Perform the ignition system trouble diagnosis.

7.1. Test the spark intensity of ignition system.

7.2. Test the ignition coil and high tension wire by ohmmeter.

7.3. Test the condenser.

7.4. Test and adjust the ignition timing and ignition advance mechanism by ignition timing light.

7.5. Clean and test the spark plug by spark plug cleaner and tester.

7.6. Set the ignition timing with the help of ignition timing light.

8. Study the automotive charging system trouble diagnosis.

8.1. Dismount the alternator from the engine.

8.2. Disassemble the alternator.

8.3. Test the components of alternator by suitable instruments.

8.4. Reassemble the alternator.

8.5. Remount the alternator to the engine.

8.6. Test the output of the alternator.

8.7. Perform the quick voltage regulator test by DC voltmeter during engine operation.

9. Perform the electric starting system trouble diagnosis.

9.1. Dismount the cranking motor from the engine.

9.2. Perform the visual inspection of starting system components.

9.3. Disassemble the starting motor.

9.4. Test the components of starting motor by suitable instrument.

9.5. Reassemble the cranking motor.

9.6. Test the performance of solenoid switch.

9.7. Test the performance of cranking motor by no load test and lock torque test.

9.8. Test the performance of whole starting system.

10. Perform the diesel injector trouble diagnosis.

10.1. Dismount the injectors from the engine.

10.2. Disassemble the injector.

10.3. Clean the injector components.

10.4. Perform visual inspection of the injector components.

10.5. Replace nozzle set if necessary.

10.6. Assemble the injectors.

10.7. Perform pressure setting or pop test, dribble test, back leakage test and spray pattern test of the injectors by the injector tester.

10.8. Remount the injectors to the engine.

REFERENCE BOOKS

1. Automotive electrical equipment - W.H. crouse

2. Automobile electrical and electronic system - TONY TRANTER

3. Engine Instrumentation and testing - Md. Radwanoor Rahman

66273 Automotive Trouble Shooting & Emission Control

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AIMS

To provide the students with an opportunity to acquire knowledge, skill and attitude in the area of automotive trouble shooting and diagnosis with special emphasis on:

- trouble-diagnosis of automotive engine and their system.
- trouble-diagnosis of automotive power trains.
- trouble-diagnosis of automotive chassis.
- the basic concepts of automobile emission
- harmful effects of emission on human and plants
- emission standards
- different emission control system and devices used in automobiles

SHORT DESCRIPTION

Trouble diagnosis of automotive engines; Trouble diagnosis of ignition systems; Trouble diagnosis of fuel systems; Trouble diagnosis of lubricating system; Trouble diagnosis of cooling system; Trouble diagnosis of automotive of power trains; Trouble diagnosis of automotive chassis; Trouble diagnosis Process with fault code; Emission fundamentals; Automotive emissions; Emission standards; Emission control system; Positive crankcase ventilation system; Controlling evaporative emission; Cleaning exhaust gas; Exhaust gas re-circulation, Treating exhaust gas; Catalytic converter.

DETAIL DESCRIPTION

Theory:

1. Understand trouble diagnosis of automotive engine.

1.1. State the meaning of troubleshooting.

1.2. Outline the importance of trouble shooting and diagnosis in automotive field.

1.3. Describe the symptom, possible cause and remedies of automotive engine failure.

2. Understand the trouble diagnosis of ignition system.

2.1. Describe the trouble diagnosis of conventional battery coil ignition system.

2.2. Describe the trouble diagnosis of magneto ignition system.

2.3. Describe the trouble diagnosis of CDI system.

2.4. Describe the trouble diagnosis of electronic ignition system.

3. Understand the trouble diagnosis of fuel system.

3.1. Describe the mechanical fuel-pump trouble diagnosis of carburetor engine.

3.2. Describe the symptom, possible causes and remedies of EFI pump failure.

3.3. Describe the symptom, possible cause and remedies of diesel injection pump failure.

3.4. Describe the trouble diagnosis chart of EFI system.

3.5. Describe the trouble diagnosis chart of diesel injection fuel system.

4. Understand the trouble diagnosis of lubricating system.

4.1. Describe the possible causes and remedies of oil pressure drop.

4.2. Describe the possible causes and remedies of main bearing noise.

4.3. Describe the possible causes and remedies of connecting rod noise.

4.4. Describe the possible causes and remedies of noisy valves.

4.5. Describe the possible causes and remedies of oil pump fault.

5. Understand the trouble diagnosis of cooling system.

5.1 Describe the symptom, possible causes and remedies of internal & external leakage.

5.2 Describe the symptom, possible causes and remedies of poor coolant circulation.

5.3 Describe the symptom, possible causes and remedies of over heating.

5.4 Describe the symptom, possible causes and remedies of radiator over flow.

5.5 Describe the symptom, possible causes and remedies of corrosion.

5.6 Describe the symptom, possible causes and remedies of low engine temperature.

5.7 Mention the symptom, possible causes and remedies of noisy pump.

6. Understand the trouble diagnosis of automotive power trains.

6.1. Describe the trouble diagnosis of automotive clutch.

6.2. Describe the trouble diagnosis of automotive manual transmission.

6.3. Describe the diagnosis of automotive transaxle.

6.4. Describe the trouble diagnosis of automotive transfer case.

6.5. Describe the trouble diagnosis chart for automatic transmission and transaxles.

6.6. Describe the trouble diagnosis of drive-shaft and universal joint.

6.7. Describe the trouble diagnosis of differential.

7. Understand the trouble diagnosis of automotive steering & suspension system.

7.1. Describe the trouble diagnosis of steering and suspension.

7.2. Describe the symptom, possible causes and remedies of wheel alignment.

7.3. Describe the symptom possible causes and remedies of steering system problem.

8. Understand the trouble diagnosis of automotive brake system.

8.1 Describe the trouble diagnosis chart of brake system.

8.2 Mention the possible causes and remedies of different trouble of automotive brake system.

8.3 Mention the possible causes and remedies of brake failure.

9. Understand the trouble diagnosis with fault code.

9.1 Explain fault code of automobile.

9.2 Explain cheek engine lamp or malfunction indication lamp.

9.3 Explain the OBD-I & OBD-II on board diagnosis system.

9.4 Describe the fault diagnosis process with manual command.

9.5 Describe the fault diagnosis process with scanner.

10. Understand the atmospheric pollution and automotive emission control system.

10.1 Define emission and pollution, emission standard and emission control.

10.2 Describe the construction of earth's atmosphere.

10.3 Mention the automotive air pollutants.

10.4 Explain pollutants produced by automobile.

10.5 Mention the possible sources of atmospheric pollution from the automobiles.

10.6 Explain harmful action of automotive air pollutants to human and plants.

10.7 Mention different emission control systems used in automobile.

10.8 Explain chemical reaction takes place during combustion in the combustion chamber.

10.9 Explain stratified charge combustion.

11. Understand controlling crankcase emission and evaporative emission.

11.1 Define the terms "blow by", crankcase ventilation and evaporative emission.

11.2 Mention the necessity of positive crankcase ventilation (PCV) system.

11.3 Describe the construction and operation of PCV system.

11.4 Describe the construction and operation of evaporative emission control for carburated engine.

11.5 Describe the construction and operation of evaporative emission control for EFI engine.

11.6 Mention the function of fuel vapor return line and charcoal canister.

11.7 Describe the procedure of separating vapor from fuel.

12. Understand the exhaust gas re-circulation (EGR) system.

12.1 Mention the purposes of exhaust gas re-circulation system.

12.2 Describe the construction of EGR system.

12.3 Describe the operation of EGR system.

12.4 Mention the purposes of EGR valve.

12.5 Describe the operation of EGR valve with back pressure sensor.

12.6 Describe the operation of ECM (Electronic Control Module) controlled EGR system.

13. Understand the treating of exhaust gas.

13.1 State the meaning of treating exhaust gas.

13.2 Mention the ways of treating exhaust gas.

13.3 Describe the operation of air injection system.

13.4 Describe the operation of air aspiration system.

14. Understand the features of catalytic converter.

14.1 Define the term catalytic converter.

14.2 Mention the purposes of catalytic converter.

14.3 Mention the different types of catalytic converter.

14.4 Describe the operation of oxidizing catalytic converter.

14.5 Describe the operation of three way catalytic converter.

14.6 Mention the servicing precaution of catalytic converter.

Practical:

1. Peform diagnosis & repairing of the carbureted fuel system.

1.1. Check the fuel pump pressure, vacuum and twenty stroke fuel volume.

1.2. Dismount the fuel pump from the engine.

1.3. Disassemble the fuel pump.

1.4. Repair / replace the faulty components.

1.5. Assemble the fuel pump and remount with the engine.

1.6. Check the delivery of carburetor.

1.7. Repair / replace or adjust the faulty components.

1.8. Assemble and fix the carburetor with the engine.

1.9. Diagnose carbureted fuel system troubles and rectify.

2. Peform diagnosis & repairing of the trouble diagnosis of EFI system.

2.1. Check the EFI system for fuel leakage.

2.2. Check the EFI system for air leakage.

2.3. Check the performance of EFI fuel pump.

2.4. Check the fuel rail.

2.5. Check the fuel pressure regulator.

2.6. Check the performance of solenoid operated injection valve.

2.7. Diagnose the trouble of EFI system with built in electronic self-diagnostic system and rectify the troubles.

3. Peform diagnosis & repairing of the trouble diagnosis of diesel engine fuel system.

3.1. Clean / change fuel filter.

3.2. Dismount high pressure pump from the engine.

3.3. Dismount the injectors from the engine.
3.4. Check the performance of high pressure pump with high pressure pump test bench.
3.5. Check the performance of injectors with injector tester.
3.6. Diagnose diesel engine fuel system troubles and rectify.

4. Perform the trouble diagnosis and repairing of cooling system.

4.1. Check the pressure of cooling system with the cooling system pressure tester.
4.2. Check the radiator pressure cap with cooling system pressure tester.
4.3. Check the thermostat.
4.4. Check the hoses and hose connections.
4.5. Check the exhaust gas leakage into cooling system with a block-check tester.
4.6. Check the strength of antifreeze solution.
4.7. Check the water pump and replace it if necessary.
4.8. Check the tension of fan belt.
4.9. Reverse flush the radiator.
4.10. Diagnosis the troubles of cooling system and rectify.

5. Perform the trouble diagnosis and repairing of lubricating system.

5.1. Check oil level.
5.2. Change oil.
5.3. Chang oil filter.
5.4. Service the oil pressure relief valve.
5.5. Service the oil pump and oil pressure indicator.
5.6. Diagnose and rectify the troubles of lubricating system.

6. Perform the trouble diagnosis and repairing of ignition system.

6.1. Check the workability of ignition system component.
6.2. Check the spark intensity of ignition system.
6.3. Check ignition timing & advance mechanism with stroboscopic tight and adjust if necessary.
6.4. Clean and check spark plug gap and adjustment if necessary.
6.5. Diagnose the conventional ignition system troubles and rectify it.
6.6 Diagnose and rectify the CDI ignition system troubles.
6.7. Diagnose magneto ignition system troubles and rectify.
6.8. Diagnose and rectify the electronic ignition system troubles.

7. Perform the trouble diagnosis and repairing of clutch.

7.1. Remove clutch assembly from the vehicle.
7.2. Disassemble the clutch assembly.
7.3. Check the component of clutch assembly.
7.4. Replace the faulty components.
7.5. Reassemble and reinstall the clutch.
7.6. Adjust the clutch pedal free pedal.
7.7. Lubricate release-bearing.
7.8. Service and adjust clutch leakage.
7.9. Check for clutch disengagement.
7.10. Diagnose and rectify the clutch troubles.

8. Perform the trouble diagnosis and repairing of manual transmission and transaxle.

8.1. Check oil leakage from a transmission.
8.2. Adjust manual transmission and transaxle leakage.
8.3. Check oil level of manual transmission and transaxle.
8.4. Diagnose and rectify the trouble of manual transmission.

8.5. Diagnose and rectify the troubles of manual transaxle.

9. Perform trouble diagnosis and repairing of the automatic transmission and transaxle.

9.1 Check the fluid in an automatic transmission and in an automatic transaxle.

9.2. Check the transmission or transaxle for fluid leaks.

9.3. Diagnose troubles in various models of automatic transmission and transaxle.

9.4. Test the pressure and interpret the result.

9.5. Make a stall test and interpret the result.

9.6. Perform linkage and band adjustment.

9.7. Remove and install an automatic transmission and transaxle.

10. Perform the steering and suspension system trouble diagnosis & repair.

10.1. Diagnose the troubles in manual and power steering system.

10.2. Diagnose the troubles in suspension system.

10.3. Inspect and lubricate the steering linkage.

10.4. Replace the defective parts in steering linkage.

10.5. Replace and adjust the front wheel bearings.

10.6. Inspect the suspension system and replace defective parts.

10.7. Perform the wheel alignment on vehicle.

11. Perform the brake system troubles-diagnosis.

11.1. Diagnose the trouble in the drum brake system.

11.2. Diagnose the trouble in the disk brake system.

11.3. Adjust the drum brake.

11.4. Service the drum and disk brakes, master cylinder, brake lines and wheel cylinder.

11.5. Diagnose the troubles in power brake system and rectify.

12. Perform the trouble diagnosis with fault code.

12.1 Diagnosis the trouble with manual command (without scanner)

12.2 diagnosis the trouble with the heap of scanner.

13. Observe the emission control system.

13.1 Identify the different emission control devices used in modern automobiles.

13.2 Identify the main sources of automotive emission.

14. Service the positive crankcase ventilation (PCV) system.

14.1 Identify the different components of PCV system.

14.2 Check PCV valve for workability.

14.3 Check crankcase vacuum by PCV tester.

14.4 Service the PCV system.

15. Test the evaporative control system.

15.1 Identify the components of the system.

15.2 Replace filter in charcoal canister.

15.3 Test the system for fuel vapor leakage.

16. Service service the air injection system.

16.1 Identify the components of the system.

16.2 Remove the air pump, diverted valve, check valve and injection tube.

16.3 Test and service the air pump, diverter valve, check valve and injection tube.

16.4 Install the air pump, diverter valve, check valve and injection valve.

17. Test the exhaust gas re-circulation (EGR) system.

17.1 Identify the components of EGR system.

17.2 Test the EGR system.

17.3 Remove the EGR valve.

17.4 Test the EGR valve.

18. Test and install the catalytic converter.

18.1 Test the catalytic converter for workability.

18.2 Remove the catalytic converter from vehicle.

18.3 Install the catalytic converter.

REFERENCE BOOKS

1. Automobile Guide
   - Frederick E. Bricker.
2. Automotive Mechanics
   - William H. Crouse
   Donald L. Anglin
3. Advanced electronics Diagnosis of Automobile
   - Don Khowles.
4. Automobile engineering
   -R.B. Gupta.
5. The Automobile
   – Harban Singh Rayet.
6. Manual of Different Auto Vehicle Companys.

66274 Vehicle Automation & Signaling T P C
2 3 3

AIMS

To provide the students with an opportunity to acquire knowledge, skill and attitude in the area of Vehicle Automation & signaling with special emphasis on:

- Intelligent transport system (ITS)
- Vehicle cruise control
- Collision avoidance system's & control both steering and speed autonomously under normal environmental condition of vehicle.
- Traffic signaling

SHORT DESCRIPTION

Vehicle automation, Intelligent transport system (ITS), Vehicle cruise control, Collision avoidance system, Automation control of steering & speed under normal environment condition, Vehicle tracking system, Intelligent parking Assist system (IPAS), Automotive night vision (ANV), Blind spot monitoring, Advance automatic collision notification (AACN) and Traffic signaling.

DETAIL DESCRIPTION

Theory:

1. **Understand the Features of Vehicle Automation.**
   - 1.1 Define of vehicle automation.
   - 1.2 State name of the operation mechanism viz Informing and warning functions, Continuously automating functions, Intervening emergency functions (near-accident situations).
   - 1.3 Verity of levels of driving automation for on-road vehicles.
   - 1.4 Mention the function with levels of driving automation for on-road vehicles.
   - 1.5 Identify the challenges of emerging sector for vehicle automation.
2. **Understand the Feature of Vehicle Intelligent transport system (ITS).**
   - 2.1 State the vehicle intelligent transport system.
   - 2.2 Classify the primary category of intelligent transport system application viz Advanced traveler information systems (ATIS), Advanced transportation management systems (ATMS), ITS-Enabled transportation pricing systems, Advanced public transportation systems, Vehicle to infrastructure (VII) integration and vehicle to vehicle integration (V2V).
   - 2.3 Mention the specific ITS application of each category.
   - 2.4 Describe the primary category of intelligent transport system application.
   - 2.5 Mention the key underlying technology used in ITS.
   - 2.6 Identify the component of vehicle intelligent transport system.
   - 2.7 Explain the benefits of ITS.
   - 2.8 Apply the policy measure of vehicle intelligent transport system in urban transportation.
3. **Under the Feature of Vehicle Cruise Control.**
   - 3.1 List of Component of Cruise Control.
   - 3.2 Mention the Function of cruise control component.
   - 3.3 Operate each component of cruise control system.
   - 3.4 Advantages and disadvantages of cruise control system.
4. **Understand the Feature of Vehicle Collision Avoidance System.**
   - 4.1 Give the automobile collision avoidance system operation principle.
   - 4.2 Point out the variety of sensor used in collision avoidance system.
   - 4.3 Mention the function of collision avoidance system.
   - 4.4 Perform the automobile collision avoidance system.
5. **Understand the Feature of Automate Vehicle Steering and Speed Control.**
   - 5.1 List the component of hardware system of automate vehicle.
   - 5.2 Mention the function of hardware system component of automate vehicle.
   - 5.3 Name of the sensor used in automate vehicle steering and speed control.
   - 5.4 Draw the systematic diagram of steering control system.
   - 5.5 Illustrate the hardware configuration of steering control system.
6. **Understand the feature of vehicle tracking system.**

6.1 State the vehicle tracking system.
6.2 Identify the component of vehicle tracking system.
6.3 Discuss the GPS technology vehicle tracking system.
6.4 Write possible benefit of using GPS tracking system.
6.5 Find the application of vehicle tracking system.
6.6 Explain the function of vehicle tracking system.
6.7 Define the intelligent parking assist system.

7. Understand the Feature of Automotive Night Vision (ANV).

7.1 state what is meant by automotive night vision.
7.2 Mention the major function of automotive night vision viz Adaptive night vision, Road sing detection and recognition, Spot light projection, Scene zooming.
7.3 Describe the function of automotive night vision.
7.4 Write possible benefit of automotive night vision.

8. Understand the feature of Blind Spot Monitoring.

8.1 Define the automotive blind spot monitoring.
8.2 Types of automotive blind spot monitoring viz Active and Passive blind spot monitor.
8.3 Function of automotive blind spot monitoring.

9. Understand the Feature of Advance Automatic Collision Notification (AACN).

9.1 State the Advance Automatic Collision Notification (AACN).

10. Understand the Feature of Traffic Signaling.

10.1 State the traffic signaling.

Practical: (Field trip should be included to relevant workshop).

1. Study the automobile body parts.

1.1 Identify the panels and crown.

Ref:
Kiino, Ron. "The Kiinote: Blinded by the Spot." Motor Trend. (April 17, 2012)
http://www.motortrend.com/features/editorial/1202_the_kiinote_blinded_by_the_spot/

66275 Automotive Electrical & Electronic System -2

T	P	C
2	3	3

AIMS

To provide the students with an opportunity to acquire knowledge, skill and attitude in the area of automotive electrical and electronic systems with special emphasis on:

- Function, construction and operation of electrical devices used in automobile.
- Function, construction and operation of electronic devices used in automobile.

SHORT DESCRIPTION

Lighting system; Head light circuit; Horn and horn relay; Windshield wiper and washer; Electronic fuel injection system; Sensors; Actuators; Body electronic control; Anti-lock braking system; Electronic dash board instruments ; Electromagnetic interference, Advanced automotive lighting system.

DETAIL DESCRIPTION

Theory:

1. Understand the features of lighting system.

1.1. Mention the purpose of lighting system of automobile.
1.2. Mention the lighting system used in automobile.
1.3. Draw a simplified complete lighting circuit of automobile.
1.4. Mention the typical electrical loads of automobile showing their electrical load in watt.
1.5. Mention the different types of bulb used in automobile.
1.6. Mention the uses of different lighting system used in automobile.
1.7. Explain the relation between engine immobilizer & tail lamp malfunction.

2. Understand the features of head light circuit.

2.1. Mention the components of head light assembly.
2.2. Mention different types of head lights used in automobile.
2.3. Describe the construction of head light (such as: Halogen, LED, HID & Leser)
2.4. Mention the different types of lens and reflector of head light.
2.5. Draw the head light circuit of automobile.
2.6. Mention the functions of head light relay and dimmer switch of head light circuit.
2.7. Mention the advantages of sealed beam head light.
2.8. Mention the disadvantages of separate bulb and reflector of head light.
2.9. Describe the method of head light aiming.

3. Understand the features of side indicating light circuit.

3.1 Mention the components of side indicating light circuit.
3.2 Draw a side indicating light circuit.
3.3 Mention the different types of flasher used in automobile.
3.4 Describe the operation of thermostatic and electronic flasher.

4. Understand the features of horn and horn relay.

4.1 Mention the different types of horn used in automobile.
4.2 Illustrate the operation of horn circuit with relay.
4.3 Describe the operation of electric horns and air horns.

4.4 Mention the purpose of horn relay.

4.5 Describe the procedure of horn adjustment.

5. Understand the features of wind shield wiper and washer.

5.1 Mention the purpose of wind shield wiper and wind shield washer.

5.2 Mention different types of wind shield wiper mechanism.

5.3 Explain the intermittent wiping principle.

5.4 Describe the operation of different types wind shield wiper & washer mechanism.

6. Understand diesel electronic fuel injection (EFI) /Common Rail Diesel Injection (CDI)

6.1 Define the electronic fuel injection CDI system of diesel engine.

6.2 Mention the purpose of CDI system.

6.3 Mention the name of different types of diesel CDI system.

6.4 Explain the principle of operation of CDI system with diagram.

6.5 Explain the advantages of CDI system over conventional system.

7. Understand the features of sensors.

7.1 Define sensor.

7.2 Mention the purpose of sensor used in diesel & gasoline-EFI system.

7.3 Name different types of sensors used in automobile.

7.4 Describe the operation of lambda (oxygen) sensor, air flow sensor, engine temperature sensor throttle positions sensor, manifold absolute pressure (MAP) sensor, knock sensor, intake air temperature sensor.

7.5 Mention the uses of brake pad wear sensor and fluid level sensor.

8. Understand the features of actuators.

8.1 Define actuator.

8.2 Identify different types of actuators used in automobile.

8.3 Describe the operation of different types of actuators such as idle speed control (ISC) valve, gasoline & diesel fuel injector, igniter, circuit opening relay & EFI main relay.

9. Understand the vehicle security system.

9.1 Describe the vehicle security system.

9.2 Describe the tire pressure monitoring system.

9.3 Mention the advantages of tire pressure monitoring system.

9.4 Describe the warning device used in automobile.

9.5 Describe the traction control system.

10. Understand the electronic dash board instruments.

10.1 Describe the operation of digital speedometer with block diagram.

10.2 Describe the operation of electronic tachometer.

10.3 Describe the operation of electronic engine temperature gauge with block diagram.

10.4 Describe the operation of electronic fuel gauge with block diagram.

10.5 Describe the operation of electronic oil pressure gauge with block diagram.

10.6 Describe the operation of trip computer with block diagram.

11. Understand the electromagnetic interference.

11.1 Define electromagnetic interference.

11.2 Mention the source of interference.

11.3 Explain the effects of electromagnetic interference.

11.4 Mention the different methods of suppressing the interference.

11.5 Describe the methods of suppressing the interference.

12. Understand the advanced automotive lighting system.

12.1 Mention the different types of advanced automotive lighting system.

12.2 Explain fiber-optics lighting system.

12.3 Explain computer controlled lighting system with block diagram.

12.4 Explain distributed lighting system with block diagram

Practical:

1. Perform the automotive lighting system wiring & testing.

1.1 Identify different lighting circuit of automobile.

1.2. Connect and complete the wiring on a board or vehicle.

1.3. Test the operation of lighting circuit.

1.4. Aiming the head light.

2. Perform Head light Aiming

2.1. Place the vehicle properly

2.2. Set the head light aligner properly.

2.2. Adjust head light by scewing or unscrewing the adjusting screw of Head light.

3. Perform the automotive horn and horn circuit wiring.

3.1. Identify the component of horn circuit.

3.2. Connect and complete the wiring of horn circuit on a circuit board or vehicle.

3.3. Test the operation of horn circuit.

3.4. Adjust the horn for proper tone.

4. Perform the wind shield wiper & washer circuit wiring.

3.1 Identify the components of wind shield wiper & washer mechanism.

3.2 Connect & complete the wiring of wind shield wiper

3.3 Test the operation of wind shield wiper & washer circuit.

5. Perform the electronic fuel injection (EFI) system testing.

5.1. Identify different component of EFI system.

5.2. Remove the injector & sensors.

5.3. Test the work ability of injector & sensors.

5.4. Reinstall the injector & sensors.

5.5. Test the operation of the system.

6. Perform the sensors testing.

6.1. Identify the sensors used in automobile.

6.2. Remove all sensors from the vehicle.

6.3. Test the sensor for workability.

6.4. Reinstall the sensor.

7. Perform the actuators testing.

7.1. Identify the actuators used in automobile.

7.2. Remove the common actuators.

7.3. Test the actuators for its workability.

7.4. Reinstall the actuators.

8. Perform the vehicle security system wiring.

8.1 Identify the components of different vehicle security system.

8.2 Connected the complete the warning of vehicle security system.

8.3 Test of operation of vehicle security system.

9. Observe the electronic dash board instruments operation.

9.1 Identify the components of the dash board.

9.2 Remove complete dash board from vehicle.

9.3 Test and install the dash board.

9.4 Test the operation of dash board instruments.

10. Perform the advanced automotive lighting system wiring.

10.1 Observe the fiber-optics lighting system.

10.2 Observe the computer control lighting system.

10.3 Observe the distributed lighting system.

REFERENCE BOOKS

1. Automobile Electrical and Electronic System
   - A. Tranter.
2. Automotive Electronic System
   - Trevor Mellard.
3. Automobile Electrical Equipment
   - P.L. Kohle.
4. Automotive Electrical Equipment
   - W.H. Crouse.
5. Understand Automotive Electronics
   - Willium B. Ribben
6. Automotive Mechanics.
   – W. H Crouse and Angilin
7. Automobile Engineering
   – Dr. Kripal Singh.
11. Automobile Engineering
   - N.K. Gir

66276 Automobile Engineering Project

T	P	C
0	6	2

AIMS

To provide the students with an opportunity to acquire skill and attitude in the area of automobile engineering project with special emphasis on:

- Build up a storage battery.
- Build up automobile electric system model .
- Build up automobile auxiliary system model.
- Build up automobile battery charger.
- Make a cut model of manual gear box, torque converter & Differential.
- Reconditioning of automobile engine.

SHORT DESCRIPTION

Build up a storage battery; Build up a magneto ignition system; Build up a model of magneto CDI system; Build up a model of battery CDI system; Build up a model of conventional ignition system; Build up a model of electronic ignition system; Build up a model of automotive lighting system; Build up a model of automobile charging system; Build up a model of automobile electric starting system; Build up a model of automobile hydraulic brake system; cut model of manual gear box, torque converter,Differential, Make a model of steering system. Reconditioning of automobile spark ignition engine; Reconditioning of compression ignition engine.

DETAIL DESCRIPTION

1. Build up a 12 volt lead acid battery.

1.1. Collect the materials of the battery.
1.2. Make the cells of the battery.
1.3. Install the cells in the battery case.
1.4. Connect the battery cells.
1.5. Covered the top of the battery.
1.6. Pour electrolyte in the battery cells.
1.7. Charge the battery.

2. Build up a model of magneto ignition system.

2.1. Collect the materials of magneto ignition system.
2.2. Make a board with portable frame.
2.3. Install the components of magneto ignition system on the portable frame board.
2.4. Connect the components.
2.5. Test the workability of the built unit.

3. Build up a model of magneto CDI system.

3.1. Collect the materials of magneto CDI system.
3.2. Make a board with portable frame.
3.3. Install the components of magneto CDI system on the portable board.
3.4. Connect the components.
3.5. Test the workability of the built unit.

4. Build up a model of battery CDI system.

4.1. Collect the materials of battery CDI system.

4.2. Make a board with portable frame.
4.3. Install the components of battery CDI system on the board.
4.4. Connect the components.
4.5. Test the workability of the built unit.

5. Build up a model of conventional battery coil ignition system.

5.1. Collect the materials of a conventional battery coil ignition system.
5.2. Make a board with portable frame.
5.3. Install the components on the board.
5.4. Connect the components.
5.5. Test the workability of the built unit.

6. Build up a model of electronic ignition system.

6.1. Collect the materials of an electronic ignition system.
6.2. Make a board with portable frame.
6.3. Install the components on the board.
6.4. Connect the components.
6.5. Test the workability of the built unit.

7. Build up a model of automobile lighting system.

7.1. Collect the materials of automobile lighting system.
7.2. Make a board with portable frame.
7.3. Install the components of the automobile lighting system on the board.
7.4. Connect the components.
7.5. Test the workability of the built unit.

8. Build up a model of automobile charging system.

8.1. Collect the materials of a automobile charging system.
8.2. Make a board with portable frame.
8.3. Install the components on the board.
8.4. Connect the components.
8.5. Test the workability of the built unit.

9. Build up a model of automobile electrical starting system.

9.1. Collect the materials of automobile electrical starting system.
9.2. Make a board with portable frame.
9.3. Install the components on the board.
9.4. Connect the components.
9.5. Test the workability of the built units.

10. Build up a model of automobile hydraulic brake system.

10.1. Collect the materials of an automobile hydraulic system.
10.2. Make a board with portable frame.
10.3. Install the components of brake system.
10.4. Connect the components.
10.5. Test the workability of the built unit.

11. Build up a model of battery charger.

11.1 Draw circuit diagram of battery charger.
11.2 Collect the components.
11.3 Make a wooden/steel box of required size.
11.4 Install the components of complete the ckt.
11.5 Test the workability.

12. Built up a model of car air-conditioning system.

12.1 Collect the materials of air-conditioning system.

12.2 Collect the wooden table for installing the materials.

12.3 Install the components on the table.

12.4 Connect the components.

12.5 Test the workability of the built model

13. Make a cut model of manual gear box.

13.1. Collect a manual gear box.

13.2. Cut different portion of gear box. as per instruction.

13.3. Set the gear box with a stand.

13.4. Assemble the gear box & operate.

14. make a cut model of torque converter

14.1. . Collect a torque converter.

14.2. Cut different portion of torque converter as per instruction.

14.3. Set the torque converter with a stand.

14.4. Assemble the torque converter & operate

15. make a cut model of differential.

15.1. Collect a manual differential.

15.2. Cut different portion of differential as per instruction.

15.3. Set the differential with a stand.

15.4. Assemble the differential & operate

16 Make a model of steering system.

16.1.Collect the component of steering system.

16.2. Make a board with portable frame.

16.3. Set the components with frame.

16.4. Operate the steering system.

17. Recondition a disorder automobile SI engine.

17.1. Perform the visual and instrumental inspection of the engine.

17.2 .Identify the troubles of the engine.

17.3 . machining works.

17.5 . Collect replaceable parts.

17.6 . Reassemble the engine with new parts.

17.7 . Test the engine for correct operation.

18. Recondition a disorder automobile CI engine.

18.1. Perform the visual and instrumental inspection of the engine.

18.2 . Identify the troubles of the engine.

18.3 . Disassemble the engine

18.4 . Perform machining works.

18.5 . Collect replaceable parts.

18.6 . Reassemble the engine with new parts.

18.7. Test the engine for correct operation.

REFERENCE BOOKS

1. Automobile Electrical and Electronic System

- A. Tranter.

2. Automotive Electronic System

- Trevor Mellard.

3. Automobile Electrical Equipment
- P.L. Kohle.
4. Automotive Electrical Equipment
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8. Automobile Engineering
– G. B. S Narang
9. Automobile Engineering
- R.B. Gupta
10. Automobile Engineering
- K.K. Ramalingam
11. Automobile Engineering
- N.K. Gir

65853 INNOVATION & ENTREPRENEURSHIP

T	P	C
2	0	2

AIMS

- To be able to understand the concept of entrepreneurship & entrepreneur.
- To be able to understand the concept of environment for entrepreneurship.
- To be able to understand the sources of venture ideas in Bangladesh.
- To be able to understand the project selection.
- To be able to understand business planning.
- To be able to understand the insurance and premium.
- To be able to understand the MDG & SDG.

SHORT DESCRIPTION

Concepts of entrepreneurship & entrepreneur; Entrepreneurship & economic development; Environment for entrepreneurship; Entrepreneurship in the theories of economic growth; Sources of ventures ideas in Bangladesh; Evaluation of venture ideas; Financial planning; Project selection; Self employment; Entrepreneurial motivation; Business plan; Sources of assistance & industrial sanctioning procedure; Concept of SDG; SDG 4,8 .

DETAIL DESCRIPTION

Theory :

1. Understand the basic concept of entrepreneurship & entrepreneur.

1.1 Define entrepreneurship & entrepreneur.
1.2 Discuss the characteristics and qualities of an entrepreneur.
1.3 Mention the classification of entrepreneur.
1.4 Discuss the necessity of entrepreneurship as a career.
1.5 Discuss the prospect of entrepreneurship development in Bangladesh.

2. Understand the concept of entrepreneurship and economic development.

2.1 Define economic development.
2.2 Discuss the economic development process.
2.3 Discuss the capital accumulation or rate of savings.
2.4 Discuss the role of entrepreneur in the technological development and their introduction into production Process.
2.5 Discuss the entrepreneur in the discovery of new product.
2.6 Discuss the discovery of new markets.

3. Environment for entrepreneurship development:

3.1 Define the micro environment.
3.2 Discuss individual income, savings and consumption.
3.3 Define macro environment.
3.4 Discuss political, socio-cultural, economical, legal and technological environment.
3.5 Difference between micro and macro environment .

4. Understand the concept of entrepreneurship in the theories of economic growth.

4.1 Define entrepreneurship in the theories of economic growth.
4.2 Discuss the Malthusian theory of population and economic growth.
4.3 Discuss the stage theory of growth.
4.4 Discuss the Schumpeterian theory of economic development.
4.5 Discuss the entrepreneurship motive in economic development.

5. Understand the sources and evaluation of venture ideas in Bangladesh.

5.1 Define sources of venture ideas in Bangladesh.
5.2 Discuss different types of sources of venture ideas in Bangladesh.
5.3 Define evaluation of venture ideas.
5.4 Discuss the factors that influence the selection of venture idea.

6. Understand the concept of project selection and financial planning.

6.1 Define project.
6.2 Discuss the idea of project.
6.3 Describe the guide lines for project ideas.
6.4 Discuss the sources of project ideas.
6.5 Discuss the evaluation of project ideas.
6.6 Describe the technical aspect of project.
6.7 Define financial planning.
6.8 Discuss the long term financial plan.
6.9 Discuss the short term financial plan.

7. Understand the concept of self employment.

7.1 Define self employment.
7.2 Describe different types of employment.
7.3 Describe the importance of business as a profession.
7.4 Discuss the reasons for success and failure in business.

8. Understand the business plan and the concept of the environment for entrepreneurship.

8.1 Define business plan.
8.2 Describe the importance of business plan.
8.3 Discuss the contents of business plan.
8.4 Define environment of business.
8.5 Describe the factors which effect environment on entrepreneurship

9. Understand the concept of sources of assistance & industrial sanctioning procedure.

9.1 Define sources of assistance.
9.2 Describe different types of sources of assistance.
9.3 Discuss the aid of sources.
9.4 Discuss the industrial policy.
9.5 Define foreign aid.

10. Understand the insurance and premium.

10.1 Define insurance and premium
10.2 Describe the essential conditions of insurance contract.
10.3 Discuss various types of insurance.
10.4 Distinguish between life insurance and general insurance.

11. Understand the concept of Sustainable Development Goals (SDG)

11.1 Define Sustainable development
11.2 State UN targets of MDG
11.3 State UN targets of SDG
11.4 Describe the importance of SDG
11.5 Explain the objectives of SDG
11.6 State the Challenges to achieve SDGs
11.7 Explain the actions to face the challenges of SDGs
11.8 State the of 7^{th} 5 years plan
11.9 Mention the link of 7^{th} 5 years plan with SDGs
11.10 Write down the 5 ps of sustainable development goals

12. Understand SDG 4,8 and 17

12.1 Describe SDG 4 and its targets

12.2 State the elements of Quality education for TVET

12.3 Describe the gender equality and equal access of TVET for economic growth

12.4 Describe SDG 8 and its targets

12.5 Explain Green development, Green Economy, Green TVET & Green Jobs

12.6 Explain the role an entrepreneur for achieving SDG

Reference book :

1. A hand book of new entrepreneur-by p.c jain.
2.A manual on business opportunity Identification and selection-by j.B patel and S S modi.
3.Uddokta unnoyan Nirdeshika -Md.Sabur khan.
4.Entrepreneurship- bashu and mollik.
5.Business Entrepreneurship-kage faruke.
6. Website, Youtube and Google