

BARATHIYAR UNIVERSITY : COIMBATORE 641 046
CENTRE FOR COLLABORATION OF INDUSTRY AND INSTITUTION(CCII)
Diploma in Automobile Engineering and Management
(For the CCII candidates admitted from the academic year 2015-16 onwards)

Scheme of Examinations

Semester -1

Sl. No.	Course code	Course title	Total
01	DAEM 101	General Engineering, Workshop practice, Occupational Safety	100
02	DAEM 102	Marketing Management and Sales Promotions	100
03	DAEM 103	Petrol and Diesel Engines	100
04	DAEM 104	Engine performance	100
05	DAEM 105	Transmission system and Axles	100

Semester -2

01	DAEM 201	Brakes	100
02	DAEM 202	Suspension and steering	100
03	DAEM 203	Automotive Electrical system and electronic fundamentals	100
04	DAEM 204	Practical	100
05	DAEM 205	Viva- Voce	100
		Total	1000

Eligibility for admission

1. Diploma in Automobile Engineering and Management	+2/ITI/equivalent
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duration of course – Semester pattern

1. Diploma in Automobile Engineering and Management	1 year (2 semesters)
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Semester -1

Course Code: DAEM: 101

Course Title : General Engineering, Workshop practice, Occupational safety

Course Objective

This course will enable students to understand workshop standardization, familiarize with tools and equipments used in an automotive workshop. It also gives first hand information about all ancillary trades, occupational hazards and its prevention, safety measures observed in a work shop, Machine drawing, general data processing and office automation.

Unit - I

- **Machine drawing**
Drawing sheet marking - Lines, and other symbols - Orthographic projection
Third angle projection

Unit – II

- **Workshop standardization & Occupational safety**
Definition - Fire and its prevention – Accidents - First aid - Electrical Safety
Safety Hazards - Safety awareness - Safety signs - Investigation and keeping records -
Safety dress - Environmental concerns - Overview of 5S technique

Unit - III

Work shop Equipments & tools

Hand tools - Precision measuring tools – Jacks – Stands – Creepers
Air Compressor - Drilling machine - Bench grinder - Tyre changer
Tyre balancing machine - Trolley jacks - Four post lift - Arbor press
Brake drum/disc grinding machine

Unit -IV

- **Ancillary trades**
Introduction – welding - Sheet metal working – Cutting – Filing - Drilling
Cutting external and internal threads - Measuring with vernier caliper and micrometer

Unit - V

Data processing & general Evolution of automobiles

Evolution of automobiles - Starting a career in automobile industry
Working as a professional service technician - Working as a sales promoter
Working as a Marketing executive/Manager - Area of specialization
Basic Electronics -Computer fundamentals

Books for study

Workshop technology	Hajra Choudhary
Safety, health and environment	NCPT
Machine Drawing	ND Bhat
Introduction to computer	Peter Norton

Course Code: DAEM - 102

Course Title : Marketing Management and Sales Promotion

Course Objective

This course will enable the students to understand about Marketing management, sales promotion and related marketing management in automotive industry. This includes customer care, various marketing strategy, sales promotion aspects etc.

Marketing Management and Sales Promotion

Unit - I

Introduction - Definition of Marketing Mgt - Function of Marketing Mgt - Qualities of Marketing Manager

Unit - II

Management – Definition - Concept and Process of Mgt - Principles of Mgt - Advantage of Mgt

Unit - III

Marketing Research – Introduction - Marketing Research Process - Concept & Importance of Marketing Research - Marketing Research Development

Unit - IV

Sales Promotion – Introduction - Technique of sales promotion - Advertising and sales promotion

Unit - V

Market – Introduction - Type of Market - Area relating to Market and Sales Promotion

Books for study

Principles of Management

LM Prasad

Industrial Marketing Management

Arun Sharma

Course Code : DAEM - 103

Course Title : Petrol and Diesel Engines

Course Objective

This course will enable the students to learn about engines types and its operation. This include comparison between diesel and petrol engine, Disassembling the engine and study of all parts, Engine construction details, and asserting serviceability of each and every part of engine by measuring and testing.

Unit - I

• **Engine operation**

Combustion engines evolution - Internal combustion engine – Engine terminology - Four stroke operation - Two stroke operation - Type of engines

Cylinder arrangements - Valve arrangements - Spark ignition engine (petrol engine) -

Compression ignition engine (Diesel engine) - Comparison between CI and SI engine - Valve arrangements

Unit - II

- **engine systems**

cooling system - Air cooling - Liquid cooling - Pressurized cooling - cooling system parts – Radiator - Water pump - Water jackets - Thermostat valve - PVRV - Cooling fan - Expansion Tank – Layout - Fault diagnosis and repair - Lubrication system - Purpose and Types - Quality of lubricants - Petrol lubrication system - Dry sump - Wet sump - Lubrication system parts – Pump – Filter - Pressure release valve and bypass valve - Oil pressure sending unit - Layout and flow of lubricant - Fault diagnosis

Unit - III

- **Intake, Exhaust, Turbo charging and engine condition testing**

Air cleaner - Intake manifold - Throttle valve - Exhaust manifold - Material used for manifolds - Catalytic converter - Silence muffler - Various sensors in intake and exhaust systems - Gaskets - Volumetric efficiency - Factors effecting volumetric efficiency - Turbo charging - Turbo charger - Lay out and maintenance of turbo charger - Engine condition testing - Compression test - Vacuum test - Emission testing.

Unit - IV

- **Assembling disassembling of engine**

Introduction - Removal of engine from car - Outside cleaning - removing attaching parts - removing head assembly - removing piston and crank shaft
Cleaning block and measuring cylinder wear - testing of block and cylinder head for leakage - Procedure (disassembling) - Initial lubrication – Cleanliness -testing
Proper torque while assembling - fitting in the vehicles

Unit - V

Engine parts

Introduction - Material used for cylinder head - Cleaning and testing - removing cam shaft and valves - Measuring and servicing valves - Checking serviceability of cam shaft - Valve operating system - Material used for cylinder head
Cleaning and testing - testing run out -Measuring and servicing crank pin and main bearing - cleaning oil passage and main gallery

Books for study

Automotive engineering
Automobile engineering Vol I & II

James Alderman
Dr Kirpal singh

Course Code : DAEM - 104

Course Title : Engine Performance

Course Objective

This course will enable the students to attain adequate knowledge about engine performance by studying and testing various systems.

Unit - I

- **Fuels**
Petrol supply systems - Diesel supply systems - Alternative fuels - Petrol injection, components and pressure checking - Filtration of diesel - Injector and Fuel injection pump

Unit - II

- **On- Board diagnosis**
Introduction - OBD-I - OBD-II - Diagnostic tools (engine scan tools) -Fault codes.

Unit - III

- **Car computer (ECM) and Sensors**
Engine control module - car sensors -Type and function of various sensors - IAT Sensor (intake air temp) - TP sensor (Throttle position) - MAF sensor (mass air flow) - ECT. (Engine coolant temp) - Crank shaft and cam shaft position sensor -Knock sensor - Lambda oxygen sensor(s) - Testing of sensors

Unit - IV

- **Ignition system**
Conventional ignition system - Ignition circuit -Coil, contact breaker points and distributor - Setting ignition timing - Distributor less ignition - Spark plugs -Coil on plug ignition

Unit - V

- **Vehicle emission control and testing**
EGR (Exhaust gas recirculation) - Positive crankcase ventilation - Catalytic converter - Petrol evaporation control - Emission norms - Emission testing tools

Books for study

Automotive engineering
Automobile engineering Vol I & II

James Alderman
Dr Kirpal singh

Course Code : DAEM - 105

Course Title : Transmission System and Axles

Course Objective

This course will enable the students to know about various types of transmission system, function of all components and assemblies of transmission, disassembling them, servicing and reassembling.

Unit - I

- **Transmission system**

Function – Types - Automatic transmission –Transaxle - Manual transmission - Major assemblies of transmission - Gears

Unit - II

- **Clutch**

Introduction – Types - Single plate dry disc clutch - Multi plate clutch - Wet friction - clutch removal - Servicing and refitting - clutch adjustments - Automatic clutch - Fault finding and rectification

Unit - III

- **Gearbox**

Purpose and Types - sliding mesh - Constant mesh -Synchromesh gearbox -Power flow - Power take-off - Gearbox lubrication - shifting mechanism - Self and interlocking

Unit - IV

- **Propeller shaft and differential**

Function - Type of propeller shaft - Universal joint - Slip joints -Testing, servicing of propeller shaft - Purpose of differential assembly - Parts of differential assembly - Differential action - Differential adjustments

Unit - V

- **Axle**

Axle types - split, banjo and Salisbury types - Drive shaft - Fully floating axle - Semi and three quarter floating axle - Wheel hub and wheel bearing - Testing, servicing transmission assemblies and parts

Reference books

Automotive engineering
Automobile engineering Vol I & II

James Alderman
Dr Kirpal singh

Semester -2

Course Code : DAEM - 201

Course Title : Brakes

Course Objective

This course will enable the students to know about all types of brakes used in automobiles, function of each assembly, advantages of various systems, removal servicing and reassembling and testing them.

Unit - I

- **Brake system**

Purpose – Types - Mechanical brakes - Hydraulic brake - Hydraulic principles - Major assemblies and components - brake fluid, qualities and types

Unit - II

- **Hydraulic brake system diagnosis**

Lay out - Major components - Brake pedal and adjustment - Master cylinder -Servo brake - Tandem master cylinder - Brake lines and wheel cylinders -drum brake and disc brake - Brake shoes/ pads - Brake adjustments - Brake bleeding -Hydraulic brake system fault finding

Unit - III

- **parking brakes/ hand brake**

Purpose – Operation - Adjustment of hand brake

Unit - IV

- **ABS**

Introduction - working of ABS - Lay out of brake system with ABS - Advantage of ABS - ABS sensors testing

Unit - V

- **Power assisted brake/Air brake**

Advantage - Major components - Servicing of major components –Air compressor - Air pressure regulator - Storage tanks -Treadle valve -brake valves
- Hand/ Failsafe brake

Books for study

Automotive engineering

James Alderman

Automobile engineering Vol I & II

Dr Kirpal singh

Course Code : DAEM - 202

Course Title : Suspension and Steering

Objective

This course will enable the students to know about various types of steering and suspension system, function of all components and assemblies of these systems, disassembling them, servicing and reassembling. They also know about wheels and tyres and steering geometry

Unit - I

- **Suspension system**
Purpose – Types - Independent suspension - Rigid suspension - Leaf springs

Unit - II

- **Independent suspension**
Types – Advantages - Wishbone type - Torsion bar type - Macpherson strut type

Unit - III

- **Rigid suspension**
Road spring assembly - Shackles - Shock absorbers -Telescopic shock absorber - Stabilizer or antiroll bars

Unit - IV

- **Front Axle, steering and steering geometry**
Introduction - Wheel alignment - Steering geometry - Camber angle -Caster angle - Toe-in and toe-out - King pin inclination - Steering mechanism -Steering gears - Under steer and over steer - Steering linkages - Power steering -checking of wheel alignment and steering geometry - Steering adjustments -Steering trouble shooting

Unit - V

- **Wheels and tyres**
Introduction - Type of wheels - Wheel dimensions –Tyre - Construction of tyres - Comparison of radial and bias ply tyre - Tyre materials - tyre designation - Tubeless tyre - Factors affecting tyre life - tyre wear indicators - Wheel and tyre trouble shooting

Books for study

Automotive engineering
Automobile engineering Vol I & II

James Alderman
Dr Kirpal singh

Course Code : DAEM -203

Course Title : Automotive Electrical System and Electronic Fundamentals

Objective

This course will enable the students to know about automotive electrical system, function of all electrical components and assemblies of these systems, disassembling them, servicing and reassembling. They also know about electronic fundamentals and air-conditioning

Unit - I

- **Electrical circuits, Lighting and signaling**

Introduction - Basic fundamentals of electricity - Series circuit - Parallel circuit - Series-parallel circuit - Calculations based on Ohms law - Electrical symbols -Digital meters - Automotive wiring - Electronic fundamentals - tracing various circuits - Flasher unit - Fuses and relays - Driver information and navigation -Horn, wiper and other electrical circuits

Unit - II

- **Battery**

Types - lead acid battery - testing of battery - charging and discharging -Battery maintenance

Unit - III

- **Cranking system operation and diagnosis**

Type of starter motor - Solenoid switch - disassembling and servicing of starter motor - tracing starting circuit faults

Unit - IV

- **Charging system operation and diagnosis**

Type of alternators - Circuit diagram - disassembling and servicing of alternator

Unit - V

- **Air conditioning and heating**

Introduction - A/c compressor - Condenser and evaporator - Blower motor - Air conditioning system servicing -Charging refrigerant

Books for study

Automotive engineering	James Alderman
Automobile engineering Vol I & II	Dr Kirpal singh
Automotive electrical & electronic system	Tom Denton

Course Code : DAEM - 204

Course Title : Practical

Objective

On Job training, Familiarization with Automotive industry and Evaluation

Unit - I

- **On Job training/Practical for the following units on completion or along with theory.**
- Workshop practice – Workshop Tools, equipments, handling, Safety, measuring equipments, filing, grinding, chipping, cutting, welding, Data entry operation.
- Petrol and Diesel engines - Engine operation, engine systems, Intake, Exhaust, Turbo charging and engine condition testing, Assembling disassembling of engine, Engine parts.
- Transmission system and axles - Transmission system, Clutch, Gearbox, Propeller shaft and differential, Axle.
- Brakes - Brake system, Hydraulic brake system diagnosis, parking brakes/ hand brake, ABS, Power assisted brake/Air brake.
- Suspension and steering - Suspension system, Independent suspension, Rigid suspension, Front Axle, steering and steering geometry, Wheels and tyres.
- Automotive Electrical & Electronic system - Electrical circuits, Lighting and signaling, Battery, Cranking system operation and diagnosis, Charging system operation and diagnosis, Air conditioning and heating.

Unit - II

- Factory visits

Visits to 02 automotive industries

Course Code : DAEM - 205

Course Title : Viva Voce

Objective

Evaluation of professional competency

Unit - I

- Projects

Any one of the following

1. Automotive designing
2. Automotive servicing
3. Taxing

- Viva-voce (Final examination)
- Record books

Books for study

Name of book	Author	Published on
1. Automobile engineering Vol I	Dr Kirpal singh	2011 9 th edition
2. Automobile engineering Vol II	Dr Kirpal singh	2013 9 th edition
3. Automotive electrical & electronic system	Tom Denton	2004 1 st edition
4. Workshop technology	Hajra Choudhary	2009 2 nd edition
5. Health, Safety & Environment	NCPT	2008 1 st edition
6. Machine Drawing	ND Bhat	2010 4 th edition
7. Introduction to computer	Peter Norton	2011 9 th edition
8. Principles of Management	LM Prasad	2006 1 st edition
9. Industrial Marketing Management	Arun Sharma	2005 1 st edition

Reference books for the program

Name of book	Author
1. Automotive Technician Training	Tom Denton
2. Automobile Mechanical and Electrical Systems	Tom Denton
3. Advanced Automotive Fault Diagnosis	Tom Denton
4. Automobile engineering Vol I & II	Dr Kirpal singh
5. Industrial Safety Management	N.K. Tara Fdar, K.J Tara Fdar
6. Safety, A personal Focus	David L Bever
7. Machine Drawing	Gupta
8. Automotive engineering	James Alderman
9. Thermodynamics	Aroma & Domkundwar
10. Hand book of Hazardous Air pollutions	Dennis P Nolan P.E
11. Workshop technology	AK singh
12. Fundamentals of electrical engineering	D R Nagpal
13. Encyclopedia of occupational health and safety	Inter National Labor Office
14. Safety, health and working condition in the transfer of technology	Inter National Labor Office
15. Computer fundamentals	VK Jain
16. Principles of Management & Marketing	LM Prasad
17. Industrial Marketing Management	Arun Sharma
18. Industrial Engineering and Management	Dr.O.P. Khanna
19. Business Marketing Management	Thomas W. Speh
20. Industrial Safety, Health environment and Management system	R.K.Jain