# First-Year Scheme & Syllabus for B.Voc. Degree Programme in

# Automobile Servicing

(Dr Babasaheb Ambedkar Technological University, Lonere)

**Semester-I**

| Sr. No. | Code | Course title | Weekly Teaching hours | | | Evaluation Scheme | | | Credit | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | ISE | MSE | ESE | | |
| **General Education** | | | | | | | | | | |
| **Semester I - Theory** | | | | | | | | | | |
| 1 | BVASC101 | Motor Vehicle Technology -II | 3 | 0 | - | 25 | 0 | 25 | 3 | 50 |
| 2 | BVASC102 | Automobile Electrical Equipment | 3 | 0 | - | 25 | 0 | 25 | 3 | 50 |
| 3 | BVASC103 | Two and Three Wheeler | 3 | 0 | - | 25 | 0 | 25 | 3 | 50 |
| 4 | BVASC104 | Modern Electric & Hybrid Vehicles | 0 | 0 | 2 | 25 | 0 | 25 | 3 | 50 |
| | | **Total** | | | | | | | **12** | **200** |
| **Skill Components** | | **Lab/Practical's** | | | | | | | | |
| 5 | BVASL105 | Metrology and Measuring Instruments –Lab | 0 | 0 | 2 | 25 | 0 | 25 | 1.5 | 50 |
| 6 | BVASL106 | Electric & Hybrid Vehicles –Lab | 0 | 0 | 2 | 25 | 0 | 25 | 1.5 | 50 |
| **On-Job-Training (OJT)/Qualification Packs (ANY 1)** | | | | | | | | | **Group GAS1** | |
| | | | **Evaluation Scheme** | | | | | | | |
| | | | IA | | | ESE | | | | |
| 7 | BVASE107 | **Elective:** Automotive Service Technician Level 5 (ASC/Q 1403) | 50 | | | 150 | | | 15 | 200 |
| 8 | BVASE108 | Spare Parts Operations Executive Level 5 (ASC/Q 1502) | | | | | | | | |
| 9 | BVASE109 | Industrial Engineer (Layout Design) (ASC/Q6401) | | | | | | | | |
| 10 | BVASE110 | Tool Designer (ASC/Q4001) | | | | | | | | |
| 11 | BVASE111 | Equipment Designer L5 (ASC/Q 6405) | | | | | | | | |
| | | **Total** | | | | | | | **18** | **300** |

## Semester-II

| Sr. No. | Code | Course title | Weekly Teaching hours | | | Evaluation Scheme | | | Credit | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | ISE | MSE | ESE | | |
| **Semester II- Theory** | | | | | | | | | | |
| 1 | BVASC201 | Industrial Management | 3 | 0 | - | 25 | 0 | 25 | 3 | 50 |
| 2 | BVASC202 | Total Quality Management | 3 | 0 | - | 25 | 0 | 25 | 3 | 50 |
| 3 | BVASC203 | Entrepreneurship | 3 | 0 | - | 25 | 0 | 25 | 3 | 50 |
| 4 | BVASC204 | Garage Organization & Transport Management | 3 | 0 | - | 25 | 0 | 25 | 3 | 50 |
| | | **Total** | | | | | | | **12** | **200** |
| **Skill Components** | | **Lab/Practical's** | | | | | | | | |
| 5 | BVASL205 | Project | 0 | 0 | 3 | 25 | 0 | 25 | 3 | 100 |
| **On-Job-Training (OJT)/Qualification Packs (ANY 1)** | | | | | | | | | Group GEM2 | |
| | | | **Evaluation Sheet** | | | | | | | |
| | | | IA | | | ESE | | | | |
| 6 | BVASE212 | **Elective:** One more QP to be opted from the QPs mentioned in the Level 5 first semester | 50 | | | 150 | | | 15 | 200 |
| | | **Total** | | | | | | | **18** | **300** |

# Semester
# I
# Syllabus

# Syllabus

*Name of the Course: B. Voc (Automobile Servicing)*

**Semester I**

| **Subject Name: Motor Vehicle Technology - II** | | |
|---|---|---|
| Course Code : **BVASC101** | Semester: **I** | |
| Weekly Teaching Hours: TH: **03** Tut: **00** | Scheme of Marking TH: **25,** IA: **25,** Total: **50** | |
| TH Exam Duration: **01 Hours** | Scheme of Marking PR: -- | |
| Credit:**3** | | |

| **Content** | | **Hours** |
|---|---|---|
| **Unit – I** | **Frame And Body** | 09 |
| | Function and construction of frame. Cross-section of frames. Unitized construction (monocoque) types of bodies. Terms - Turning radius, lock-to-lock angle, center point steering, positive steering, and grade ability. Idea of Safety features in a modern car. | |
| **Unit – II** | **Suspension System** | 09 |
| | Function. Types - conventional and independent. Spring types - coil, leaf - elliptical, semielliptical; helper springs, transverse springs. Spring camber; spring material. Torsion bar, stabilizer bar. Shock absorbers- telescopic and gas. Maruti suspension system and shockers. Anti-roll bars. Nitrox suspension. | |
| **Unit – III** | **Steering System And Front Axle** | 09 |
| | Principle - Ackermann and Davis. Function, requirements. Steering gear box - types. Construction and working details of worm and sector, rack and pinion, worm and wheel, worm and recirculating ball type. Tractor steering. Power steering. Electronic Steering.<br>Front axle - rigid front axle. Stub axle. Elliot and reverse elliot type. Lemoine and reverse lemoine type. Tractor front axle. Maruti steering system. Wheel alignment - castor angle, camber angle, K.P.I., Toe-in, toe out. General values of these. | |
| **Unit – IV** | **Braking System** | 09 |
| | Braking terms - braking efficiency, stopping distance, stopping time, weight transfer during braking, leading/trailing shoe of brake. Determination of braking torque. Effect of braking on steering. Types of braking systems-constructional details and working of mechanical brakes, hydraulic brakes, parking brake, vacuum, pneumatic, air-hydraulic brakes; tractor brakes. Drum and disc brakes. Master cylinder, tandem master cylinder, wheel cylinder. Brake lining and brake fluid. Brake defects, their causes and remedies. Anti-Lock Braking System (ABS) & Electronic Brake Distribution (EBD). | |
| **Unit – IV** | **Automobile Pollution And Its Control** | 09 |
| | Effects and extent of pollution caused due to stationary and automobile engines. Harmful products and their causes in petrol & diesel engines. Measures to control exhaust emissions from two-stroke engines, four-stroke engines, and diesel engines. Turbocharger. Products which cause de-activation of catalysts in catalytic converters. Unleaded petrol. Emission measuring instruments for petrol and diesel engines. Limits specified in Motor Vehicles Act. Recent trends in Automobile Pollution Control-Exhaust Gas Recirculation. Air Injection, Reactor System. Positive Crankcase Ventilation. Evaporative Emission Control System. | |

**Books**

| **Name of Authors** | **Title of the Book** | **Publisher** |
|---|---|---|
| A.K. Babu, S.C. Sharma, T.R. Banga | Automobile Mechanics | Khanna Publishing House |

| Subject Name: Automobile Electrical Equipment | |
|---|---|
| Course Code : **(BVASC102)** | Semester: **I** |
| Weekly Teaching Hours: TH: **03** Tut: **00** | Scheme of Marking TH: **25,** IA: **25,** Total: **50** |
| TH Exam Duration: **01 Hours** | Scheme of Marking PR: **--** |
| Credit:**3** | |

| Content | | Hours |
|---|---|---|
| **Unit – I** | **Automobile Wiring Systems & Cables** | 09 |
| | Earth-return and insulated-return systems; 6 Volt, 12 Volt and 24 Volt systems. Positive and negative earthing. Cables-starting systems cables, general purpose cables and high-tension cables; specifications and color codes. Diagram of a typical wiring system. Wiring harness, cable connectors, circuit breakers, plastic fiber-optic wires, printed circuits. Fuses in circuits. | |
| **Unit – II** | **Storage Battery** | 09 |
| | Principle of lead-acid cells; constructional details of battery plates, separator, container, terminal, vent plug, grouping compound. Electrolyte: specific gravity of electrolyte and its variation with temperature. Effect of charging and discharging of specific gravity. Capacity of battery. Efficiency of battery. Methods of charging of battery. Internal circuit of battery charger. Care and maintenance of batteries. Checking for cell voltage and specific gravity of electrolyte. Battery tests- high discharge test, cranking motor test, open-circuit voltage test, cadmium test, life test. Battery failures, Maintenance-free batteries, VRLA batteries, Traction battery. Alkaline type batteries. Fuel cell and its types, Battery Life enhancer. | |
| **Unit – III** | **Dynamo** | 09 |
| | Principle of generation of D.C. Constructional details of a Dynamo. Armature reaction. Principle of commutation. Construction of commutator. Types of wound field generator series, shunt and compound wound. Other types of D.C. generators-four brush & four pole, interpole, split field and bucking field. Dyna-Starter, Generator drive. | |
| **Unit – IV** | **Alternator** | 09 |
| | Principle of generation of A.C. Constructional details of an alternator. Working of alternators. Advantages over dynamo. Types of alternators. Charging of battery with an alternator. Regulator for alternators. | |
| **Unit – V** | **Regulators** | 09 |
| | Constant current and constant voltage systems, Double-contact and compensated voltage control regulators. Current-and-voltage regulator, Cut-out | |

**Books**

| Name of Authors | Title of the Book | Publisher |
|---|---|---|
| A.K. Babu | Automotive Electricals and Electronics | Khanna Publishing House |
| PL Kohli | Automotive Electrical Equipment | … |
| A.W. Judge | Modern Electrical Equipment | … |
| WH Crouse | . Automotive Electrical Equipment | … |

| Subject Name: Two and Three Wheeler | |
|---|---|
| Course Code : **(BVASC103)** | Semester: **I** |
| Weekly Teaching Hours: TH: **03** Tut: **00** | Scheme of Marking TH: **40,** IA: **10,** Total: **50** |
| TH Exam Duration: **02 Hours** | Scheme of Marking PR: **--** |
| Credit:**3** | |

| Content | | Hours |
|---|---|---|
| **Unit – I** | **The Power Unit** | 09 |
| | Two stroke and four stroke SI & CI engine Construction and Working, merits and demerits, Symmetrical and unsymmetrical valve & port timing diagrams, scavenging process. | |
| **Unit – II** | **Fuel and Ignition Systems** | 09 |
| | Fuel system – Different circuits in two wheeler fuel systems, fuel injection system. Lubrication system, Ignition systems - Magneto coil and battery coil spark ignition system, Electronic ignition System, Starting system - Kick starter system – Self-starter system, recent technologies. | |
| **Unit – III** | **Chassis and Sub-Systems** | 09 |
| | Main frame for two and three wheelers, its types, Chassis and different drive systems for two wheelers, Single, multiple plates and centrifugal clutches, Gear box and its and various gear controls in two wheelers. Front and rear suspension systems, Shock absorbers, Panel meters and controls on handle bar, Freewheeling devices. | |
| **Unit – IV** | **Brakes and Wheels** | 09 |
| | Drum brakes & Disc brakes Construction and Working and its Types, Front and Rear brake links layouts. Brake actuation mechanism. Spoked wheel, cast wheel, Disc wheel & its merits and demerits. Tyres and tubes Construction & its Types. Steering geometry. | |
| **Unit – V** | **Two & Three Wheelers – Case Study** | 09 |
| | Case study of Sports bike, Motor cycles, Scooters and Mopeds - Auto rickshaws, Pick up van, Delivery van and Trailer, Servicing and maintenance, recent developments. | |

| **Books** | | |
|---|---|---|
| **Name of Authors** | **Title of the Book** | **Publisher** |
| ---- | … | … |

# Subject Name: Modern Electric and Hybrid Vehicles

| | |
|---|---|
| Course Code : **(BVASC104)** | Semester: **I** |
| Weekly Teaching Hours: TH: **03** Tut: **00** | Scheme of Marking TH: **25,** IA: **25,** Total: **50** |
| TH Exam Duration: **01 Hours** | Scheme of Marking PR: **--** |
| Credit:**3** | |

| Content | | Hours |
|---|---|---|
| **Unit – I** | **Introduction** | 07 |
| | Introduction to electric and hybrid electric vehicles, History of hybrid and electric vehicles, Social and environmental importance of electric and hybrid electric vehicles, Electrical basics, Motor and generator basics. | |
| **Unit – II** | **Electric and Hybrid Electric Drive Trains** | 07 |
| | Basic concept of electric and hybrid traction, Introduction to various electric and hybrid electric drive train topologies, Advantages and disadvantages. | |
| **Unit – III** | **Power Flow** | 07 |
| | Power flow control in electric and hybrid electric drive train topologies. | |
| **Unit – IV** | **Electric Drive Components** | 07 |
| | Introduction to electric drive components used in electric and hybrid vehicles, Electric motor requirements, Direct Current (DC) motors (Brushed and Brushless), Power converters, Drive controllers. | |
| **Unit – V** | **Regenerative Braking System (RBS)** | 08 |
| | Introduction and need of Regenerative Braking System, Advantages and disadvantages of RBS, Working of RBS, Concept of Regenerative Braking using Piezoelectric material, Using shock absorbers as vibration energy harvesters. | |

**Books**

| Name of Authors | Title of the Book | Publisher |
|---|---|---|
| A.K. Babu, | Electric & Hybrid Vehicles | Khanna Publishing House |
| Jack Erjavec& Jeff Arias | Automotive Fuel Technology-Electric, Hybrid and Fuel-Cell Vehicles | --- |
| Iqbal Husain | Electric and Hybrid Vehicles: Design Fundamentals | --- |
| Mehrdadehsani, Yimingao, Ali Emadi. | Modern Electric, Hybrid Electric, and Fuel Cell Vehicles: Fundamentals, Theory and Design: | --- |

| **Subject Name: Metrology and Measuring Instruments lab** | |
|---|---|
| Course Code : **BVASL105** | Semester: **I** |
| Weekly Practicals: PR: **01** Tut: **00** | Scheme of Marking TH: **--** |
| TH Exam Duration: **--** | Scheme of Marking PR: **25,** IA: **25,** Total: **50** |
| Credit:**1.5** | |
| **Contents** | |

1. Measurement of angle with the help of sine bar/ Vernier Bevel protractor.
2. Study and sketch of various types of optical projectors.
3. Study and sketch of various types of comparators and use them for comparing length of given piece.
4. To measure the diameter of a hole with the help of precision balls.
5. To measure the diameter of a hole with the help of precision balls.
6. To measure external and internal taper with the help of taper gauges, precision rollers.
7. To test the squareness of a component with auto-collimeter.
8. To measure the pitch, angle and form of thread of a screw.
9. To measure the geometry of a gear having involute profile.
10. To measure the straightness of the edge of a component with the help of autocollimeter.
11. To measure the length, breadth, thickness, depth, height with micrometer.
12. to measure the length, breadth, thickness, depth, height, with height gauge and Vernier calipers.
13. Calibration of Vernier calipers/micrometers.
14. Calibration of height gauge/depth gauge.
15. Study of a tool maker's microscope.
16. Checking of accuracy of snap gauge with slop gauge.
17. Checking of accuracy of a plug gauge with micrometer.
18. Measurement of areas by polar planimeter.
19. Use of feeler, wire, radius and fillet gauges measurement of standard parameters.

| **Subject Name: Electric and Hybrid Vehicles Lab** | |
|---|---|
| Course Code : **BVASL106** | Semester: **I** |
| Weekly Practical's: PR: **01** Tut: **00** | Scheme of Marking TH: **--** |
| TH Exam Duration: **--** | Scheme of Marking PR: **25,** IA: **25,** Total: **50** |
| Credit:**1.5** | |
| **Contents** | |

1. Understand working of different configurations of electric vehicles
2. Understand hybrid vehicle configuration and its components, performance analysis
3. Understand the properties of batteries and its types
4. Understand of electric vehicle drive systems.
5. Understand of hybrid electric vehicles.
6. Understand Auxiliary systems including charging, starter motor, on board power supply, lighting and environmental sensing and conducting repairs. Repair & Replacement of Electric/ Hybrid Vehicle body
7. Repair & Replacement of Electric Vehicle Drive Train
8. Fault diagnosis & repair / replacement of Battery, DC & AC Electrical Machines, and Hybrid Electric Vehicles

# Group GAS1 of Qualifier Packs

| **Subject Name: Automotive Service Technician Level 5 (ASC/Q 1403)** | |
|---|---|
| Course Code : **BVASE107** | Semester: **I** |
| Weekly Skilling Hours: PR: **24** Tut: **00** | Scheme of Marking TH: **00,** IA: **00,** Total: **00** |
| PR Exam Duration: **06 Hours** | Scheme of Marking PR: **150,** IA: **50,** Total: **200** |
| Credit:**15** | **Choose any one from specified Group GAS1 of Qualification Packs** |
| **Syllabus for this qualifier Pack is available on** https://www.nqr.gov.in/qualification-title?nid=1026 | |

| **Subject Name: Spare Parts Operations Executive Level 5 (ASC/Q 1502)** | |
|---|---|
| Course Code : **BVASE108** | Semester: **I** |
| Weekly Skilling Hours: PR: **24** Tut: **00** | Scheme of Marking TH: **00,** IA: **00,** Total: **00** |
| PR Exam Duration: **06 Hours** | Scheme of Marking PR: **150,** IA: **50,** Total: **200** |
| Credit:**15** | **Choose any one from specified Group GAS1 of Qualification Packs** |
| **Syllabus for this qualifier Pack is available on** https://www.nqr.gov.in/qualification-title?nid=1246 | |

| **Subject Name: Industrial Engineer (Layout Design) (ASC/Q6401)** | |
|---|---|
| Course Code : **BVASE109** | Semester: **I** |
| Weekly Skilling Hours: PR: **24** Tut: **00** | Scheme of Marking TH: **00,** IA: **00,** Total: **00** |
| PR Exam Duration: **06 Hours** | Scheme of Marking PR: 15**0,** IA: **50,** Total: **200** |
| Credit:**15** | **Choose any one from specified Group GAS1 of Qualification Packs** |
| **Syllabus for this qualifier Pack is available on** https://www.nqr.gov.in/sites/default/files/MASTER%20OCC UPATIONAL%20MAP%20-%209_0.pdf | |

| **Subject Name: Tool Designer (ASC/Q4001)** | |
|---|---|
| Course Code : **BVASE110** | Semester: **I** |
| Weekly Skilling Hours: PR: **24** Tut: **00** | Scheme of Marking TH: **00,** IA: **00,** Total: **00** |
| PR Exam Duration: **06 Hours** | Scheme of Marking PR: **150,** IA: **50,** Total: **200** |
| Credit:**15** | **Choose any one from specified Group GAS1 of Qualification Packs** |
| **Syllabus for this qualifier Pack is available on** https://www.nqr.gov.in/sites/default/files/QP-Tool%20designer.pdf | |

| Subject Name: Equipment DesignerL5 (ASC/Q 6405) | |
|---|---|
| Course Code : **BVASE111** | Semester: **I** |
| Weekly Skilling Hours: PR: **24** Tut: **00** | Scheme of Marking TH: **00,** IA: **00,** Total: **00** |
| PR Exam Duration: **06 Hours** | Scheme of Marking PR: 15**0,** IA: **50,** Total: **200** |
| Credit:**15** | **Choose any one from specified Group GAS1 of Qualification Packs** |
| **Syllabus for this qualifier Pack is available on** https://www.nqr.gov.in/sites/default/files/QP Equipment%20Designer.pdf | |

***Skill Practical assessment will be done rules/ procedure of respective Skill Sector Council of India.**

# Semester
# II
# Syllabus

# Syllabus
# Name of the Course: B. Voc (Automobile Servicing)
# Semester II

| **Subject Name: Industrial Management** | |
|---|---|
| Course Code : **BVASC201** | Semester: **II** |
| Weekly Teaching Hours: TH: **03** Tut: **00** | Scheme of Marking TH: **25,** IA: **25,** Total: **50** |
| TH Exam Duration: **01 Hours** | Scheme of Marking PR: **--** |
| Credit:**3** | |

| **Content** | | **Hours** |
|---|---|---|
| **Unit – I** | **Introduction** | 07 |
| | Growth of industry, The management of men, materials and machines, the art of management, Sources of capital- industrial individual enterprise, private partnership and private Ltd. Co., Joint Stock Co. shares, debentures, financial agencies and their role in promoting industries. Break even analysis. | |
| **Unit – II** | **Private sector and public sector** | 07 |
| | Public sector enterprise, merits and demerits of public sector industry and private sector industry, Line, staff and functional organizations, reasons for the choice of various types of organization, functions of different departments, viz. stores, purchase and sales departments relationship between individual departments. | |
| **Unit – III** | **Wages & incentives** | 07 |
| | Definition of wages, real wage and nominal wage, systems of wage payment, incentives, financial and non - financial incentives, Essentials of a good wage plan, essentials of a good incentive scheme. Introduction to elements of cost & indirect expenses, Material cost, labour cost, fixed and variable overheads, components of cost, selling price, Factory expenses, administrative expenses, selling & distribution expenses, depreciation, obsolescence, interest on capital, Idleness, Repair and maintenance. | |
| **Unit – IV** | **Labour, industrial & tax laws** | 08 |
| | Evolution of industrial law, factory act, workmen compensation act, payment of wages act, employee's state insurance act, Industrial dispute act. Role of technician in industry: Position of technician in various engineering departments, Role of a supervisor in industry, Foremanship, duties and qualities of a good foreman. | |
| **Unit – V** | **Material management** | 07 |
| | Introduction, Scope of Material Management selective control techniques-ABC analysis, Material handling, inventory control, Essential steps in inventory control, quality standards. | |

**Books**

| **Name of Authors** | **Title of the Book** | **Publisher** |
|---|---|---|
| S.C. Sharma | Industrial Management | Khanna Publishing House |

# Subject Name: Total Quality Management

| | |
|---|---|
| Course Code : **BVASC202** | Semester: **II** |
| Weekly Teaching Hours: TH: **03** Tut: **00** | Scheme of Marking TH: **25,** IA: **25,** Total: **50** |
| TH Exam Duration: **01 Hours** | Scheme of Marking PR: **--** |
| Credit:**3** | |

| Content | | Hours |
|---|---|---|
| **Unit – I** | **Introduction, Basic concepts of total quality management** | 08 |
| | Introduction to Quality, Dimensions of Quality, Quality Planning, Concept and definition of quality cost, Determinants of Quality, Optimum cost of performance, Principles of TQM, Pillars of TQM, Introduction to leadership and Leadership roles, Quality council and Quality statement, Strategic Planning Process, Deming philosophy. | |
| **Unit – II** | **Continuous process improvement** | 07 |
| | Input /output process Model, Juran trilogy, PDCA Cycle, 5 –'S' Housekeeping principle, Kaizen Seven tools of Quality (Q-7 tools), Check Sheet, Histogram, Cause and effect diagram, Pereto diagram, Stratification analysis, Scatter diagram, Control charts, Control chart for variables & process capability, Control chart for attributes. | |
| **Unit – III** | **Management planning tools & Bench marking** | 07 |
| | Affinity diagram, Relationship diagram, Tree diagram, Matrix diagram, Matrix data analysis, Arrow Diagram, Process decision programme chart (PDPC), Concept of bench marking, Reason to bench marking, Bench marking process, Types of bench marking, Benefits of bench marking. | |
| **Unit – IV** | **Just in time (JIT)** | 07 |
| | JIT philosophy, Three elements of JIT, Principles of JIT Manufacturing, JIT Manufacturing building blocks, JIT benefits, Kanban & 2 Bin Systems. | |
| **Unit – V** | **Total productive maintenance (TPM)** | 07 |
| | Concept of Total Productive Maintenance, Types of maintenance, OEE (Overall Equipment Efficiency), Stages in TPM implementation, Pillars of TPM, Difficulties faced in TPM implementation. | |

**Books**

| Name of Authors | Title of the Book | Publisher |
|---|---|---|
| S.C. Sharma, M.P. Poonia | Total Quality Management | Khanna Publishing House. |

# Subject Name: Entrepreneurship

| | |
|---|---|
| Course Code : **BVASC203** | Semester: **II** |
| Weekly Teaching Hours: TH: **03** Tut: **00** | Scheme of Marking TH: **25,** IA: **25,** Total: **50** |
| TH Exam Duration: **01 Hours** | Scheme of Marking PR: **--** |
| Credit:**3** | |

| | Content | Hours |
|---|---|---|
| **Unit – I** | **Entrepreneurship and entrepreneur** | 08 |
| | Need of Employment and Opportunities, Essential Characteristics of a good Entrepreneur, Industrial Policy, Classification of industries- Micro, small scale, Medium scale, large scale, Type of industries- Production, Job based & Service. | |
| **Unit – II** | **Entrepreneurial Development** | 07 |
| | Product identification/ selection, Site selection, Plant layout, Institutional support needed, Pre-market survey. | |
| **Unit – III** | **Entrepreneurship Support System and Start-ups** | 07 |
| | Introduction to start-up's, Role of District Industries Centre in setting up industry, Function of NSIC, SISI, NISIET, NRDC, SSIC, SIDO, NMTC, KVIC, RSMML, Role of state finance corporation, state electricity corporations, pollution control board, BIS, I.S.O. etc. | |
| **Unit – IV** | **Introduction to Tax System, Insurance and Acts** | 07 |
| | Idea of income tax, sales tax, excise duty and custom duty, Industrial and fire insurance, procedure for industrial insurance, Introduction to Industrial acts, factory act, Workmen's compensation act 1923, Apprentices act 1961, Environmental protection act 1986. | |
| **Unit – V** | **Project Report Preparation** | 07 |
| | Procedure of preparing a project report, Format of project report, Preparation of project report, Introduction to ISO: 9000 Series of Quality System. | |

# Subject Name: Garage Organization & Transport Management

| | |
|---|---|
| Course Code : **BVASC204** | Semester: **II** |
| Weekly Teaching Hours: TH: **03** Tut: **00** | Scheme of Marking TH: **25,** IA: **25,** Total: **50** |
| TH Exam Duration: **01 Hours** | Scheme of Marking PR: **--** |
| Credit:**3** | |

| Content | | Hours |
|---|---|---|
| **Unit – I** | **Layout Of Garage And Tools & Equipment Required** | 07 |
| | Location of modern automobile garage. Layout of a fully equipped modern garage. Major equipment used in repair, testing, and reconditioning of automobiles. Service Station equipment (compressor, washer, hydraulic ramp and other lifting devices etc.) Denting and painting tools and equipment. Layout of fuel filling station-cum-service station. Workshop safety. | |
| **Unit – II** | **Garage Procedure** | 08 |
| | A typical garage organization chart. Duties of garage foreman. Vehicle selling-dealership, showroom, Terms of Warranty, after-sales service, advertising, and salesmanship. Diagnosing and estimating repairs. Booking of repairs. Job card, time card. Inspection and testing of repaired vehicles. Billing of repairs. Customer record. Purchase and sale of used vehicles. Insurance and accidental jobs. Safety in garages. Customer satisfaction. Time management. | |
| **Unit – III** | **Store Organization** | 07 |
| | Stores and store-keeping procedure. Day book, ledger, stock register. Indenting and issue of spares and materials. Inventory control. Stocking of material - shelves, racks, bins; fuels and inflammable materials. Handling of liquids and acids. Duties and responsibilities of storekeeper and purchase officer. Tools-Storing and issuing. | |
| **Unit – IV** | **Fleet Management** | 07 |
| | Types of vehicles in a fleet - goods vehicles, tankers and carriers, delivery vans, fire fighting vehicles, break-down service vehicles, buses and luxury vehicles. Layout of a fleet maintenance depot, Duties of driver, conductor and mechanic, scheduling the maintenance of a fleet. Estimating the operating cost of transport vehicles. | |
| **Unit – V** | **Motor Vehicle Act** | 07 |
| | Definition of vehicles, testing and certifying procedures, Registration of vehicles, Permits for passenger and goods vehicles, Licensing, Transfer of ownership. Essentials of driving and traffic regulations; signals and traffic signs. | |

**Books**

| Name of Authors | Title of the Book | Publisher |
|---|---|---|
| **AW Clair** | Fleet Maintenance & Management: | --- |

| **Subject Name: Project** | |
|---|---|
| Course Code : **BVASL205** | Semester: **II** |
| Weekly Practicals: PR: **01** Tut: **00** | Scheme of Marking TH: -- |
| TH Exam Duration: -- | Scheme of Marking PR: **50,** IA: **50,** Total: **100** |
| Credit:**3** | |

1. On the basis of learning in the vocational diploma, a project to be taken up by the student strengthening his/ her vocational skills

# Group GAS2 of Qualifier Packs

| **Subject Name: Automotive Service Technician Level 5 (ASC/Q 1403)** | |
|---|---|
| Course Code : **BVASE206** | Semester: **II** |
| Weekly Skilling Hours: PR: **24** Tut: **00** | Scheme of Marking TH: **00,** IA: **00,** Total: **00** |
| PR Exam Duration: **06 Hours** | Scheme of Marking PR: **150,** IA: **50,** Total: **200** |
| Credit:**15** | **Choose any one from specified Group GAS1 of Qualification Packs** |
| **Syllabus for this qualifier Pack is available on** https://www.nqr.gov.in/qualification-title?nid=1026 | |

| **Subject Name: Spare Parts Operations Executive Level 5 (ASC/Q 1502)** | |
|---|---|
| Course Code : **BVASE207** | Semester: **II** |
| Weekly Skilling Hours: PR: **24** Tut: **00** | Scheme of Marking TH: **00,** IA: **00,** Total: **00** |
| PR Exam Duration: **06 Hours** | Scheme of Marking PR: 15**0,** IA: **50,** Total: **200** |
| Credit:**15** | **Choose any one from specified Group GAS1 of Qualification Packs** |
| **Syllabus for this qualifier Pack is available on** https://www.nqr.gov.in/qualification-title?nid=1246 | |

| **Subject Name: Industrial Engineer (Layout Design) (ASC/Q6401)** | |
|---|---|
| Course Code : **BVASE208** | Semester: **II** |
| Weekly Skilling Hours: PR: **24** Tut: **00** | Scheme of Marking TH: **00,** IA: **00,** Total: **00** |
| PR Exam Duration: **06 Hours** | Scheme of Marking PR: **150,** IA: **50,** Total: **200** |
| Credit:**15** | **Choose any one from specified Group GAS1 of Qualification Packs** |
| **Syllabus for this qualifier Pack is available on** https://www.nqr.gov.in/sites/default/files/MASTER%20OCCUPATIONAL%20MAP%20-%209_0.pdf | |

| **Subject Name: Tool Designer (ASC/Q4001)** | |
|---|---|
| Course Code : **BVASE209** | Semester: **II** |
| Weekly Skilling Hours: PR: **24** Tut: **00** | Scheme of Marking TH: **00,** IA: **00,** Total: **00** |
| PR Exam Duration: **06 Hours** | Scheme of Marking PR: **150,** IA: **50,** Total: **200** |
| Credit:**15** | **Choose any one from specified Group GAS1 of Qualification Packs** |
| **Syllabus for this qualifier Pack is available on** https://www.nqr.gov.in/sites/default/files/QP-Tool%20designer.pdf | |

| Subject Name: Equipment Designer L5 (ASC/Q 6405) | |
|---|---|
| Course Code : **BVASE210** | Semester: **II** |
| Weekly Skilling Hours: PR: **24** Tut: **00** | Scheme of Marking TH: **00,** IA: **00,** Total: **00** |
| PR Exam Duration: **06 Hours** | Scheme of Marking PR: **150,** IA: **50,** Total: **200** |
| Credit:**15** | **Choose any one from specified Group GAS1 of Qualification Packs** |
| **Syllabus for this qualifier Pack is available on** https://www.nqr.gov.in/sites/default/files/QP-Equipment%20Designer.pdf | |

***Skill Practical assessment will be done rules/ procedure of respective Skill Sector Council of India**