



J.C. Bose University of Science & Technology YMCA, Faridabad

(A Haryana State Government University)

(Established by Haryana State Legislative Act No. 21 of 2009 & Recognized by UGC Act 1956 u/s 22 to Confer Degrees)

Accredited 'A' Grade by NAAC

COMMUNITY COLLEGE OF SKILL DEVELOPMENT

Sub: Minutes of 7th Meeting of Board of Studies (BOS) Community College of Skill Development held on 18/05/2020 at 1.00 PM on the Zoom Application.

Present:

- | | |
|--|---------------|
| 1. Dr. Sanjeev Goyal, Principal CCSD
& Nodal Officer, B.Voc | : Chairperson |
| 2. Dr. Rashmi Popli, Nodal officer, Community College | : Member |
| 3. Dr. Anju Gupta, Associate Professor, JCBUST, Faridabad | : Member |
| 4. Dr. Sandhya Dixit, Associate Professor,
JCBUST, YMCA, Faridabad | : Member |
| 5. Sh. Parbhakar Yadav, Op. Manager, M/s Durga Threading
Tools, Faridabad | : Member |

The following members could not attend the meeting: -

1. Mr. Pankaj Munjal
2. Representative of SSCs

At the outset, Dr. Sanjeev Goyal, Principal CCSD and Chairman-Board of Studies warmly welcomed all the members of the Board of Studies of Community College of Skill Development. The Chairman also appreciated the interest and the presence of outside members, who took pain to attend this meeting out of their busy schedule, for the healthy discussion on the academic development of the Community College.

Thereafter, the Agenda Items taken up and after detailed deliberation/discussion, the following decisions were taken.

Item No. BOS/07/01: To consider and confirm the Minutes of its previous meeting held on 24/10/2019.

The Board considered and confirmed the Minutes of its 6th meeting held on 24/10/2019.

Item No. BOS/07/02: To note the Action Taken Report (ATR) on the Minutes of BOS meeting held on 24/10/2019.

The Chairman informed the Board regarding the action taken on the minutes of BOS meeting held on 24/10/2019, where necessary. The Board noted the Action Taken Report, as placed before it.

Item No. BOS/07/03: To note the matter of starting of new course B.Voc in Banking financial and Insurance Services (BFSI) and also consider & approve the Scheme & syllabi with elective courses of B.Voc in Banking financial and Insurance Services (BFSI). (Annexure – A)

The Board noted the matter regarding the starting of the course B.Voc in Banking financial and Insurance Services (BFSI) from the session 2020-21 and after detailed deliberations/discussions approved the scheme & syllabi to be followed in B.Voc courses in Banking financial and Insurance Services (BFSI).

Item No. BOS/07/04: To consider and approve the scheme & syllabus of B.Voc courses in Automobile, Manufacturing, Electrical and Web Development. (Annexure – B)

It was brought to the notice of the Board that earlier the scheme & syllabi upto 2nd year of above courses were approved by the Board. It was informed by the Chairman (BOS) that as per requirement, some modifications have been made in the scheme and syllabi of these courses and elective subjects have been also introduced in the syllabus. However, the modified scheme & syllabi of B.Voc courses in Automobile, Electrical, Manufacturing, Web Development are placed before the Board for consideration and approval.

The board after detailed deliberations/discussions approved the scheme & syllabi to be followed in B.Voc courses in Automobile, Electrical, Manufacturing and Web Development.

Item No. BOS/07/04: To consider and approve the scheme & syllabus of PG Diploma Courses (Data Science & Analytics and Yoga Science & Naturopathy). (Annexure – C)

The board after detailed deliberations/discussions approved the scheme & syllabi to be followed in PG Diploma Courses (Data Science & Analytics and Yoga Science & Naturopathy).

Item No. BOS/07/05: To consider and approve the Fee structure-2020 of Community College of Skill Development.

The Board considered and approved the Fee Structure of Community College of Students.

Item No. BOS/07/06 : To consider and approve the proposal regarding following the University Examination Ordinances.

It was brought to the notice of the Board that conduct of examination in respect of CCSD students has been assigned to the Controller of Examination Office of the University. The Board considered and approved to follow the University Examination Ordinance for all courses.

Item No. BOS/07/07 : To consider and approve syllabus of Entrance Test for admission in B.Voc Courses.

The Board was informed that from the session 2020-21, the CCSD is going to organize an Entrance Test for all B.Voc Courses. The board considered and approved the syllabus of Entrance Test.

Item No. BOS/07/08: To consider and approve the list of teachers for taking classes and conducting internal examinations of CCSD students.

The Board after going through the agenda note approved the list of teachers for taking classes and conducting Internal Examinations of CCSD students with the suggestion that area of specialization of teachers should be mentioned in the list.

Item No. BOS/07/9: To consider and approve the Information Brochure of CCSD for Academic Session 2020-2021.

The Board after going through the Information Brochure-2020 of CCSD considered and approved the Information Brochure 2020.

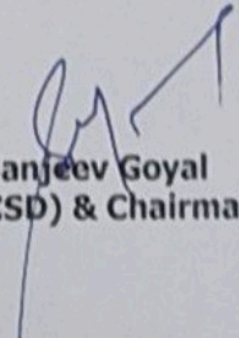
Item No. BOS/07/10: To consider and approve the Online Application Fee of B.Voc and Diploma Courses.

The Board considered and approved the Online Application Fee of B.Voc and Diploma Courses.

Item No. BOS/07/11: To consider and approve the minimum stipend Criteria for On Job Training (OJT) in Industries.

The Board considered and approved that the minimum stipend payable to the students for On Job Training (OJT) in Industries is Rs. 5000/- per month.

Meeting ended with a vote of thanks to the Chair.


Dr. Sanjeev Goyal
Principal (CCSD) & Chairman-BOS

SCHEME OF EXAMINATION
and
SYLLABUS
for
Bachelors in Vocation (B.Voc)
in
AUTOMOBILE
Offered by
Community college of skill development



J C Bose University of Science & Technology YMCA
Sector-6, Mathura Road, Faridabad, Haryana, India

2020-21

ABOUT THE PROGRAM

The B.Voc. Degree in Automotive Technology runs with a mission to impart knowledge, technical skills & hands-on training in automobiles, focusing on four wheelers & three wheelers, both petrol & diesel, and two wheelers. This program is an outcome of industry and student demand. Only Degree program in Automotive Technology with more than 80% Practical to make you more employable and outshine your career. This program is designed to introduce the students to the operation of today's complex vehicles by giving them a comprehensive understanding from basic to advance, of various automotive systems like transmission, brakes, steering, suspension, electrical & electronics, and engine performance, etc. Students under this program will acquire the necessary skills to diagnose and repair mechanical and computer controlled electronic systems on the latest models of automobiles. Vocational training programs have been created with the aim of imparting industry-specific skills in students. These programs are crafted in such a way that the students acquire skills, which will lead them to employment in the respective sector.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO-1: To train students with practical skills and experimental practices related to core and applied areas of Automobile Engineering to expand their knowledge horizon beyond books and make them industry ready.

PEO-2: To enable students to service, design and maintain automotive equipments which are useful for the industries.

PEO-3: To improve team building, team working and leadership skills of the students with high regard for ethical values and social responsibilities.

PEO- 4: To enable students to communicate effectively and efficiently.

PROGRAMME OUTCOMES (POs)

After completion of the program, the student will:

- 1) Be trained to NSQF level 7 in at least one job/profile in the field of automotive skills.
- 2) Be trained for multiple skill sets under the domain of automotive skills like Body repair, refinish painting technology, wheel care, engine emission system, automotive electrical circuit designing, vehicle dynamics etc.
- 3) Be able to supervise the various automotive workshop floors for mechanical shop, wheel care, body & paint repair.
- 4) Be trained & equipped with knowledge and understanding to start his/her own enterprise in automotive sales and services.
- 5) able to develop skills in management of customer issues, analysis and evaluation mechanical, electrical and electronics faults.
- 6) Plan and set his/her enterprise/agency for repair and overhaul of engines and power trains, repair of suspension and steering system, wheel maintenance or spare parts business of any automotive OEM.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

- 1) To apply practical skills, vocational training and knowledge of automobile servicing fundamentals to industries.
- 2) The student will be ready and skilled to take-up career or to pursue higher studies with high regard to ethical values and social responsibilities.

SYLLABUS & SCHEME OF EXAMINATION

Year	FIRST SEMESTER			SECOND SEMESTER		
I	Course	Code	Credit	Course	Code	Credit
	Communication Skills	BSC-101	3	Employability Skills	BSC-206	3
	Engineering Calculations	BSC-102	3	Applied Science	PCC-AM-205	3
	Engineering Science	PCC-AM-106	3	Quality, inspection and Safety	PCC-AM-202	3
	Motor Vehicle Techonolgy-1	PCC-A-101	3	Elements of Automobile Engg	PCC-AM-203	3
	Automobile Workshop-1	PCC-AM-103	18	Automobile Workshop-2	PCC-AM-204	18
	Total		30	Total		30
Cumulative Credits = 60 DIPLOMA						
NSQF LEVEL - 5 JOB ROLE - AUTOMOTIVE SERVICE TECHNICIAN (ASC/Q1403)						
Year	THIRD SEMESTER			FOURTH SEMESTER		
II	Motor Vehicle Technology-2	PCC-AM-303	3	On Job Training (OJT)/ Internship evaluation including report and presentation	PCC-AM-401	30
	Automobile Electrical Equipment	PCC-AM-304	3			
	IT Tools	PCC-AM-306	3			
	Soft Skills	BSC-301	3			
	Automobile Workshop-3	PCC-AM-305	18			
	Total		30	Total		30
Cumulative Credits = 120 ADVANCED DIPLOMA						
NSQF LEVEL- 6 JOB ROLE - AUTOMOTIVE SERVICE TECHNICIAN (ASC/Q1404)						
Year	FIFTH SEMESTER			SIXTH SEMESTER		
III	On Job Training (OJT)/ Internship evaluation including report and presentation	PCC-AM-501	30	Entrepreneurship	BSC-601	3
				Vehicle Performance and Testing	PCC-A-605	3
				Industrial Management	PCC-A-603	3
				Project	BSC-602	3
				Automobile Workshop-4	PCC-AM-606	15
				Electives (choose any one)		
				Alternative Fuels & Emission Control*	PCC-A-604	3
				Vehicle Body Engineering*	PCC-A-608	
				Autotronics*	PCC-A-607	
				Total		30
Cumulative Credits = 180 B.VOC						
NSQF LEVEL - 7 JOB ROLE - SERVICE SUPERVISOR (ASC/Q1412)						

FIRST SEMESTER

MOTOR VEHICLE TECHNOLOGY – I

Semester 1st
Stream– Automobile
L T P Total Credits
3 0 0 3

Sessional – 25 Marks
Theory – 75 Marks
Total: 100 Marks
Duration of Exam: 3 Hours

Course Objectives:

1. To introduce about automobile basics.
2. To understand about suspension and steering system.
3. To study about automobile wheels and tyres.

UNIT-I

Introduction: Classification of automobiles- according to number of wheels, propulsion systems, transmission drives, type of fuels, application & capacity, study of main specifications. Components of an automobile- functions & layout of frame, frameless construction, axles, introduction of steering system, suspension system, braking system, power train & drives, clutch, gear box, final drive, propeller shaft, u-joints, vehicle body, wheels, tyres & tubes.

UNIT-II

I C Engine: Classification of heat engine, constructional & working details of two strokes & four stroke petrol & diesel engines, different parts of internal combustion engine, applications and types, power and efficiency.

UNIT-III

Suspension System: Need of suspension, principle and function of suspension system, sprung and un-sprung mass, types of suspension systems, constructional details, suspension springs, characteristics of leaf spring, coil spring, rubber spring, air spring and torsion bar, Introduction to independent suspension, front & rear suspension systems of the vehicle, anti-roll bar, shock absorbers.

UNIT-III

Steering System: Steering system- requirements, front axle details & steering geometry, castor, camber, toe in, toe out steering axis inclination, steering linkages, and different types of steering gear boxes, their constructional & working details. Concept and working of power steering.

UNIT-IV

Wheels and Tyres: Road-wheels - Rim types and sizes, Tyres-conventional, radial, Tubeless tyre its advantages, Tyre sizes, wheels-front and rear, Tyre retreading, Tyre wear, wheel balancing, Tyre pressure, Advantages of filling nitrogen in tyres.

Course Outcomes:

1. To learn various components of automobile.
2. To improve understanding about power unit of automobile.
3. To acquire knowledge about steering and suspension system.
4. To be able to check wheel unbalances.

Reference Books:

1. Automobile Engineering, R.K. Rajput, Laxmi Publications.
2. Automobile Mechanics, A.K. Babu, S.C. Sharma, T.R. Banga, Khanna Publishing House
3. Automobile Engineering by Dr. Kripal Singh

ENGINEERING SCIENCE

Semester 1st
Stream– Automobile
L T P Total Credits
3 0 0 3

Sessional – 25 Marks
Theory – 75 Marks
Total: 100 Marks
Duration of Exam: 3 Hours

Course Objectives:

1. To learn about measurement devices.
2. To understand law of motion and friction.
3. To study about thermodynamics.
4. To learn about fuel and its classifications.

UNIT I: Units and Measurements

Need for measurement: Units of measurement; systems of units; SI units, fundamental and derived units. Length, mass and time measurements; accuracy and precision of measuring instruments; errors in measurement; significant figures. Dimensions of physical quantities, dimensional analysis and its applications.

UNIT II: Laws of Motion

Intuitive concept of force, Inertia, Newton's first law of motion; momentum and Newton's second law of motion; impulse; Newton's third law of motion.

Law of conservation of linear momentum and its applications.

Equilibrium of concurrent forces, Static and kinetic friction, laws of friction, rolling friction, lubrication. Dynamics of uniform circular motion: Centripetal force, examples of circular motion.

UNIT III: Thermodynamics

Heat, temperature, thermal expansion; thermal expansion of solids, liquids and gases, anomalous expansion of water; specific heat capacity; Cp, Cv - calorimetry; change of state - latent heat

capacity. Thermal equilibrium and definition of temperature (zeroth law of thermodynamics), heat, work and internal energy. First law of thermodynamics, isothermal and adiabatic processes. Second law of thermodynamics: reversible and irreversible processes, Heat engine and refrigerator.

UNIT IV: Fuel and their Classification

Definition, characteristics, classification into solid, liquid and gaseous fuel, Petroleum and brief idea of refining into various fractions and their characteristics and uses, Calorific value of fuel, Gaseous fuels- preparation, properties, composition and use of producer gas, water and oil gas.

UNIT V: Pollution & its Control

Air Pollution: Types of pollutants, source effects, sink and control of primary pollutants – CO, NO_x, HC, SO_x and particulates, effects of pollutants on man and environment – photochemical smog and acid rain. Water Pollution: Classification of pollutants, their sources, waste water treatment – domestic and industrial. Soil Pollution: Composition of soil, classification and effects of soil pollutants and their control. Hazardous Wastes: Classification – radioactive, biomedical and chemical, treatment and disposal – physical, chemical and biological processes.

Course Outcomes:

1. To learn about unit and dimensions.
2. To improve understanding about motion and its laws.
3. To acquire knowledge about thermodynamics.
4. To be able to understand about pollution and its control.

Reference Books:

1. Thermodynamics by P K Nag
2. Environmental pollution and control engineering: C. S. Rao
3. Hand book of industrial metrology – John W. Greve, Frank W. Wilson, PHI – New Delhi
4. Engineering Metrology – K.J. Hume, Macdonald and Co.(publisher) London

COMMUNICATION SKILLS

Semester -1st
Stream–Automobile
L T P Total Credits
3 0 0 3

Sessional – 25 Marks
Theory – 75 Marks
Total: 100 Marks
Duration of Exam: 3 Hours

Course Objectives:

1. To discuss types of communication and their forms
2. To improve comprehension
3. To improve spoken English and ability to articulate ideas
4. To improve formal writing skills

Unit 1: Introduction to Communication: Meaning, Importance and Function of Communication, Types of communication, language of communication; advantages and disadvantages; Barriers to Communication; Organizational Communication

Unit 2: Grammar: Parts of speech, Articles, Tenses, Formation of Sentences, Active and Passive Voice, Direct and Indirect speech

Unit 3: Writing and Comprehension: Comprehension, Composition, Translation, Paraphrasing, Letter writing

Unit 4: 7 Cs of Communication; Grice's Cooperative Principle; Group Discussions; Public Speaking; Facing Interviews

Course Outcome:

1. To learn about communication process and ways to make communication effective by giving attention to all elements involved.
2. To improve grammar and gain confidence by enhancing their abilities to articulate their ideas.
3. To acquire better writing skills in formal communication.
4. To be able to revise documents for fruitful reading and comprehension.

Reference books:

1. Wren and Martin. *High School English Grammar and Composition*. New Delhi: RRP, 2007
2. Murphy, Raymond. *Essential English Grammar*. New Delhi: Cambridge, 2017

ENGINEERING CALCULATIONS

Semester - 1st
Stream–Automobile
L T P Total Credits
3 0 0 3

Sessional – 25 Marks
Theory – 75 Marks
Total: 100 Marks
Duration of Exam: 3 Hours

Course Objectives

1. To familiarize the prospective engineers with Basics of mathematics
2. To understand fundamental arithmetical operations.
3. To learn Unit systems, Fractions and Decimals, roots, percentage.
4. To have Knowledge of differential quantities

Course Contents

Unit-I: Basic Aptitude- Fundamental Arithmetical Operation- Addition, Subtraction, Multiplication and Division. Applied Workshop Problems Involving Addition, Subtraction, Multiplication and Division, System Of Units – Definition, Different Types & System Of Units i.e.(C.G.S. & SI Units for Length, Mass, Area, Volume, Capacity, Time) HCF, LCM, Square Root Cube Root.

Unit-II: Trigonometry – Introduction, Trigonometric Identities, Quadrant Rule, Trigonometric Ratios of Some Specific Angles, Ratios of Complementary Angles.

Unit-III: Differentiation- Introduction to Derivatives, Product Rule, Quotient Rule, Chain Rule, Derivatives of Algebraic Function, Derivative of Trigonometric Functions.

Unit –IV: Integration: Concepts of integration, integration of trigonometric, exponential and logarithmic functions, integration by parts.

Unit-V: Algebra- Algebraic Expressions and Identities, Terms Coefficients and Factors, Monomials Binomials and Polynomials, Multiplication and Division of Algebraic Expressions, Standard Identities and Their Applications.

Course Outcomes:

1. To Apply the Arithmetical Operations And Conversion Of Units.
2. To Convert in Fraction And Decimals, Percentage.
3. To Solve HCF, LCM , Square Roots And Cube Roots.
4. To Deal With Differential Problems.
5. To Learn About Trigonometric Ratios.

Reference Books:

1. Mathematics Book by R.D Sharma
2. Advanced Engineering Mathematics By Jain Rk.
3. A Basic Course in Mathematics By Nabjyoti Dutta.
4. Skills in Mathematics By Amit M Aggarwal.
5. Applied Mathematics for Polytechnics By H.K. Dass.

AUTOMOBILE WORKSHOP-1

Job Role- Automotive Service Technician Level 4 (ASC/Q 1402)

Semester 1st

Sessional – 25 Marks

Stream– Manufacturing
L T P Total Credits
18 0 0 18

Theory – 75 Marks
Total: 100 Marks
Duration of Exam: 3 Hours

Course Objectives:

1. To introduce about automobile basics.
2. To understand repairing of suspension and steering system.
3. To study the repairing of automobile wheels and tyres.
4. To perform the vehicle overhauling.

A. To understand the functioning of various components and aggregates of the vehicle

To be competent, the user/individual on the job must be able to:

1. understand the auto component manufacturer specifications related to the various components/ aggregates in the vehicle, engines and fuel system (diesel, petrol, electrical, gas, hybrid etc.) , cooling system , air supply systems, emission and exhaust system, ignition systems, clutch assembly, clutch operating system, gearbox (manual and automatic), drivelines and hubs, drive-train assembly and transmission systems (manual, automatic etc.), steering system, suspension system, brake system (including regenerative braking systems), tyres and wheels (including wheel alignment), radiator, batteries and power storage system.
2.
 - o electrical wire harness, lighting, ignition, electronic and air-conditioning systems etc.
 - o electronic systems including active and passive safety, media and other systems
 - o various lubrication systems.
3. To understand the functioning of each system, component and aggregate (including both mechanical and electrical aggregates) of a vehicle. □
4. To understand the tools used to assess and confirm technical faults that cannot be determined through a visual inspection.
5. To ensure any malfunctions observed in tools and equipment are reported to the concerned persons.
6. To understand the various values and tolerance limits of various components across the mechanical/ electrical aggregates.

B. Assessing service and repair requirements

To be competent, the user/individual on the job must be able to:

available for assessing service and repair requirements of the vehicle including: diagnostic displays, visual inspections, test drives, vehicle/equipment manufacturer specifications,

standard operating procedures for diagnosis, understand typical symptoms of common technical faults in a vehicle

C. Assist in the diagnosis of the root cause of the vehicle trouble

To be competent, the user/individual on the job must be able to:

1. To follow standard operating procedures for using workshop tools and equipment for fault diagnosis or troubleshoot problem in a vehicle
2. To review the job card and understand customer complaints, follow standard operating procedure set out for diagnosing faults.
3. To follow instructions of seniors for specific tasks related to diagnosing faults in the various sub-assemblies and aggregates in a vehicle.
4. To use checklists and standard OEM operating procedures to understand if the fault is because of improper servicing, or low levels of oils, coolants, grease etc. or poor quality oil/ air filters etc.
5. To ensure any malfunctions or repair requirements observed in vehicles (and beyond own scope of work) are reported to the concerned person.
6. To understand the various precautions to be taken to avoid damage to the vehicle and its components while working on diagnosis or troubleshooting the vehicle for any faults.

D. Functioning of various components and component systems

To be competent, the user/individual on the job must be able to:

1. to understand the basic technology used in and functioning of various components and component systems of the vehicle including: o engines and fuel system (diesel, petrol, electrical, gas etc.)
2. to understand the tools used to assess deviations from specifications during routine servicing.

E. Carry out routine service and minor repairs of mechanical & electrical aggregates

To be competent, the user/individual on the job must be able to:

1. To calibrate, align and adjust settings, alignment and other routine service and maintenance of various parts and aggregates including: o engine and aggregates o other engine sub-assemblies like turbocharger, radiator etc. o gear box and it aggregates o propeller shafts and other transmission systems o clutch and brake systems and sub-assemblies o chassis o electrical and electronic components steering systems o suspension system o other components (including to valves, ignition, fuel and emissions, transmission, lights, tyres, steering and body fittings)

2. To ensure that for routine maintenance and service, the correct spare parts and appropriate grade of lubricants, coolant, oils and grease required have been obtained ensure all dismantled components (including mechanical and electrical aggregates) are cleaned and conditioned prior to reassembly.
3. To understand the various precautions to be taken to avoid damage to the vehicle and its components while working on other aggregates.
4. To record all service and repairs carried out and ensure completeness of tasks assigned before releasing vehicle for the next procedure.
5. To ensure all workshop tools, equipment and workstations are adequately maintained by carrying out scheduled checks, calibration and timely repairs where necessary

Course Outcomes:

1. To introduce about the automobile and its classifications.
2. To improve understanding about different parts of automobile and their functions.
3. To learn vehicle repairing.
4. To be able to rectify about vehicle pollution and do its control.

SECOND SEMESTER

ELEMENTS OF AUTOMOBILE ENGINEERING

Semester -2nd
Stream– B.Voc
L T P Total Credits
3 0 0 3

Sessional – 25 Marks
Theory – 75 Marks
Total: 100 Marks
Duration of Exam: 3 Hours

Course objectives:

1. To study the chassis layout.
2. To study different types of clutches.
3. To learn the concepts of braking system.
4. To understand fuel supply and ignition system.

Course contents:

UNIT-1: Introduction & chassis layout: General study of the motor vehicle with functions of its main components and assemblies (engine excluded), Conventional layout of chassis Front wheel drive, four-wheel drive, rear engine vehicle, their advantages and disadvantages, Layout of Maruti car chassis and tractor chassis, Definitions of items-wheel track, wheel base, front and rear overhang, kerb weight, ground clearance.

UNIT-2: Fuel and Ignition Systems 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-3: Braking System: Need and classification of brakes, drum brakes and disc brakes, constructional & working details, introduction to hydraulic brake, parking brake, vacuum assisted hydraulic brakes, air assisted hydraulic brakes, air brakes, leading & trailing brake shoes, self-energizing brakes & ABS, working of master cylinder, wheel cylinders, tandem master cylinder, characteristics of brake fluid.

UNIT-4: Clutch system: Layout of conventional transmission system, clutch - necessity, functions, requirements, types, Constructional details and working of single plate, multiple plate, diaphragm clutches, fluid coupling, Centrifugal and semi-centrifugal clutch, Clutch pedal free play, Clutch defects, probable causes, remedies.

UNIT-5: Automobile pollution and its control: 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.

Course Outcomes:

Students will able

1. To identify different chassis layout.
2. To learn about different types of clutches.
3. To understand the concepts of braking system.
4. To understand fuel supply and ignition system.

Text Book(s):

1. K.K. Jain, R.B. Asthana, “Automobile Engineering”, Tata McGraw Hill, New Delhi
2. Dr. Kirpal Singh, “Automobile Engineering (Vol-1)”, Standard Publisher Distributors.
3. K.K. Ramalingam, “Automobile Engineering”, Scitech Publication, Chennai
4. Tom Denton, “Automobile Mechanical and Electrical Systems” Indian Ed., Routledge (T&F Group) Pub.

QUALITY, INSPECTION AND SAFETY

Semester -2nd
Stream– B.Voc
L T P Total Credits
3 0 0 3

Sessional – 25 Marks
Theory – 75 Marks
Total: 100 Marks
Duration of Exam: 3 Hours

Course objectives:

1. To understand the importance of safety, health and environment.
2. To classify different types of accidents.
3. To study different types of hazards.
4. To study about 5S at workplace.

UNIT-1: Importance of Safety, health and environment: Safety, Health and Environment, cleaning of work area, tools, equipment and materials, Importance of safety, objectives of safety management, personal protective equipment like safety gloves, safety glasses, safety shoes and safety helmet, contents of the first aid kit, instructions of equipment manual.

UNIT-2: Accidents: Classification of accidents, causes of accidents, accident investigations/reporting, approaches to prevent accidents, Firefighting.

UNIT -3: Safety in hazardous area: Hazards and risks, difference between hazard and risk, Hazard in industrial zones, physical, chemical, environmental, biological, ergonomics and psycho-social hazards, Introduction to OSHMS, OSHAS 18001 and OSHA.

UNIT-4: 5S in safety: The basic principles of 5 S in manufacturing and workplace – Cleaning, sorting etc sorting of materials, tools and equipment’s and spare parts, standards, procedures and policies related to 5S, importance of waste disposal, segregation of waste into Hazardous and Non Hazardous waste, disposal the waste as per SOP, labeling procedures, storage procedures.

Unit–5: Inspection: how to measure the correct specifications of the output in the terms of thickness, hardness, durability, tightness, finesse etc. relevant manufacturing standards and

procedures followed in the company in detail, different types of defects which may arise due to improper manufacturing.

Unit-6 Quality control: Concept of quality control. elements of quality control, quality control groups, objectives of quality control. Statistical quality control, objectives of S.Q.C. Inspection by variables & attributes. Frequency distribution, mean, median & mode, standard deviation, X-R charts, P-Charts, C-Charts and acceptance sampling. (i) I.S.O. 9000 (ii) KAIZEN (iii) Six Sigma (iv) 5S.

Course outcomes:

1. Student will aware about safety and health.
2. Student will able to differentiate different types of accidents.
3. Student will able to differentiate different types of risks.
4. Student will learn about 5S at workplace.

Reference books:

1. [Industrial Safety and Health Management by C Ray Asfahl](#), pearson publications.
2. [Industrial Safety Management by N. K. Tarafdar](#)
3. [Industrial Safety \(Safety Management\) by D S S Ganguly & C S Changeriya](#)

APPLIED SCIENCE

Semester -2nd
Stream- B.Voc
L T P Total Credits
3 0 0 3

Sessional – 25 Marks
Theory – 75 Marks
Total: 100 Marks
Duration of Exam: 3 Hours

Course Objectives: Following are the objectives of this course:

- 1) To Learn concepts of Units, Laws of vectors, parallel forces, moment of force, couple.
- 2) To Learn the fundamentals of properties and behavior of the materials
- 3) Understand different types of communication systems
- 4) To know fundamental of advanced communication systems.

Course Contents:

Unit – I Basics of mechanics and force system: Significance and relevance of Mechanics, Statics, Dynamics. Space, time, mass, particle, flexible body and rigid body. Scalar and vector quantity, Units of measurement (SI units) - Fundamental units and derived units. Force – unit, representation as a vector and by Bow's notation, characteristics and effects of a force, Principle of transmissibility of force, Force system and its classification. Resolution of a force - Orthogonal components of a force, moment of a force, Varignon's Theorem. Composition of forces –

Resultant, analytical method for determination of resultant for concurrent, non-concurrent and parallel co-planar force systems – Law of triangle, parallelogram and polygon of forces.

Unit– II Properties of solids: Definitions of deforming force, elasticity and plasticity, examples for elasticity and plasticity, definition of stress and its types with examples and its S.I unit, definition of strain and its types with examples, elastic limit, Hooke’s law, stress - strain graph with explanation. Modulus of elasticity and its types, derivation of an expression for Young’s modulus of a material. Definition of Compressibility and factor of safety. Simple problems on stress, strain and Young’s modulus. Properties of liquids: Definition of thrust and pressure with S.I units. Definition of surface tension and its S.I unit, Viscosity.

Unit– III Transmission of heat: Definitions of conduction, convection and radiation with examples, definition of thermal conductivity, co-efficient of thermal conductivity(K) and its S.I unit. Applications of conduction, convection and radiation.

Unit– IV Thermodynamics: Introduction of thermodynamics, system, surrounding and boundary, types of system, properties of system, state, equilibrium and process, types of thermodynamic processes, laws of thermodynamics- zeroth, First, second and third law.

Unit– V Electromagnetic waves: Definition, generation of electromagnetic waves and their properties. Electromagnetic spectrum: Definition, classification and its applications. Lasers: Principle and listing the types of Laser, properties of Laser, applications. Nano-Technology: Definition of Nano-Technology, advantages and dis-advantages of nano Technology.

Course outcomes: After completing this course, student will be able to:

1. Identify the force systems for given conditions by applying the basics of mechanics.
2. Create knowledge of properties of matter applicable to engineering.
3. Analyse the different concepts of waves and vibration in the field of engineering
4. Analyse the recent trends in physics related to engineering.

Reference Books: -

1. D.S. Bedi, Engineering Mechanics, Khanna Publications, New Delhi (2008)
2. Khurmi, R.S., Applied Mechanics, S. Chand & Co. New Delhi.

3. Bansal R K, A text book of Engineering Mechanics, Laxmi Publications.
4. Ramamrutham, Engineering Mechanics, S. Chand & Co. New Delhi.

EMPLOYABILITY SKILLS

Semester -2nd
Stream– Automobile
L T P Total Credits
3 0 0 3

Sessional – 25 Marks
Theory – 75 Marks
Total: 100 Marks
Duration of Exam: 3 Hours

Course Objectives:

- 1) To discuss types of communication and their forms.
- 2) To improve comprehension.
- 3) To improve spoken English and ability to articulate ideas
- 4) To improve formal writing skills

Course Contents:

Unit 01 Communication skill: Oral and written communication Listening skills, written communications, motivation, ethics, Time management, facing job interviews, behaviour skills, Assessing oneself.

Unit -02 English Literacy – Pronunciation, listening speaking and reading: - greetings and introductions describing people, Telephone skills, Office Hospitality, Describing things.

Unit -03 Entrepreneurship skills- 1: - Scope and advantage of self-employment, Entrepreneurial skills, values and attitudes, Characters of Successful Entrepreneurs, Identification of entrepreneurs bu self-assessment, Micro, small and medium enterprises, Creativity and idea generation.

Unit -04 Entrepreneurship Skills – 2: - Understanding Consumer, Market Survey: Scope & Influence of publicity and advertisement, Accounting and analysis, Assistance provided by Central and State Govt. Organisations, Project formation, feasibility and profitability estimates, Filling up a Preliminary Project Report Proforma, Investment procedure-loan procurement.

Course Outcome:

- 1) To learn about communication process and ways to make communication effective by giving attention to all elements involved.

- 2) To improve grammar and gain confidence by enhancing their abilities to articulate their ideas.
- 3) To acquire better writing skills in formal communication.
- 4) To be able to revise documents for fruitful reading and comprehension

Reference books:

1. Wren and Martin. High School English Grammar and Composition. New Delhi: RRP, 2007
2. Murphy, Raymond. Essential English Grammar. New Delhi: Cambridge, 2017
3. Malhotra, Prerna and Halder, Deb. Communication Skills: Theory and Practice.

AUTOMOBILE WORKSHOP – 2

[Including all practicals of Automotive Service Technician Level 5 (ASC/Q 1403)]

Semester 1st

Stream– Manufacturing

L T P Total Credits

18 0 0 18

Sessional – 25 Marks

Theory – 75 Marks

Total: 100 Marks

Duration of Exam: 3 Hours

Course Objectives:

1. To introduce about automobile basics.
2. To understand repairing of suspension and steering system.
3. To study the repairing of automobile wheels and tyres.
4. To perform the vehicle over hauling.

(A) Carry out diagnosis of vehicle for repair requirements.

1. To Follow standard operating procedures for using workshop tools and equipment for fault diagnosis or troubleshoot problem in a vehicle.
2. To Conduct inspection of the engine and aggregates to diagnose need for repairs or adjustment in various engine aggregates.
3. To Conduct inspection of mechanical, electrical and electronic systems to diagnose need for repairs, adjustment or part replacement
4. To Understand the various precautions to be taken to avoid damage to the vehicle and its components while working on diagnosis or troubleshooting the vehicle for any faults.

(B) Carry out service and major repairs in mechanical aggregates and overhauling of a vehicle.

1. To Understand the auto component manufacturer specifications related to the various components/ aggregates in the vehicle (including major aggregates like engine. gear box, transmission systems propeller shaft etc.)

2. To Service, repair and overhaul of steering system.
3. To Service, repair and overhaul of suspension system.
4. To Service, repair and overhaul of tyres.
5. To Service, repair and overhaul of wheels.
6. To Service, repair and overhaul diesel Engines and its fuel system.
7. To Service, repair and overhaul petrol Engines and its fuel system.
8. To Service, repair and overhaul of cooling system and radiator
9. To Service, repair and overhaul of emission and exhaust system.
10. To Service, repair and overhaul of gearbox, drive-train assembly and transmission systems (manual, automatic etc.)
11. To Service, repair and overhaul of brake system.
12. To Service, repair and overhaul of pneumatic brakes.
13. To Service, repair and overhaul of hydraulic brakes.
14. To Service, repair and overhaul of clutch assembly.
15. To Service, repair and overhaul of single plate and multi plate clutches.
16. To Service, repair and overhaul of hydraulic and pneumatic system and various lubrication systems.

(c) Carry out service and repairs of electrical and electronic faults in a vehicle.

1. Repair and overhaul of electronic control unit
2. To Repair and overhaul of electrical wire harness, lighting, ignition, electronic and air-conditioning systems etc.
3. To Repair and overhaul of safety systems.
4. Repair and overhaul of hydraulic and pneumatic system.

Course Outcomes:

5. To learn about vehicle and its repair.
6. To improve understanding about different parts and their functions.
7. To perform vehicle wheel balancing.
8. To be able to rectify about vehicle pollution and do its control

THIRD SEMESTER

MOTOR VEHICLE TECHNOLOGY-2

Semester -3rd
Stream– B.Voc (A)
L T P Total Credits
3 0 0 3

Sessional – 25 Marks
Theory – 75 Marks
Total: 100 Marks
Duration of Exam: 3 Hours

Course Objectives:

1. To introduce about automobile basics.
2. To understand about suspension and steering system.
3. To study about automobile wheels and tyres.

UNIT 1: INTRODUCTION TO IC ENGINES

Heat engines, development of IC Engine, classification of IC Engine, application of IC Engine, engine cycle-energy balance, basic idea of IC Engine, different parts of IC Engine, terms connected with IC Engine, working cycles, four stroke cycle engine, two stroke cycle engine, intake for compression ignition engine, compression of four stroke and two stroke cycle engines, comparison of SI and CI engine, comparison between petrol and diesel engine.

UNIT 2: FUEL SUPPLY SYSTEM (SI ENGINES)

Air, fuel and exhaust gases circuits of petrol and diesel engines, introduction to carburation and carburetors, induction system, factors influencing carburation, mixture requirements, distribution, transient mixture requirements, a simple or elementary carburetor, complete carburetor, carburetors, petrol injection, theory of simple carburetor.

UNIT 3: FUEL SUPPLY SYSTEM (CI ENGINES)

INTRODUCTION to fuel injection system for CI Engines, functional requirements of an injection system, functions of fuel injection system, fuel injection systems, fuel pump and fuel injector (Atomiser), types of nozzles and fuel spray patterns, engine starting systems, fuel injection computation in CI Engines, troubleshooting of a fuel system, troubleshooting of carburetor.

UNIT 4: ENGINE FRICTION AND LUBRICATION SYSTEMS

Introduction, total engine friction, effect of engine parameters on engine friction, determination of engine friction, lubrication systems, crankcase ventilation, lubrication system of some indian vehicle.

UNIT 5: TRANSMISSION SYSTEMS

Introduction to transmission system, clutch, gear box (transmission), propeller shaft, universal joints, final drive and differential, rear axles.

Course Outcomes:

1. To learn various components of automobile.
2. To improve understanding about power unit of automobile.
3. To acquire knowledge about steering and suspension system.
4. To be able to check wheel unbalances.

Reference Books:

1. Automobile Engineering, R.K. Rajput, Laxmi Publications.
2. Automobile Mechanics, A.K. Babu, S.C. Sharma, T.R. Banga, Khanna Publishing House
3. Automobile Engineering by Dr. Kripal Singh

AUTOMOBILE ELECTRICAL & ELECTRONICS

Semester -3rd
Stream– B.Voc (A)
L T P Total Credits
3 0 0 3

Sessional – 25 Marks
Theory – 75 Marks
Total: 100 Marks
Duration of Exam: 3 Hours

Course Objectives:

1. To introduce about Automotive Electrical and Electronic Systems.
2. To understand about Batteries, Starting System, Charging System.
3. To study about Ignition System, Lighting System
4. To learn about Dash – Board Instruments.

UNIT I: TYPES OF BATTERIES

Principle and construction of Lead Acid Battery, Nickel – Cadmium Battery, Nickel Metal, Hybrid Battery, Sodium Sulphur Battery and Aluminium Air Battery, Characteristics of Battery, Battery

Rating, Capacity and Efficiency, Various Tests on Battery, Battery-Charging Techniques, Maintenance of batteries.

UNIT II: ELECTRICAL COMPONENTS

Requirements of Starter Motor, Starter Motor types, construction and characteristics, Starter drive mechanisms, Starter Switches and Solenoids, Charging system components, Generators and Alternators, types, construction and Characteristics. Voltage and Current Regulation, Cut –out relays and regulators, Charging circuits for D.C. Generator, A.C. Single Phase and Three – Phase Alternators.

UNIT III IGNITION SYSTEMS

Battery Coil and Magneto-Ignition System, Circuit details and Components of Battery Coil and Magneto-Ignition System, Centrifugal and Vacuum Advance Mechanisms, Spark Plugs, Constructional details and Types.

UNIT IV ELECTRICAL AND ELECTRONIC IGNITION SYSTEMS

Electronically-Assisted and Full Electronic Ignition System, Non-Contact-type Ignition Triggering devices, Capacitive Discharge Ignition Distributor-less Ignition System, Digital Ignition System, Control Strategy of Electronic Ignition System.

UNIT V WIRING, LIGHTING AND OTHER INSTRUMENTS AND SENSORS

Automotive Wiring, Insulated and Earth Return System, Positive and Negative Earth Systems, Head Lamp and Indicator Lamp Details, Anti-Dazzling and Dipper Details, Electrical and Electronic Fuel Lift Pumps, Theory and Constructional Details of Dash Board Instruments and their Sensors like Speedometer, Odometer, Fuel Level Indicator Oil Pressure and Coolant Temperature Indicators, Horns and Wiper Mechanisms, Automotive Wiring Circuits.

Course Outcomes:

1. Students will be able to understand various Automobile Electrical Equipments.
2. Students will be able to understand ignition systems.
3. Students will learn about electronic ignition system.
4. Students will understand about automobile wiring, lighting and sensors.
- 5.

Text books

- 1) Young, A.P. and Griffith, S.L., Automobile Electrical Equipments, ELBS and New Press.
- 2) Kholi .P.L. Automotive Electrical Equipment, Tata McGraw-Hill co ltd, New Delhi, 2004
- 3) Automotive Electricals and Electronics, A.K. Babu, Khanna Publishing House

IT TOOLS

Semester -3rd	Sessional – 25 Marks
Stream– B.Voc (A)	Theory – 75 Marks
L T P Total Credits	Total: 100 Marks
3 0 0 3	Duration of Exam: 3 Hours

Unit 1: Computer Organization & OS: User perspective.

- Understanding of Hardware.
- Basics of Operating System.

Unit 2: Networking and Internet.

- Network Safety concerns.
- Network Security tools and services.
- Cyber Security.
- Safe practices on Social networking.

Unit 3: Office automation tools:

- Spreadsheet.
- Word processing.
- Presentation.

Unit4: Multi Media Design: (Open Source Design Tools).

- Interface and Drawing Tools in GIMP.
- Applying Filters.
- Creating and handling multiple layers.
- Using Stamping and Smudging tools.
- Importing pictures.

Unit 5: Troubleshooting: Hardware, Software and Networking.

- Commonly encountered problems.
- (Monitor: No display, KB/Mouse not responding, monitor giving beeps, printer not responding, check for virus, Delete temporary files if system is slow, adjust mouse speed).

Work Integrated Learning IT – ISM

- Identification of Work Areas.
- Work Experience.

Reference Books:

1. IT Tools, R.K. Jain, Khanna Publishing House
2. Information Security & Cyber Laws, Sarika Gupta, Khanna Publishing House
3. Mastering PC Hardware & Networking, Ajit Mittal, Khanna Publishing House

SOFT SKILLS

Semester -3rd
Stream– B.Voc (AM)
L T P Total Credits
4 0 0 4

Sessional – 25 Marks
Theory – 75 Marks
Total: 100 Marks
Duration of Exam: 3 Hours

Course Objectives:

- 1) To help the students in building interpersonal skills.
- 2) To develop skill to communicate clearly.
- 3) To enhance team building and time management skills.
- 4) To learn active listening and responding skills.

UNIT 1: GRAMMAR AND VOCABULARY

1. Tenses, 2. Subject–verb agreement. 3. Sentence Analysis: Simple, Compound and Complex sentences. 4. Phrases: Adjective, Adverb and Noun Phrase, 5. Clauses: Adjective, Adverb and Noun Phrase. 6. Voice, Narration, Gerund, Participle.

UNIT 2: ORAL COMMUNICATION

1. Listening Skill – Active listening, Barriers to active listening. 2. Speaking Skill–Stress patterns in English, 3. Questioning skills, 4. Barriers in Speaking 5. Reading Skill–Skimming, Scanning, Intensive reading, 6. linking devices in a text, 7. Different versions of a story/ incident.

UNIT 3: WRITING SKILLS

Letter writing, Business letters • Application letters • Covering letters • Report writing o Academic report o Business report o Technical report o Technical project report • Job Application and Resume writing

UNIT- IV: SOFT SKILLS

1. Body Language– Gesture, posture, facial expression. 2. Group Discussion– Giving up of PREP, REP Technique. 3. Presentation Skills: a. (i) How to make power point presentation b. (ii) Body language during presentation 4. Resume writing: Cover letter, career objective, Resume writing (tailor made) 5. Interview Skills: Stress Management, Answering skills.

UNIT- 5: STRESS AND TIME MANAGEMENT

Introduction • Stress In Today's Time • Identifying The Stress Source • Signs Of Stress • Ways To Cope With Stress • Healthier Ways To Deal With Stress • Time Management • Prioritize Your Work • Smart Work • Four Ds Of Decision Taking.

REFERENCE BOOKS:

1. Advanced English Usage: Quirk & Greenbaum; Pearson Education.
2. Developing Communication Skills: Banerjee Meera & Mohan Krishna; Macmillan Publications, 1990.
3. Personality Development and Group Discussions by Barun K. Mitra, Oxford University Press

WORKSHOP-3

Semester -3rd
Stream– B.Voc (A/M)
L T P Total Credits
0 0 8 10

Internal – 50 Marks
External – 50 Marks
Total: 100 Marks
Duration of Exam: 3 Hours

1: INTRODUCTION TO AUTOCAD

Starting AutoCAD, AutoCAD Screen Components (Drawing Area Command Window Navigation bar Status bar), Invoking Commands in AutoCAD Keyboard (Ribbon Application Menu Tool Palettes Menu Bar Toolbar), Shortcut Menu, AutoCAD Dialog Boxes, Starting a New Drawing (Open a Drawing Start from Scratch Use a Template Use a Wizard, Saving Your Work, Save Drawing as Dialog box), Using the Drawing Recovery Manager to Recover Files, Closing a Drawing, Opening an Existing Drawing, Opening an Existing Drawing Using the Select File Dialog Box Opening an Existing Drawing Using the Startup Dialog Box Opening an Existing Drawing, Using the Drag and Drop Method, Quitting AutoCAD, Creating and Managing Workspaces Creating a New Workspace Modifying the Workspace Settings Autodesk Exchange

2: GETTING STARTED WITH AUTOCAD

Dynamic input mode, Enable Pointer Input, Enable Dimension Input where possible Show command prompting and command input near the crosshairs, Drafting Tooltip Appearance, Drawing Lines in autocad, The Close Option, The Undo Option, Invoking tools Using Dynamic INPUT/Command Prompt Coordinate Systems, Absolute Coordinate System, Relative Coordinate System, Relative Polar Coordinates, Direct Distance Entry Erasing Objects, Cancelling and Undoing a Command Object Selection Methods, Window Selection Window Crossing Method Drawing a Circle, BASIC Display Commands Setting Units Type and Precision, Specifying the Format Specifying the Angle Format, setting the limits of a drawing.

3: STARTING WITH ADVANCED SKETCHING

Drawing Arcs, Drawing Rectangles, Drawing Ellipses, Drawing Regular Polygon, Drawing Polylines Placing Points, Drawing Infinite Lines Writing a Single Line Text

4: WORKING WITH DRAWING AIDS

Introduction, Understanding the Concept and use of LAYERS, Advantages of Using Layers, Working with Layers, Creating New Layers, Making a Layer Current, Controlling the Display of Layers, Deleting Layers, Object Properties Changing the Colour, Changing the Line type, Changing the Line weight, Changing the Plot Style, Properties Palette, Quick Properties, Palette Drafting, Settings dialog box, Setting Grid, Setting Snap, Snap Type, Drawing Straight Lines using the Ortho Mode, Working with Object Snaps, Auto Snap, Endpoint Midpoint, Nearest Centre, Tangent Quadrant Intersection, Apparent Intersection Perpendicular, Node Insertion, Snap to None Parallel Extension From, Midpoint between 2 Points, Temporary Tracking Point, Combining Object Snap Modes, Running Object, Snap Mode, Overriding the Running Snap, Cycling through Snaps, Using Auto Tracking, Object Snap Tracking, Polar Tracking, Auto Track Settings, Function and Control Keys.

5: EDITING SKETCHED OBJECTS-I

Editing Sketches, Moving the Sketched Objects, Copying the Sketched Objects, Creating Multiple Copies, Creating a Single Copy, Offsetting Sketched Objects, Rotating Sketched Objects, Scaling the Sketched Objects, Filletting the Sketches, Chamfering the Sketches,

Trimming the Sketched Objects, Extending the Sketched Objects, Stretching the Sketched Objects, Lengthening the Sketched Objects, Arraying the Sketched Objects, Rectangular Array Polar Array, Path Array, Mirroring the Sketched objects Text Mirroring.

6: EDITING SKETCHED OBJECTS-II

Introduction to Grips Types of Grips, Editing a Polyline by Using Grips Editing Grippled Objects ,Changing the Properties Using the PROPERTIES Pale Matching the Properties of Sketched Objects, Cycling Through Selection, Managing Contents Using the Design enter Autodesk Seek design content Link Displaying Drawing Properties, Basic Display Options Redrawing the Screen Regenerating Drawings, Zooming Drawings Real-time Zooming All Option, Centre Option Extents Option Dynamic Option Previous Option Window Option Scale Option Object Option Zoom In and Out, Panning Drawings Panning in Real time.

7: CREATING TEXT AND TABLES

Annotative Objects Annotation Scale, Assigning Annotative Property and Annotation Scales Customizing Annotation Scale, Multiple Annotation Scales, Assigning Multiple Annotation Scales Manually Assigning Multiple Annotation Scales Automatically, Controlling the Display of Annotative objects Creating Text, Writing Single Line Text Entering Special Characters Creating Multiline Text, Text Window Text Editor Tab, Editing Text, Editing Text Using the DDEDITCommand Editing Text Using the Properties Palette Modifying the Scale of the Text, Inserting Table in the Drawing Table style Area, Insert options Area Insertion behaviour Area, Column and row settings Area Set cell styles Area, Creating a New Table Style Starting table Area General Area, Cell styles Area, Setting a Table Style as Current Modifying a Table Style Modifying Tables, Substituting Fonts, Specifying an Alternate Default Font Creating Text Styles, Determining Text Height Creating Annotative text

8: BASIC DIMENSIONING, GEOMETRIC DIMENSIONING, AND TOLERANCING

Need for Dimensioning in AutoCAD Fundamental Dimensioning Terms, Dimension Line, Dimension Text Arrowheads Extension Lines Leader, Centre Mark and Centrelines Alternate Units, Tolerances Limits, Associative Dimensions Definition Points Annotative Dimensions, Selecting Dimensioning Commands Using the Ribbon and the Toolbar Using the Command

Line, Dimensioning a Number of Objects Together Creating Linear Dimensions, DIMLINEAR Command Options Creating Aligned Dimensions Creating Arc Length Dimensions Creating Rotated Dimensions Creating Baseline Dimensions Creating Continued Dimensions Creating Angular Dimensions, Dimensioning the Angle between Two Nonparallel Lines Dimensioning the Angle of an Arc, Angular Dimensioning of Circles, Angular Dimensioning based on Three Points Creating Diameter Dimensions, Creating Radius Dimensions Creating Jogged Linear Dimensions Creating Ordinate Dimensions, Maintaining Equal Spacing between Dimensions Creating Inspection Dimensions, Inspection Label Dimension Value, Working with True Associative Dimensions Inspection Rate, Removing the Dimension Associatively, Converting a Dimension into a True Associative Dimension Drawing Leaders, Multileader, Adding leaders to existing Multileader, Removing Leaders from Existing Multileader, Aligning Multileaders, Distribute, Make leader segments Parallel Specify Spacing, Use current spacing, Geometric Dimensioning and Tolerance Geometric Characteristics and Symbols Adding, Geometric Tolerance, Feature Control Frame, Geometric Characteristics Symbol, Tolerance Value and Tolerance Zone Descriptor Material Condition Modifier, Datum, Complex Feature Control Frames Composite Position Tolerance Projected Tolerance Zone, Creating Annotative Dimensions, Tolerances, Leaders, and Multileaders

9: EDITING DIMENSIONS

Editing Dimensions Using Editing Tools Editing Dimensions by Stretching, Editing Dimensions by Trimming and Extending Flipping Dimension Arrow, Modifying the Dimensions Editing the Dimension Text Updating Dimensions, Editing Dimensions with Grips, Editing Dimensions using the Properties Palette Properties Palette (Dimension), Properties Palette (Multileader), Model Space and Paper Space Dimensioning

10: DIMENSION STYLES, MULTILEADER STYLES, AND SYSTEM VARIABLES

Using Styles and Variables to Control Dimensions Creating and Restoring Dimension Styles, New Dimension Style dialog box Controlling the Dimension Text Format Fitting Dimension Text and Arrowheads Formatting Primary Dimension Units Formatting, Alternate Dimension

Units Formatting the Tolerances, Creating and Restoring Multileader Styles Modify Multileader Style dialog box.

11: MODEL SPACE VIEWPORTS, PAPER SPACE VIEWPORTS, AND LAYOUTS

Model Space and Paper Space/Layouts Model Space Viewports (Tiled Viewports), Creating Tiled Viewports Making a Viewport Current Joining Two Adjacent Viewports, Paper space viewports (Floating Viewports) Creating Floating Viewports, Creating Rectangular Viewports Creating Polygonal Viewports, Converting an Existing Closed Object into a Viewport Temporary Model Space, Editing Viewports, Controlling the Display of Objects in Viewports Locking the Display of Objects in Viewports Controlling the Display of Hidden Lines in Viewports Clipping Existing Viewports, Maximizing Viewports Inserting Layouts, Inserting a Layout Using the Wizard Defining Page Settings, Controlling the Display of Annotative Objects in Viewports

12: PLOTTING DRAWINGS

Plotting Drawings in AutoCAD, Plotting Drawings Using the Plot Dialog Box Page setup Area, Printer/plotter Area Paper size Area Number of copies Area Plot area, Plot offset (origin set to printable area) Area Plot scale Area, Plot style table (pen assignments) Area Shaded viewport options Area, Plot options Area Preview, Adding Plotters, The Plotter Manager Tool Using Plot Styles, Adding a Plot Style

13: HATCHING DRAWINGS

Hatching, Hatch Patterns Hatch Boundary, Hatching Drawings Using the Hatch Tool Panels in the Hatch Creation Tab, Boundaries Panel Pattern Panel Properties Panel Origin Panel Options Panel Match Properties, Setting the Parameters for Gradient Pattern Creating Annotative Hatch, Hatching the Drawing Using the Tool Palettes Drag and Drop Method, Select and Place Method, Hatching Around Text, Dimensions, and Attributes

14: WORKING WITH BLOCKS

The Concept of Blocks Advantages of Using Blocks Drawing Objects for Blocks, Converting Entities into a Block Inserting Blocks, Creating and Inserting Annotative Blocks Block Editor, Adding Blocks in Tool Palettes Drag and Drop Method, Modifying Existing Blocks in the

Tool Palettes, Layers, Colours, Line types, and Line weights for Blocks Nesting of Blocks, Creating Drawing Files using the Write Block Dialog Box Exploding Blocks Using the XPLODE Command Renaming Blocks, Deleting Unused Blocks Editing Constraints to Block.

FOURTH SEMESTER

Students will go in industries for On Job Training. Students will be evaluated based upon On Job Training (OJT)/Internship including report and presentation.

FIFTH SEMESTER

Students will go in industries for On Job Training. Students will be evaluated based upon On Job Training (OJT)/Internship including report and presentation.

SIXTH SEMESTER

VEHICLE PERFORMANCE AND TESTING

Semester - VI	Sessional – 25 Marks
Stream– Automobile	Theory – 75 Marks
L T P Total Credits	Total: 100 Marks
3 0 0 3	Duration of Exam: 3 Hours

Course Objectives:

1. To introduce about various parameters of vehicle performance.
2. To understand drive train and Component testing.
3. To study Vehicle testing.

Course Contents:

Unit-I: Vehicle Performance Parameters: Vehicle Performance parameters: Fuel economy, acceleration, deceleration, gradability, top speed, handling, comfort, life durability, EGR systems, Impact of vehicular systems on performance: Suspension system, Steering system, Brakes, Tyres, carriage unit. Catalytic converters function and construction, Lambda close loop control system for gasoline vehicles.

Unit-II: Drive train and Component testing: Vehicular transmission performance: comparison of automotive clutches, Epicyclic transmission, torque converter, final drive and differential, testing of vehicle components: clutch, gear box (for noise and shifting force), brake testing, wheels and tyre testing – tyre wear pattern identification and causes.

Unit-III: Vehicle testing: Vehicle Testing - Road test, free acceleration test, coast down test, passer by noise test, road load data acquisition for vehicle. Test tracks: Proving ground testing, high speed track, pavement track, corrugated track, mud track, steering pad, gradient track, deep wading through shallow water Laboratory testing: Testing on chassis dynamometer, transition testing (Euro III onwards), accelerated testing, virtual testing, evaporative emission testing, oil consumption testing, endurance test, high speed performance test. Collisions and Crash Testing: Crash testing: Human testing, dummies, crashworthiness, pole crash testing, rear crash testing, vehicle to vehicle impact, side impact testing, crash test sensors, sensor mounting, crash test data acquisition, braking distance test.

Unit-IV: Comfort, Convenience and Safety: Seats: types of seats, driving controls accessibility, and driver seat anthropometry. Steering: steering column angle, collapsible steering, and power steering. Adaptive cruise control, navigation system, adaptive noise control, driver information system, Safety: Motor vehicle safety standards, active safety, passive safety, bio-mechanics Structural safety, energy absorption, ergonomic consideration in safety.

Unit-V: Noise Vibration and EMI: Noise and vibration: Mechanism of noise generation, engine noise and vibration, causes and remedies on road shocks, wind noise and measurement. Automobile testing instrumentation: Sensors types and selection, instrumentation for functional tests, model test and full scale testing.

INDUSTRIAL MANAGEMENT

Semester - VI	Sessional – 25 Marks
Stream– Automobile	Theory – 75 Marks
L T P Total Credits	Total: 100 Marks
3 0 0 3	Duration of Exam: 3 Hours

1. Introduction: 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.

2. Private sector and public sector: 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.

3. Wages & incentives: 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.

4. Labour, industrial & tax laws: 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.

5. Material management: Introduction, Scope of Material Management selective control techniques-ABC analysis, Material handling, inventory control, Essential steps in inventory control, quality standards

Reference Books: 1. Industrial Management, S.C. Sharma, Khanna Publishing House

ENTREPRENEURSHIP

Semester - VI	Sessional – 25 Marks
Stream– Automobile	Theory – 75 Marks
L T P Total Credits	Total: 100 Marks
3 0 0 3	Duration of Exam: 3 Hours

Unit-1: Entrepreneurship and entrepreneur: Entrepreneurship concept and process, Entrepreneur, Essential Characteristics of a good Entrepreneur, Types of entrepreneur, Industrial Policy, Classification of industries- Micro, small scale , Medium scale, Large scale, Product identification/ selection, Site selection, Plant layout, Pre-market survey.

Unit-2: Entrepreneurship Support System and Start-ups: 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-3 Introduction to Tax System, and Acts: Idea of income tax, Goods and Services Tax and custom duty, Introduction to Industrial Acts, factory Act, Workmen's Compensation Act 1923, Apprentices Act 1961, Environmental Protection Act 1986

Unit-4: Project Report Preparation: Procedure of preparing a project report, Format of project report, Preparation of project report, Introduction to ISO: 9000 Series of Quality System

Outcome:

- Students will be aware about the concepts of entrepreneurship development and significance of entrepreneurship in economic development.
- It will help students to know about various acts related to an industry.
- Students will be able to prepare project report.
- They will be able to know the support available from Govt. to start a new venture.

Reference Books:

1. Khanka S.S., "Entrepreneurship Development" S.Chand.
2. Desai, A N. "Entrepreneur & Environment" Ashish, New Delhi.
3. Drucker, Peter. "Innovation and Entrepreneurship" Heinemann, London.

4. Kumar, S A. "Entrepreneurship in Small Industry" Discovery, New Delhi

ALTERNATIVE FUELS & EMISSION CONTROL*

Semester - VI	Sessional – 25 Marks
Stream– automobile	Theory – 75 Marks
L T P Total Credits	Total: 100 Marks
3 0 0 3	Duration of Exam: 3 Hours

Course Objectives:

1. To introduce about alternate fuels.
2. To understand about automobile emission control system.
3. To study about emission measurement and control.

Course Contents:

Unit-I: Conventional Fuels and Need for alternative fuels: Estimate of petroleum reserve and availability - comparative properties of fuels- diesel and gasoline, quality rating of SI and CI engine fuels, fuel additives for SI and CI engines, need for alternative fuels, applications, types etc.

Unit-II: Alternative Fuels: Gaseous Fuels and Bio-fuel: Introduction to CNG, LPG, ethanol, vegetable oils, bio-diesel, biogas, Hydrogen and HCNG. Study of availability, manufacture, properties, storage, handling and dispensing, safety aspects, engine/vehicle modifications required and effects of design parameters performance and durability Synthetic Fuels Introduction to Syngas, DME, P-Series, GTL, BTL, study of production, advantages, disadvantages, need, types, properties, storage and handling, dispensing and safety, discussion on air and water vehicles.

Unit-III: Emission Control (SI Engine): Emission formation in S.I. engines - Hydrocarbons, carbon monoxide, oxides of nitrogen, poly-nuclear aromatic hydrocarbon, effects of design and operating variables on emission formation in spark ignition engines, controlling of pollutant formation in engines exhaust after treatment, charcoal canister control for evaporative emission control, emissions and drivability, positive crank case ventilation system for ubhc emission reduction.

Unit-IV: Emission Measurement and Control (CI Engine): Chemical delay, intermediate compound formation, pollutant formation on incomplete combustion, effect of design and operating variables on pollutant formation, controlling of emissions, emissions and drivability, exhaust gas recirculation, exhaust after treatment – doc, dpf, scr and Int. Measurement and test procedure (ndir analyzers, fid, chemiluminescence nox analyzer, oxygen analyzer, smoke measurement, constant volume sampling, particulate emission measurement, orsat apparatus.)

Unit-V: Health effects of Emissions from Automobiles: Emission effects on health and environment. Emission inventory, ambient air quality monitoring, Emission Norms: As per Bharat Standard up to BS – IV.

Reference Books: 1. Electric & Hybrid Vehicles, A.K. Babu, Khanna Publishing House

VEHICLE BODY ENGINEERING*

Semester - VI	Sessional – 25 Marks
Stream– Automobile	Theory – 75 Marks
L T P Total Credits	Total: 100 Marks
3 0 0 3	Duration of Exam: 3 Hours

Course Objectives:

1. To familiarize the students with the fundamentals of vehicle body.
2. After completion of the course, the student shall be able to explain the concept of car body design, passenger safety, crumple zone and crash testing. Identify the concepts of wind tunnel testing and vehicle body optimization techniques to reduce drag.
3. To Demonstrate the various types of bus body construction, seating layout, regulations and comfort.

UNIT-I

Auto Body- Introduction, main features and functions of body, body requirements, Types: saloon, convertibles, limousine, estate car, racing and sports car. Visibility: regulations, driver's visibility, tests for visibility, frame construction- tubular, interlaced, channel section, ladder type, car frame, truck frame.

UNIT-II

Body Structures- frameless construction, integral construction, semi- unitary or endo- skeleton, unitary with sub frame, car body paneling, special purpose bodies, passenger and luggage requirements, all metal bodies, coach built bodies, auto floors, cowl assembly, front end assembly, roof assembly doors and door fittings.

UNIT-III

Body Materials- requirement of body material, type- specification, Timber- plywood fibre board, Steel, Mild steel – angle, channel, strips, Aluminium alloy- sheets, strips, channel etc., Rivets/ screws, glass- coloured glass, toughened glass, fibre reinforced

UNIT- IV

Safety Standards-Safety standards regarding- anchorage, instruments/ control, windshield, glass, wipers, doors, windows, roofs, head rests, safety belts, air bags.

Text Book(s):

- [T1] Sydney F. Page, "Body Engineering", 3rd Ed. Chapman & Hill Ltd., London.
[T2] P.L. Kohli, "Automotive Chassis and Body", McGraw Hill Publication Co.
[T3] J Fairbrother, "Fundamentals of Vehicle Body work", Hutchinson, London

AUTOTRONICS*

Semester - VI	Sessional – 25 Marks
Stream– Automobile	Theory – 75 Marks
L T P Total Credits	Total: 100 Marks
3 0 0 3	Duration of Exam: 3 Hours

Course Objectives:

1. To understand importance of electronics in an automobile.
2. To study Automotive Sensors & Actuators.
3. To study Automotive Electronic Systems.

UNIT –I

Fundamentals of Automotive Electronic System: Current Trends in Automotive Electronic Engine Management System, Electro-magnetic Interference Suppression, Electromagnetic Compatibility, Electronic Dashboard Instruments, onboard Diagnostic system, security and warning systems.

UNIT –II

Automotive Sensors & Actuators Types of sensors, actuators, Crankshaft position, camshaft position, manifold absolute pressure, Airflow rate sensor, Throttle position sensor, Inlet air temperature sensor, oxygen sensor, vehicle speed sensor, Wheel speed sensor, sensors for feedback control, engine control actuators, Solenoid actuators, motorized actuators.

UNIT –III

Automotive Electronic Systems Electronic Ignition systems, Electronic injection systems, Antilock brake system circuit, Traction control, Electronic control of automobile transmission, Active suspension, EPS

UNIT –IV

Applications Data Acquisitions- Temperature Control – Stepper Motor Control-Automotive Applications Engine Control, Suspension System Control, Driver Information Systems), Development of A High Speed, High Precision Learning Control System for the Engine Control. Programmable Logic Controls, Relay Logic, Control, Motion Control.

[T1, T2][No. of Hrs. 11]

Text Book(s):

[T1] Ramesh Goankar S., “Microprocessor Architecture Programming and Applications”, Willey Eastern Ltd.

[T2] William B. Riddens, “Understanding Automotive Electronics”, 5thEdition, Butter Worth Heinemann

PROJECT

Students needs to do a project in this semester.

[Including all practicals of Service Supervisor Level 7 (ASC/Q 1412)]

Semester - VI	Sessional – 25 Marks
Stream– Manufacturing	Theory – 25 Marks
L T P Total Credits	Total: 50 Marks
0 0 15 15	Duration of Exam: 3 Hours

Course Objectives:

1. To introduce about automobile basics.
 2. To understand repairing of suspension and steering system.
 3. To study the repairing of automobile wheels and tyres.
 4. To perform the vehicle over hauling.
-
- 1) To Follow standard operating procedures for using workshop tools and equipment for fault diagnosis or troubleshoot problem in a vehicle.
 - 2) To Conduct inspection of the engine and aggregates to diagnose need for repairs or adjustment in various engine aggregates.
 - 3) To Conduct inspection of mechanical, electrical and electronic systems to diagnose need for repairs, adjustment or part replacement
 - 4) To Understand the various precautions to be taken to avoid damage to the vehicle and its components while working on diagnosis or troubleshooting the vehicle for any faults.
 - 5) To Understand the auto component manufacturer specifications related to the various components/ aggregates in the vehicle (including major aggregates like engine. gear box, transmission systems propeller shaft etc.)
 - 6) To Service, repair and overhaul of steering system.
 - 7) To Service, repair and overhaul of suspension system.
 - 8) To Service, repair and overhaul of tyres.
 - 9) To Service, repair and overhaul of wheels.
 - 10) To Service, repair and overhaul diesel Engines and its fuel system.
 - 11) To Service, repair and overhaul petrol Engines and its fuel system.
 - 12) To Service, repair and overhaul of cooling system and radiator

- 13) To Service, repair and overhaul of emission and exhaust system.
- 14) To Service, repair and overhaul of gearbox, drive-train assembly and transmission systems (manual, automatic etc.)
- 15) To Service, repair and overhaul of brake system.
- 16) To Service, repair and overhaul of pneumatic brakes.
- 17) To Service, repair and overhaul of hydraulic brakes.
- 18) To Service, repair and overhaul of clutch assembly.
- 19) To Service, repair and overhaul of single plate and multi plate clutches.
- 20) To Service, repair and overhaul of hydraulic and pneumatic system and various lubrication systems.
- 21) Repair and overhaul of electronic control unit
- 22) To Repair and overhaul of electrical wire harness, lighting, ignition, electronic and air-conditioning systems etc.
- 23) To Repair and overhaul of safety systems.
- 24) Repair and overhaul of hydraulic and pneumatic system.

Course Outcomes:

- 1) To learn about vehicle and its repair.
- 2) To improve understanding about different parts and their functions.
- 3) To perform vehicle wheel balancing.
- 4) To be able to rectify about vehicle pollution and do its control



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(Established by Haryana State Legislative Act No. 21 of 2009 & Recognized by UGC Act 1956 u/s 22 to Confer Degrees)

Accredited 'A' Grade by NAAC



Annexure-1A

COMMUNITY COLLEGE OF SKILL DEVELOPMENT (CCSD)

Program B.Voc Automobile (program Code: 253)

Revised Scheme Course Index of the year 2020-2021(BOS Dated 18/05/2020)

Mapping of the course with the employability/Entrepreneurship/Skill Development

S.No	Course	Code	Skill Development	Entrepreneurship	Employability
1	COMMUNICATION SKILLS	BSC-101	✓	✓	
2	ENGINEERING CALCULATIONS	BSC-102	✓	✓	
3	ENGINEERING SCIENCE	PCC-AM-106	✓		✓
4	Motor Vehicle Technology-1	PCC-A-101	✓		✓
5	Automobile Workshop-1	PCC-AM-103	✓	✓	✓
6	EMPLOYABILITY SKILLS - 1	BSC-206	✓	✓	
7	APPLIED SCIENCE	PCC-AM-205	✓		✓
8	QUALITY, INSPECTION AND SAFETY	PCC-AM-202	✓		✓
9	Elements of Automobile Engg	PCC-AM-203	✓		✓
10	Automobile Workshop-2	PCC-AM-204	✓	✓	✓
11	Motor Vehicle Technology-2	PCC-AM-303	✓		✓
12	Automobile Electrical Equipment	PCC-AM-304	✓		✓
13	IT TOOLS	PCC-AM-306	✓		✓
14	SOFT SKILLS	BSC-301	✓	✓	
15	Automobile Workshop-3	PCC-AM-305	✓	✓	✓
16	ON-JOB TRAINING (OJT)	PCC-AM-401	✓	✓	✓
17	ON-JOB TRAINING (OJT)	PCC-AM-501	✓	✓	✓
18	Vehicle Performance and Testing	PCC-A-605	✓		✓
19	INDUSTRIAL MANAGEMENT	PCC-AM-603	✓		✓
20	ENTREPRENEURSHIP	BSC-601	✓	✓	
21	PROJECT	BSC-602	✓	✓	✓
22	Automobile Workshop-4	PCC-AM-606	✓	✓	✓
23	Alternative Fuels & Emission Control*	PCC-A-604	✓		✓
24	Vehicle Body Engineering*	PCC-A-608	✓		✓
25	Autotronics*	PCC-A-607	✓		✓

Principal, CCSD