FEDERAL MINISTRY OF EDUCATION

National Technical Certificate (NTC) Curriculum in

AUTOBODY WORK

(PANEL BEATING)

February, 2025

Innovation Development and Effectiveness in the Acquisition of Skills (IDEAS) Project

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NATIONAL BOARD FOR TECHNICAL EDUCATION
Plot B, Bida Road, P.M.B. 2239, Kaduna, Nigeria

NATIONAL TECHNICAL CERTIFICATE

CURRICULUM AND MOUDULE SPECIFICATIONS IN

AUTOBODY WORK

(PANEL BEATING)

FEBRUARY, 2025

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GENERAL INFORMATION

AIM

To give training and impart the necessary skills leading to the production of craftsmen and other skilled personnel who will be enterprising and self-reliant**.**

ENTRY QUALIFICATIONS

CRAFT PROGRAMME

Candidates must not be less than 14 years of age and should have successfully completed three years of Junior Secondary Education or its equivalent. Special consideration may be given to sponsored candidates with lower academic qualifications who hold trade test certificates and are capable of benefitting from the programme.

ADVANCED CRAFT PROGRAMME

Candidates should possess the National Technical Certificate or its equivalent and should have had a minimum of two years post qualification cognate industrial experience.

THE CURRICULUM

The Curriculum of each programme is broadly divided into three components:

a. General Education, which accounts for 30% of the total hours required for the programme.
b. Trade Theory, Trade Practice and Related Studies which account for 65% and
c. Supervised Industrial Training/Work Experience, which accounts for about 5% of the total hours required for the programme. This component of the course, which may be taken in industry or College production unit, is compulsory for the full-time students.

Included in the curriculum are the teacher's activity and learning resources required for the guidance of the teacher.

Unit Courses/Modules

A Course/Module is defined as a body of knowledge and skills capable of being utilized on its own or as a foundation or pre-requisite knowledge for more advanced work in the same or other fields of study. Each trade course/module when successfully completed can be used for employment purposes.

Behavioral Objectives

These are educational objectives, which identify precisely the type of behavior a student should exhibit at the end of a course/module or programme. Two types of behavioral objectives have been used in the curriculum. They are:

a. General Objectives
b. Specific Learning Outcomes

General objectives are concise but general statements of the behavior of the students on completion of a unit of work such as understanding the principles and application in:

a. Government in Political Science
b. Demand and supply in Economics
c. Orthographic Projection in Engineering/Technical Drawing;
d. Loci in Mathematics

Specific learning outcomes are concise statements of the specific behavior expressed in units of discrete practical tasks and related knowledge the students should demonstrate as a result of the educational process to ascertain that the general objectives of course/programme have been achieved. They are more discrete and quantitative expressions of the scope of the tasks contained in a teaching unit.

General Education in Technical Colleges

The General Education component of the curriculum aims at providing the trainee with complete secondary education in critical subjects like English Language, Economics, Physics, Chemistry, Biology, Entrepreneurial Studies and Mathematics to enhance the understanding of machines, tools and materials of their trades and their application and as a foundation for post-secondary technical education for the above average trainee. Hence, it is hoped that trainees who successfully complete their trade and general education may be able to compete with their secondary school counterparts for direct entry into the Polytechnics or Colleges of Education (Technical) for ND or NCE courses respectively.

For the purpose of certification, only the first three courses in mathematics will be required. The remaining modules are optional and are designed for the above average students.

National Certification

The NTC and ANTC programmes are run by Technical Colleges accredited by NBTE. The National Business and Technical Examinations Board (NABTEB) conducts the final National examination and awards certificates.

Trainee who successfully complete all the courses/modules specified in the curriculum table and pass the National Examinations in the trade will be awarded one of the following certificates:

S/NO	**LEVEL**	**CERTIFICATE**
	Technical Programme	
1	Craft Level	National Technical Certificate
2	Advanced Craft Level	Advanced National Technical Certificate

Guidance Notes for Teachers Teaching the Curriculum

The number of hours stated in the curriculum table may be increased or decreased to suit individual institutions' timetable provided the entire course content is properly covered and the goals and objectives of each module are achieved at the end of the term.

The maximum duration of any module in the new scheme is 300 hours. This means that for a term of 15 weeks, the course should be offered for 20 hours a week. This can be scheduled in sessions of 4 hours in a day leaving the remaining hours for General Education. However, (if properly organized and there are adequate resources), most of these courses can be offered in two sessions a day, one in the morning and the other one in the afternoon. In so doing, some of these programmes may be completed in lesser number of years than at present.

The sessions of 4 hours include the trade theory and practice. It is left to the teacher to decide when the class should be held in the workshop or in a lecture room.

INTEGRATED APPROACH IN THE TEACHING OF TRADE

Theory, Trade Science and Trade Calculations

The traditional approach of teaching trade science and trade calculation as separate and distinct subjects in Technical College programmersy is not relevant to the new programme as it will amount to a duplication of the teaching of mathematics and physical science subjects in the course. The basic concepts and principles in mathematics and physical science are the same as in the trade calculations and trade science. In the new scheme therefore, qualified persons in these fields will teach mathematics and physical science and the instructors will apply the principles and concepts in solving trade science and calculation problems in the trade theory classes. To this end, efforts have been made to ensure that mathematics and science modules required to be able to solve technical problems are taken as pre-requisite to the trade module.

Evaluation of Programme/Module

For the programme to achieve its objectives, any course started at the beginning of a term must terminate at the end of the term.

Instructors should therefore devise methods of accurately assessing the trainees to enable them give the student's final grades at the end of the term. A National Examination will be taken by all students who have successfully completed their modules. The final award will be based on the aggregate of the scores attained in the course work and the National Examination.

PROGRAMME: **NATIONAL TECHNICAL CERTIFICATE IN AUTO BODY WORK**

GOAL: This programme is designed to produce skilled craftsmen with good knowledge of auto body repairs and safety practices involve in its operations

CURRICULUM TABLE – COURSE HOURS/WEEK – 12 WEEKS/TERM

COURSE: AUTOBODY WORKS

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE

SUBJECT CODE	**MODULE**	**YEAR I**						**YEAR 2**						**YEAR 3**						**TOTAL HRS PER SUBJECT**	**HOURS PER WEEK**
		Term 1		Term 2		Term 3		Term 1		Term 2		Term3		Term 1		Term 2		Term 3			
		T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P		
CMA 10	Mathematics	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	216	3.00
CPH 10	Physics	2		2		2	2	2	2	2	2	2	2	2	2	2	2	2	0	360	2.0
CCH 10	Chemistry	2	0	2	0	2	0	2	1	2	1	2	1	2	1	2	1	2	1	288	2.0
CEN 10	English Language and Communication	2	0	2	0	2	0	3	0	3	0	3	0	3	0	3	0	3	0	288	3.00
CEC 11-13	Economics	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	216	2.00
ICT 11	Introduction to Computers	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	36	3.00
ICT 12	Computer Application I	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	36	3.00
ICT 13	Computer Application II	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	36	3.00
ICT 13	AutoCAD I	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	36	3.00
ICT 14	AutoCAD II	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	36	3.00

CTD 11	Technical Drawing	0	3	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	108	3.00
CTD 12	Plane Descriptive Geometry	0	0	0	0	0	0	0	3	0	3	0	3	0	0	0	0	0	0	108	3.00
CTD 13	Engineering Drawing	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	2	72	2.00
CME 11	General Metal Work I	2	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	84	7.00
CME 12	General Metal Work II	0	0	0	0	0	0	2	6	0	0	0	0	0	0	0	0	0	0	96	5.00
CAB 11	Introduction to safety in Auto Body Workshop	2	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	96	5.00
CAB 12	Materials, Tools and Equipment in Autobody	0	0	0	0	0	0	2	6	0	0	0	0	0	0	0	0	0	0	96	5.00
CAB 21	Panel Defects and Repair	0	0	0	0	0	0	2	6	2	6	0	0	0	0	0	0			192	8.00
CAB 22	Body Panel Replacement	0	0	2	6	2	6	0	0	0	0	0	0	0	0	0	0	0	0	192	8.00
CAB 31	Vehicle Body Frame and Structural Repair	0	0	0	0	0	0	0	0	2	6	2	6	0	0	0	0	0	0	192	8.00
CAB 23	Body Preparation	0	0	0	0	0	0	0	0	0	0	2	6	2	6	0	0	0	0	192	8.00
CAB 32	Spray Painting and Refinishing	0	0	0	0	0	0	0	0	0	0	0	0	0		2	6	2	6	192	8.00
	TOTAL																			3168	98
CBM 10	Entrepreneurship										2		2	-	-	-	-	-		48	
	GRAND TOTAL																			**3116**	

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN AUTOBODY WORKS		
Course: General Metal Work I	**Course Code: MEC 11**	**Contact Hours 7hrs/wk**

Learning Outcome: On completion of this module the student will be able to:

1. Understand workshop safety rules and regulations and their application in the workshop.
2. Know ferrous and non-ferrous metals in common use
3. Understand the use of common measuring, marking out, cutting and striking tools.
4. Understand the working principles of drilling machine.
5. Understand the application of various types of screw threads and rivets.
6. Produce simple engineering components on the bench.
8. Know lathe machine operations and its uses.

Practical Competence: On completion of this module, the student will be able to:

1. Use all tools correctly ensuring the machinery guards and protective eye shields are used at all times.
2. Comply with the general rules for safe practice in the work environment at all time
3. Use and select hand tools for carrying out various bench fitting and assembly tasks
4. Use tools: such as hacksaws, taps, reamers, drills, dividers, surface gauge
5. Produce threads using taps and dies
6. Correctly grind drill point angles: twist and flat drills
7. Select and set drilling machine speeds to carry out a range of operations.
8. Perform metal joining by a range of processes.
9. Mark out on metals and other materials.

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN AUTOBODY WPRKS						
Module: - General Metal Work I		**Module Code: MEC 11**		**Contact Hours: 7hrs/week**		
Course Specification: Theoretical Content						
	General Objective: 1.0 Understand Workshop Safety Rules and Applications in Machine Shop					
	Theoretical Content			**Practical Content**		
Week	**Specific Learning Objectives**	**Teacher Activity**	**Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	**Resources**
1	1.1 Explain safety rules. 1.2 Explain sources of hazards in the workshop and how to prevent them. 1.3 Explain the application of factory safety regulations in the machine shop.	Explain safety rules Explain sources of hazards in the workshop. Explain the application of factory safety regulations in the machine shop. Explain safety wears and equipment	- Safety equipment - Common hand tools like files hacksaw. - Television - Overall, - Goggles, - Gloves, - Hard shoes, - Head shield, - fire extinguishers. - Ferrous metals - Nonferrous metals - Overhead projector and laptop.	Demonstrate safety practice hazard preventive methods involving: handling and using hand tools, portable power tools and machines; - Select safety equipment and wears essential in a machine shop. - select appropriate safety equipment3 and safety wears in the workshop.	- Guide the students to demonstrate safety practice on how to prevent hazard , involving: handling and using hand tools, portable power tools and machines. using inflammable or corrosive liquids and gases; inhaling vapors or fumes; Guide students on use of safety equipment and wears essential in the machine shop.	- Safety equipment - Common hand tools like files hacksaw. - Television - Overall, - Goggles, - Gloves, - Hard shoes, - Head shield, - fire extinguishers. - Overhead projector and laptop

	1.4 Explain Personal Protective Equipment (PPE) essential in the workshop and their applications in working situations.	and their application.				

General Objective 2.0: Know Ferrous and Non-Ferrous Metals in Common Use						
2	2.1 Explain Ferrous and nonferrous metals 2.2 Explain the physical properties of metals and its composition 2.3 Differentiate between ferrous and nonferrous metals.	- Explain ferrous and non-ferrous and its properties Explain the physical properties of metals and its composition. Explain difference between ferrous and nonferrous metals.	Charts, posters, white board, concrete objects, Marker. Strips. White board, marker. Lesson note. concrete object, and chart.	1.Identify examples of ferrous and nonferrous metals and its properties Identify the composition and physical properties of ferrous and nonferrous.	Demonstrate using appropriate resources to determine composition and physical properties Test the physical properties of metals Demonstrate the different manufacturing process involved carbon steel.	Hand-held Photo Multimedia Charts, Furnace,

	2.4 Explain the application of plain carbon steel cast iron and alloy steel . 2.5 Explain the following: a) cupula process of manufacturing of cast iron; b.) blast furnace process of manufacture of pig iron; 2.6 Explain merit and demerit of ferrous and nonferrous metals,	Explain the application of plain carbon steel cast iron and alloy steel. Explain the following: a) cupula process of manufacturing of cast iron; b.) blast furnace process of manufacture of pig iron; Explain the merit and demerit of nonferrous metals.	Marker, white board, concert object.	Identify the application of plain carbon steel, cast iron and alloy steel Identify the manufacturing process involved in Cupola Furnace, Blast Furnace and equipment, Show the merit and demerit of ferrous and nonferrous metals .	Show students how metal steel are being produce, Demonstrate the manufacturing process of producing pig iron. Identify the manufacturing process involved in Cupola Furnace, Blast Furnace and equipment,	

General Objective 3.0: Understand the Use of Common Measuring, Marking-out, Cutting and Striking Tools.						
3-4	3.1 list units of measurement. 3.2 Explain "line" and "end" measurement 3.3 Define accuracy in measurement. 3.4 Explain the use of datum points, datum lines and datum faces in marking out. 3.5 Explain the application of the following instruments; marking tools, steel rule, dividers, trammel, scriber, surface plate, vee-	Explain units of measurement. Explain the differences between "line" and "end" measurement. Explain the term accuracy in measurement. Explain the use of datum point, datum lines and datum faces in marking out. Explain the application in 3.5	Diagrams , pictures, object, marker, tape. Charts Multimedia Whiteboard Pictorials Concrete object Video, charts, white board marker, textbooks,	Identify the conversion in both Imperial and SI units for length, mass, area, volume Measure various items using measuring tools Carry out line and end measurement on any material Practice marking out activities using datum points, datum line Demonstrate how to use measuring instrument. Identify how to use template. Identify the process of cutting of metals.	***Guide students to:*** Identify the conversion in both Imperial and SI units for length, mass, area, volume Measure various items Carry out line and end measurement on any material Practice marking out activities using datum points, datum line Demonstrate how to use measuring instrument. Identify how to use template. Identify the process of cutting of metals	Micrometer screw gauge, Vernier caliper, Vernier height gauge, Digital micrometer Steel rule, dividers, trammel, scriber angle plate, vee-block, Centre punch, Try square, straight snips, side cutting pliers, hacksaw, chisel and guillotine

	block, Centre punch, try square.			Identify various types of files and its uses	Identify various types of files and its uses	
	3.6 Explain the use of template in marking-out operation	Explain the use of template in marking-out operation				Guide students on how to use template for marking out.
	3.7 Explain the uses of cutting tools.	Explain the uses of cutting tools				Guide students in cutting of metals
	3.8 list the various types of files, their grades and applications.	Explain the various types of files, their grades and applications.				
	3.8 Explain the functions of of a bench vice and its holding power while performing various operations	Explain the functions of of a bench vice and its holding power while performing various operations				

	3.9 Explain the uses of the following striking tools	Explain the use of the following striking tools				

General Objective 4.0: Understand the Working Principles of a Drilling Machine						
5-6	4.1 Explain the various types of drilling machines such as: -Bench drill, -Breast drill, -Pillar drill, -drill bits. 4.2 Explain the main features of a bench or pillar drilling machine. 4.3 Describe the cause and remedy of drilling faults 4.6 State the safety precautions to be observed	Explain the various types of drilling machines such as: -Bench drill, -Breast drill, -Pillar drill, -drill bits. Explain the main features of a bench or pillar drilling machine. Explain the cause and remedy of drilling faults		Sketch types of drilling machine and label them Identify the features of a bench or a pillar drilling machine. Demonstrate the use of the following drills: - twist drill - flat drill - countersink drill - counter bore drill - combination Centre drill Carry out a project that involves the use of drilling machine while observing safety precautions	Guide students to: Sketch types of drilling machine and label them Identify the features of a bench or a pillar drilling machine. Demonstrate the use of the following drills: - twist drill - flat drill - countersink drill - counter bore drill - combination Centre drill Carry out a project that involves the use of drilling machine while observing safety precautions	Charts Multimedia Drilling machines and their accessories.

	when using a drilling machine.	Explain the safety precautions to be observed when using a drilling machine.				

	General Objective 5.0: Understand the Application of Various Types of Screw Threads and Rivets					
7-8	5.1 Explain the various thread forms and their uses 5.2 State the functions of: - a. taps b. tap wrench c. die and die stock. 5.3 Explain the meaning of tapping size and tapping drill. 5.4 State precautions to be taken when taping on the bench.	Explain the various thread forms and their uses Explain the functions of: a. taps b. tap wrench c. die and die stock. 5.3 Explain the meaning of tapping size and tapping drill. 5.4 State precautions to be taken	Rivet set	Sketch various types of thread forms Sketch the following: - a. taps (taper tap, second tap, plug) b. tap wrench c. die and die stock. Practice the use of taps, tap wrench and die and die Carry out taping on the bench Identify the types of rivets Sketch rivet set	Guide student to: Sketch various types of thread forms Sketch the following: - a. taps (taper tap, second tap, plug) b. tap wrench c. die and die stock. Practice the use of taps, tap wrench and die and die Carry out taping on the bench Identify the types of rivets Sketch rivet set	Diagrams of thread forms. Diagrams of rivets

	5.5 Describe the types of rivets.	when taping on the bench. 5.5 Describe the types of rivets.				

	General Objective: 6.0: Know Lathe Machine Operations and their Uses					
9-10	6.1 Explain the term lathe machine 6.2 Explain the types of lathe machine 6.3 Explain the essential features 6.4 Explain function of a lathe machine 6.5 Explain the working principles of the lathe machine.	Explain the term lathe machine Explain the types of lathe machine Explain the essential features Explain function of a lathe machine Explain the working principles of the lathe machine.	- Lesson notes - Diagrams and charts	Sketch three types of common lathe machine Operate lathe machine while observing the relevant safety precautions Set up the lathe for use in line with standard Carry out basic turning operations between centres with the assigned workpiece	Guide students to: Sketch three types of common lathe machine Operate lathe machine while observing the relevant safety precautions Set up the lathe for use in line with standard Carry out basic turning operations between centres with the assigned workpiece	Charts pictorials

	6.6 Describe common tools used in lathe machine: e.g butt-brazed tool, tipped tool bit etc. 6.7 Explain how to set up the lathe for carrying out turning between centres while observing safety precautions	Explain common tools used in lathe machine: e.g butt-brazed tool, tipped tool bit etc. Explain how to set up the lathe for carrying out turning between centres while observing safety precautions				

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN AUTOBODY WORKS		
MODULE: GENERAL METAL WORK II	**MODULE CODE : MEC 12**	**CONTACT HOURS: 8hrs/wk**

GOAL: The module is designed to introduce the trainees to basic processes in Mechanical Engineering such as forging, sheet-metal work and welding.

General Objectives:

On completion of this module, the trainees should be able to:

1. Understand the basic principles and processes of heat treatment of metal in the workshop.
2. Produce simple engineering components by forging.
3. Understand the basic principles and techniques of gas and metal arc welding.

PRACTICAL COMPETENCE: On completion of this module students will be able to:

1. Carry out heat treatment of metal in the workshop
2. Produce simple engineering components by forging
3. Carryout gas/arc welding and apply them in fabricating simple engineering components

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN AUTOBODY WORKS						
MODULE: GENERAL METAL WORK II		**MODULE CODE: MEC 12**			**CONTACT HOURS: 8hrs/wk**	
MODULE SPECIFICATION: KNOWLEDGE REQUIREMENTS						
GENERAL OBJECTIVES: General Objective 1.0: Understand the Basic Principles and Processes of Heat Treatment of Metal in the Workshop.						
THEORETICAL CONTENT				**PRACTICAL CONTENT**		
WEEK	**Specific Learning Outcome:**	**Teacher Activities**	**Resources**	**Specific learning outcome**	**Teacher activity**	**Resources**
1-4	1.1 Define heat treatment of metals. 1.2 Explain the process 0f heat treatment of metals 1.3State safety precautions relating to heat treatment processes and apply them in given situations. 1.4 State the importance of heat treatment of metal.	Explain Heat treatment of metals. Explain the following process of heat treatment of metal a. Hardening b. Tempering c. Annealing d. Normalizing Discuss hardening metal work. Discuss safety precautions relating to heat treatment processes and apply them in given situations. Discuss the importance of heat treatment of metal.	Electric furnace Blast furnace Tubular furnace Sample of metals	Select different types of metals in the workshop. a. Hardening b. Tempering c. Annealing d. Normalizing e. Case-hardening Select safety equipment and wears in relation to its treatment.	Guide the students to select different types of metals in the workshop Guide the students to identify structural behavior of plain carbon steel when heated for the purposes of metal heat treatment.	.

General Objective 2.0: Understand the Techniques of Producing Simple Engineering Components by Forging.						
5-6 **7-8**	2.1 Describe the main feature of the black smith's forge. 2.2 Explain the working principles of the black smith's forge. 2.3 State the functions of common forging tools such as anvil, swage block, leg vice, forging hammers, hot and cold sets, set hammer, punches and drifts, press, fullers, top and bottom swages flatter, tongs (open mouth, closed mouth, hollow bit, etc.). 2.4 Describe the following forging operations: a. upsetting b. drawing down c. setting down d. twisting e. forge welding (scarf and splice welds) f. bending g. forming closed ring	Discuss the main feature of the black smith's forge. Discuss the working principles of the black smith's forge. State the functions of common forging tools such as anvil, swage block, leg vice, forging hammers, hot and cold sets, set hammer, punches and drifts, press, fullers, top and bottom swages flatter, tongs (open mouth, closed mouth, hollow bit, etc.). Discuss the following forging operations: a. upsetting b. drawing down c. setting down d. twisting e. forge welding (scarf and splice welds) f. bending	- Charts - poster	Sketch the main features and working principles of the black smith's forge. Sketch common forging tools select forging tools available in the workshop Carry out following forging operations: a. upsetting b. drawing down c. setting down d. twisting e. forge welding (scarf and splice welds) f. bending g. forming closed ring h. forming an eye.	Show students the main features of the black smith's forge Show students forging tools in the workshop Demonstrate forging operations such as upsetting, drawing down, setting down, twisting, forge, welding (scarf and splice welds), bending, forming closed ring, forming an eye etc	

	h. forming an eye.	g. forming closed ring h. forming an eye.				

General Objective 3.0: Understand the Basic Principles and Techniques of Gas and Metal Arc Welding						
	3.1 Define welding 3.2 Explain the principles and application of gas welding. 3.3 Explain the equipment used for gas welding.	Discuss welding Discuss the principles and application of gas welding. Discuss the equipment used for gas welding.	- Oxygen cylinder acetylene cylinder regulations arc welding set goggles, shield electrode. - Diagrams and charts of various welding joints, and techniques.	Select equipment used for gas welding Prepare metal joint for gas welding Join metals together by gas welding while observing the relevant safety precautions	Show Students equipment used for gas welding Demonstrate how to prepare joint for welding	

	3.4 State the safety precautions to be observed in carrying out gas welding 3.5 Explain the principle and application with metal arc welding. 3.6 Describe the equipment used for metal arc welding.	Discuss safety precautions to be observed in carrying out gas welding Discuss the principle and application with metal arc welding. Discuss the equipment used for metal arc welding. Discuss the safety precautions to be observed in carrying out gas welding		Select equipment used for metal arc welding Select consumables used for metal arc welding Join metals together by arc welding operation while observing relevant safety precautions Produce a project that will involve the gas and metal arc welding processes	Demonstrate gas welding operation Check for students' compliance to relevant safety precautions Show Students equipment and consumables used for metal arc welding Demonstrate the use of metal arc welding machine	

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN AUTOBODY WORKS

MODULE: CAB 11: INTRODUCTION TO SAFETY IN AUTO BODY WORKSHOP

DURATION: 96 HOURS

GOAL: This module is designed to acquaint the students with the knowledge and skills to effectively observe safely in auto body Workshop.

GENERAL OBJECTIVES:
On completion of this course the students should be able to: 1.0 Observe safety procedures in auto body workshop 2.0 Understand safety signs, symbols and Codes 3.0 Understand hazard and accident prevention.

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN AUTOBODY WORKS.						
Module: - INTRODUCTION TO SAFETY IN AUTO BODY WORKSHOP				**Module Code: CAB 111**	**Contact Hours: 8hrs/week**	
Course Specification: Theoretical Content						
Week	**General Objective: 1.0 Observe safety procedures in auto body workshop**					
	Theoretical Content			**Practical Content**		
	Specific Objectives	**Teacher Activity**	**Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	**Resources**
1-3	1.1 Define safety 1.2 List the Personal Protective Equipment used in an auto body shop 1.3 List safety precautions as related to autobody workshop 1.4 Explain regular inspection of gas leaks 1.5 Explain how to store flammable products properly.	Explain safety Explain different PPE and their uses Explain fire and health safety precautions. Explain regular inspection of gas leaks Explain how to store flammable products properly.	Recommended Textbooks, Marker/marker board, Duster, Charts, video chips diagrams etc.	Observe safety precaution in autobody shop Use the Personal Protective Equipment in an auto body shop correctly Demonstrate fire and health safety precautions Carry out regular inspection of gas leaks Store flammable products properly.	Guide students to: Observe safety precaution in autobody shop Use the Personal Protective Equipment in an auto body shop correctly Demonstrate fire and health safety precautions Carry out regular inspection of gas leaks Store flammable products properly	

General Objective 2.0: Understand Safety Signs, Symbols and Codes						
4-6	2.1 Explain the different types of safety signs 2.2 Explain the importance of safety codes and symbols 2.3 Interpret safety codes used in autobody shops	Explain 2.1 to 2.3 to the students with detail notes	, white board maker and cleaner text books.	Identify the different types of safety signs . Sketch safety signs and symbols Identify the various safety color codes	Guide students to: Identify the different types of safety signs . Sketch safety signs and symbols Identify the various safety color codes	Safety charts Pictorials

General Objective 3.0: Understand Hazard and Accident Prevention						
7-9	3.1 Explain workshop hazard and prevention 3.2 List types of hazard in the workshop 3.3 Mention Sources of accident in the workshop 3.4 Describe hazards recognition techniques 3.5 Explain Hazard control methods	Explain the workshop hazard and prevention Explain the Sources of accident in the workshop Explain the types of hazard in the workshop to the students. Explain hazards recognition techniques Explain Hazard control methods	Text book White board Marker Diagrams Signs and symbols	Identify sources of hazard and how to prevent it. Identify hazard in the workshop Identify the type of hazard in the workshop. Apply hazards recognition techniques Apply hazard control methods in controlling specified hazards in the workshop	Guide student to: Identify sources of hazard and how to prevent it. Identify hazard in the workshop Identify the type of hazard in the workshop. Apply hazards recognition techniques	

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN AUTOBODY WORKS

MODULE : CAB 112 : MATERIALS, TOOLS AND EQUIPMENT IN AUTOBODY

DURATION: 96 HOURS

GOAL: This module is designed to introduce the trainees to the usage of Materials, Tools and Equipment in Autobody.

GENERAL OBJECTIVES:
On completion of this course the students should be able to: 1.0 Understand the characteristics and types of materials used in autobody repairs 2.0 Understand the characteristics and types of materials for vehicle body 3.0 Understand the application of tools used in autobody repairs 4.0 Maintain tools and equipment in autobody shop

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN AUTOBODY WORKS						
Course : MATERIALS, TOOLS AND EQUIPMENT IN AUTOBODY			**Course Code : CAB 112**		**Contact Hours: 8hrs/week**	
Course Specification: Theoretical/Practical Content						
General Objective 1.0: Understand the characteristics and types of materials used in autobody						
Theoretical Content				**Practical Content**		
Week	**Specific Objectives**	**Teacher Activity**	**Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	**Resources**
1-2	1.1 List the common materials used in an autobody workshop	Explain the common materials used in an autobody workshop	Chart Pictures Diagrams Whiteboard Marker Cleaner	Demonstrate different materials in autobody workshop	Guide students to: Demonstrate different materials in autobody workshop	Models Video clips Body Filler Putty Filler Scriber etc
	1.2 Mention the characteristics and properties of fillers	Explain the characteristics and properties of fillers		Use filler to fill a dent	Use filler to fill a dent	
	1.3 Differentiate between the various types of fillers	Explain between the various types of fillers		Apply putty on a vehicle panel	Apply putty on a vehicle panel	
	1.4 Mention the types of abrasives and their uses	Explain the types of abrasives and their uses				
	1.5 Mention the types of scalars and their uses.	Explain the types of scalars and their uses.				
	1.6 Explain the characteristics of various putty filler	Explain the characteristics of various putty filler				

General Objective 2.0: Understand the characteristics and types of materials for vehicle body						
3-4	**2.1** List the various metals used for vehicle building **2.2** Explain the characteristics and properties of different metals **2.3** Explain the importance of selecting the correct metal for panel beating application	Explain the various metals used for vehicle building Explain the characteristics and properties of different metals Explain the importance of selecting the correct metal for panel beating application	Chart Pictures Diagrams Models Video clips Whiteboard Marker Cleaner	Identify the various metals used for vehicle building Determine the strength of a given metal	Guide students to: Identify the different materials in the workshop Determine the strength of a given metal	Sample Metals (Steel, aluminum, fiberglass) Plastics, Composites

General Objective: 3.0 Understand the application of tools used in autobody repairs						
5-6	3.1 State the different classifications of tools, e.g. • Measuring tools • Hand tools • Lifting equipment • Machine tools 3.2 List examples of tools in the various classifications:	Explain the different classifications of tools, e.g. • Measuring tools • Hand tools • Lifting equipment • Machine tools Explain examples of tools in the various classifications:	Tool box Chart Pictures Diagrams Whiteboard Marker Cleaner	Identify various tools in the workshop Sketch 5 hand tools identified in the workshop	Guide student to	Sample Metals (Steel, aluminum, fiberglass) Plastics, Composites

	• Measuring tools • Hand tools • Lifting equipment • Machine tools 3.3 Explain the applications of the different classes of hand tools and equipment 3.4 State the reasons why tools/equipment needs maintenance 3.5 Explain tools/equipment maintenance task e.g • Lubrication • Cleaning • Safety adjustment • Proper storage	• Measuring tools • Hand tools • Lifting equipment • Machine tools Explain the applications of the different classes of hand tools and equipment Explain the reasons why tools/equipment needs maintenance Explain tools/equipment maintenance task e.g • Lubrication • Cleaning • Safety adjustment • Proper storage		Make use of the identified tools to carry out a simple task Perform a simple maintenance task on some tools Carry out simple adjustment and setting of tools		

General Objective:.4.0 Maintain tools and equipment in autobody shop						
7-9	4.1 Explain the term tools storage 4.2 Explain the importance of periodic maintenance of tools and equipment 4.3 Explain the maintenance requirement for common autobody hand tools and equipment 4.4 Explain the importance of tools inspection and repair 4.5 State the advantages of tools storage	Explain the term tools storage Explain the importance of periodic maintenance of tools and equipment Explain the maintenance requirement for common autobody hand tools and equipment Explain the importance of tools inspection and repair Explain the advantages of tools storage	Marker Chart Manuals White board Model Instructional Material Video chip	Clean, Lubricate and store hand tools Identify faulty hand tools and carryout repairs Perform routine maintenance on tools and equipment	Guide students to: Clean, Lubricate and store hand tools Identify faulty hand tools and carryout repairs Perform routine maintenance on tools and equipment	Workshop tools and equipment

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN AUTOBODY WORKS

MODULE : **CAB 211 PANEL DEFECTS AND REPAIR**

DURATION: **192 HOURS**

GOAL: This course is designed to acquaint the students with knowledge on panel defects and skills to repair defected panel using different techniques.

GENERAL OBJECTIVES:
On completion of this course the students should be able to: 1.0 Know the types of vehicle panel defects 2.0 Assess defects on vehicle panels 3.0 Understand repair methods and techniques

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN AUTOBODY WORKS.						
COURSE : PANEL DEFECTS AND REPAIR		**Course Code : CAB 21**		**Contact Hours: 8hrs/week**		
Module: Specification: Theoretical and Practical Content.						
General Objective: 1.0 Know the types of vehicle panel defects						
Theoretical Content				**Practical Content**		
Week	**Specific Objectives**	**Teacher Activity**	**Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	**Resources**
1-2	1.1 Define Defects 1.2 List the common types of defects. 1.3 Explain the causes of panel defects 1.4 Explain the classifications of Panel defects	Explain Defects Explain the common types of defects. Explain the causes of panel defects Explain the classifications of Panel defects	Body panels Marker Video clips Pictures White board	Identify dent on vehicle panel Identify scratch on vehicle panel Identify rust on vehicle panel Identify Holes on vehicle panel Identify bump on a panel	***Guide students to:*** Identify dent on vehicle panel Identify scratch on vehicle panel Identify rust on vehicle panel Identify Holes on vehicle panel Identify bump on a panel	Demo Car Vehicle Panels

General Objective 2.0: Assess defects on vehicle panels						
3-4	2.1 Explain the importance of assessing defects. 2.2 Explain how to evaluate defects on vehicle panels 2.3 Explain factors to consider in	Explain the importance of assessing defects. Explain how to evaluate defects on vehicle panels	Body panels Marker Video clips Pictures White board	Carryout Inspection on a damaged panel Assess the extent of damage on the panel Demonstrate various panel repair techniques	***Guide students to:*** Carryout Inspection on a damaged panel Assess the extent of damage on the panel Demonstrate various panel repair techniques	Vehicle panels

	determining an effective repair method for defects	Explain factors to consider in determining an effective repair method for defects				

General Objective 3.0: Understand repair methods and techniques						
Week 11-12	3.1 Explain the procedures for repairing panel defects 3.2 Explain the types of repair methods. 3.3 Explain the various repair techniques 3.4 List the tools used for repairing panel defects 3.5 Explain the safety precautions when repairing defects	Explain the procedures for repairing panel defects Explain the types of repair methods. Explain the various repair techniques Explain the tools used for repairing panel defects Explain the safety precautions when repairing defects	Body panels Marker Video clips Pictures White board Tool box	Identify dent on vehicle panel Remove dent on panel using hammer and dolly Remove scratch on a painted surface using fine abrasive paper Remove dent on a panel using a dent puller	Identify dent on vehicle panel Remove dent on panel using hammer and dolly Remove scratch on a painted surface using fine abrasive paper Remove dent on a panel using a dent puller	Vehicle panels Dolly blocks Hammer Dent Puller Tool box

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN AUTOBODY WORKS

MODULE : **CAB 22 BODY PANEL REPLACEMENT**

DURATION: **192 HOURS**

GOAL: This module is designed to acquaint the students with knowledge and skills for removal and replacement of vehicle body panels.

GENERAL OBJECTIVES:
On completion of this course the students should be able to: 1.0 Observe safety measures in panel removal and replacement 2.0 Use panel removal and replacement tools appropriately 3.0 Understand panel removal and replacement techniques 4.0 Know panel alignment and measurement techniques

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN AUTOBODY WORKS.						
MODULE : BODY PANEL REPLACEMENT		**Module Code : CAB 22**		**Contact Hours: 8hrs/week**		
Module: Specification: Theoretical and Practical Content.						
General Objective: 1.0 Observe safety measures in panel removal and replacement						
Theoretical Content				**Practical Content**		
Week	**Specific Objectives**	**Teacher Activity**	**Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	**Resources**
1-2	1.1 Explain the use of proper personal protective equipment. 1.2 List the safety procedures in panel removal and replacement 1.3 Explain the importance of panel support	Explain the use of proper personal protective equipment. Explain the safety procedures in panel removal and replacement Explain the importance of panel support	PPE Chart Pictures Marker Video clips White board	Demonstrate proper use of PPE Use panel support device to support a panel Carryout proper cleaning of workshop area Identify potential hazards associated with panel removal	***Guide students to:*** Demonstrate proper use of PPE Use panel support device to support a panel Carryout proper cleaning of workshop area Identify potential hazards associated with panel removal	PPE Panel Support

General Objective: 2.0 Use panel removal and replacement tools appropriately						
Week	**Specific Objectives**	**Teacher Activity**	**Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	**Resources**
3-4	2.1 Define Hand Tools 2.2 List hand tools used in panel removal and replacement	Explain tools used in panel removal and replacement - Hand tools - Power tools - Special tools	Tool Box Pictures Marker Video clips White board	Identify Hand tools Demonstrate the use of hand tools in 1.1 above	Demonstrate and guide students to use hand tools, power tools and specialized tools	Complete panel beating tool box

	2.3 Explain how to maintain hand tools 2.4 Define Power tools 2.5 List power tools used in panel removal and replacement 2.6 Explain how to maintain power tools 2.7 List specialized tools used in panel removal and replacement	Explain how to maintain tools used in panel removal and replacement Explain Power tools Explain power tools used in panel removal and replacement Explain how to maintain power tools Explain specialized tools used in panel removal and replacement		Identify power tools Demonstrate the use of power tools Identify specialized tools Demonstrate the use of the identified specialized tools		

General Objective: 3.0 Understand panel removal and replacement techniques						
Week	**Specific Objectives**	**Teacher Activity**	**Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	**Resources**
5-7	3.1 Explain removal techniques for various panel types 3.2 Explain replacement	Explain removal techniques for various panel types	• Demo car • Pictures • Marker • Video clips • White board	Remove the following panels • Bonnet • Doors • Fenders • Boot	***Guide students to:*** Remove the following panels • Bonnet • Doors • Fenders	• Demo Car • Complete tool box

	techniques for various panel types 3.3 Explain specialized replacement tools	Explain replacement techniques for various panel types Explain specialized replacement tools		• Bumper 1.1 Replace the panels that were removed in 1.1 above 1.2 Check that the replaced panels are well fitted	• Boot • Bumper Replace the panels that were removed in 1.1 above Check that the replaced panels are well fitted	

General Objective: 4.0 Know panel alignment and measurement techniques						
Week	**Specific Objectives**	**Teacher Activity**	**Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	**Resources**
8-9	4.1 Explain the importance of accurate panel alignment 4.2 Explain panel alignment methods 4.3 Explain the importance of precise measurement 4.4 Explain measurement points on vehicle panels	Explain the importance of accurate panel alignment Explain panel alignment methods Explain the importance of precise measurement Explain measurement points on vehicle panels	Chart Pictures Marker Video clips White board	Inspect a vehicle for damaged or misaligned panels Use measuring tools to record the following: • Panel dimension • Gaps • Alignment Carry out alignment on a misaligned panel Use alignment gauge to ensure accurate panel alignment and measurement	***Guide students to:*** Inspect a vehicle for damaged or misaligned panels Use measuring tools to record the following: • Panel dimension • Gaps • Alignment Carry out alignment on a misaligned panel Use alignment gauge to ensure accurate panel alignment and measurement	Demo Car Calipers Micrometers Measuring Tape Panel Alignment guage

	4.5 List common errors in panel alignment and measurement	Explain common errors in panel alignment and measurement				

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN AUTOBODY WORKS

MODULE : CAB 31 VEHICLE BODY FRAME AND STRUCTURAL REPAIR

DURATION: 192 HOURS

GOAL: This module is designed to acquaint the students with knowledge and skills for the repair of vehicle body frame and structures

GENERAL OBJECTIVES:
On completion of this course the students should be able to: 1.0 Know the different component of vehicle body frame 2.0 Understand various damages that can occur to vehicle body frame 3.0 Know the effective repair strategies for different damages 4.0 Straighten and align structural damage

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN AUTOBODY WORKS.						
MODULE : VEHICLE BODY FRAME AND STRUCTURAL REPAIR				**Module Code : CAB 31**		**Contact Hours: 8hrs/week**
Module: Specification: Theoretical and Practical Content.						
General Objective: 1.0 Know the different component of vehicle body frame						
Theoretical Content				**Practical Content**		
Week	**Specific Objectives**	**Teacher Activity**	**Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	**Resources**
1-2	1.1 Explain functions of vehicle frame 1.2 Describe the materials of construction for vehicle frames 1.3 Mention the various components of vehicle body frames 1.4 Describe the functions of the following • Frame rail • Roof structure • Body mounts	Explain functions of vehicle frame Explain the materials of construction for vehicle frames Explain the various components of vehicle body frames Explain the functions of the following • Frame rail • Roof structure Body mounts	Demo Car Pictures Marker Video clips White board	Identify various components of vehicle body frame Inspect the following and the type of damage on them • Frame rail • Roof structure • Body mounts • Pillar	***Guide students to:*** Identify various components of vehicle body frame Inspect the following and the type of damage on them • Frame rail • Roof structure • Body mounts • Pillar	Demo car

General Objective: 2.0 Understand various damages that can occur to vehicle body frame						
Week	**Specific Objectives**	**Teacher Activity**	**Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	**Resources**
3-4	2.1 List the damages that can occur on	Explain the damages that can occur on vehicle body frames	Demo Car Pictures Marker	Examine a vehicle frame for damages	***Guide student to:*** Examine a vehicle frame for damages	

	vehicle body frames 2.2 Explain the following: • Deformation • Cracks • Corrosion • Fractures 2.3 Explain wear of body mounts and bushings 2.4 Explain the causes of damages o vehicle body panels	Explain the following: • Deformation • Cracks • Corrosion • Fractures Explain wear of body mounts and bushings Explain the causes of damages o vehicle body panels	White board	Identify damages on • Body frame • Vehicle floor • Roof • Body Mounts Demonstrate how to minimize damage on vehicle body frames	Identify damages on • Body frame • Vehicle floor • Roof • Body Mounts Demonstrate how to minimize damage on vehicle body frames	

General Objective: 3.0 Know the effective repair strategies for different damages						
Week	**Specific Objectives**	**Teacher Activity**	**Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	**Resources**
5-7	3.1 Differentiate between frame and structural damages 3.2 Describe the following frame damages • Cracks and fractures • Bends and Kinks	Explain difference between frame and structural damages Explain be the following frame damages • Cracks and fractures • Bends and Kinks	Demo car Pictures Marker Video clips White board	Examine a vehicle frame for damages Identify damages on • Body frame • Vehicle floor • Roof • Body Mounts	***Guide student to:*** Examine a vehicle frame for damages Identify damages on • Body frame • Vehicle floor • Roof • Body Mounts	Demo Car Welding Equipment Toolbox Reinforcement materials

	• Corrosion and Rust • Wear and tear 3.3 Describe the following structural damages • Body mount • Unibody damage • Roof damage • Pillar damage 3.4 Describe the following impact-related damages • Front-End damage • Rear-End damage • Side Impact Damage 3.5 Enumerate the various techniques for repairing damages on vehicle body frame and structures	• Corrosion and Rust • Wear and tear Explain the following structural damages • Body mount • Unibody damage • Roof damage • Pillar damage Explain the following impact-related damages • Front-End damage • Rear-End damage • Side Impact Damage Explain the various techniques for repairing damages on vehicle body frame and structures		Demonstrate how to repair damages on vehicle fames and structures using different repair techniques	Demonstrate how to repair damages on vehicle fames and structures using different repair techniques	

General Objective: 4.0 Straighten and align structural damage						
Week	**Specific Objectives**	**Teacher Activity**	**Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	**Resources**

8-9	4.1 Explain the principles of frame straightening 4.2 Describe the various types of straightening equipment • Hydraulic rams • Damaged dozer 4.3 Explain the importance of proper alignment in vehicle structural repair 4.4 Explain laser alignment system and string alignment system	Explain the principles of frame straightening Explain the various types of straightening equipment • Hydraulic rams • Damaged dozer Explain the importance of proper alignment in vehicle structural repair Explain laser alignment system and string alignment system	Demo Car Pictures Marker Video clips White board	Inspect a vehicle for damaged or misaligned panels Straighten a deformed structure Repair cracks on vehicle body frame Repair leaks on the roof panel Carryout repair of bends and kinks Repair corrosion defect on vehicle body frame	***Guide student to:*** Inspect a vehicle for damaged or misaligned panels Straighten a deformed structure Repair cracks on vehicle body frame Repair leaks on the roof panel Carryout repair of bends and kinks Repair corrosion defect on vehicle body frame	Demo Car Hydraulic rams Damaged dozer Alignment materials

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN AUTOBODY WORKS

MODULE : **CAB 23 BODY PREPARATION**

DURATION: **192 HOURS**

GOAL: This module is designed to acquaint the students with knowledge and skills for preparing vehicle body and make ready for spray painting or refinishing

GENERAL OBJECTIVES:
On completion of this course the students should be able to: 1.0 Understand the different methods and steps of surface preparation 2.0 Apply filler on panel surface 3.0 Select appropriate abrasive paper for body preparation 4.0 Understand the importance of masking

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN AUTOBODY WORKS.						
MODULE : BODY PREPARATION				**Module Code : CAB 23**		**Contact Hours: 8hrs/week**
Module: Specification: Theoretical and Practical Content.						
General Objective: 1.0 Understand the different methods and steps of surface preparation						
Theoretical Content				**Practical Content**		
Week	**Specific Objectives**	**Teacher Activity**	**Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	**Resources**
1-2	1.1 Define Surface Preparation 1.2 Explain the different methods of body preparation 1.3 Outline the steps involved in body preparation 1.4 List the materials and tools used for body preparation	Explain Surface preparation Explain the methods of surface preparation Explain the steps involved in body preparation Explain the use of material and tools for body preparation activities	Pictures Marker Video clips White board	Identify materials used for body preparation Identify tools used for body preparation Demonstrate the step by step procedure of surface preparation	***Guide student to:*** Identify materials used for body preparation Identify tools used for body preparation Demonstrate the step by step procedure of surface preparation	Sandpaper Scriber Filler Cleaning towel Sanding block Sanding pad Bucket Water

General Objective: 2.0 Apply filler on panel surface						
Week	**Specific Objectives**	**Teacher Activity**	**Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	**Resources**
3-4	2.1 List the types of fillers 2.2 Explain the characteristics of fillers	Explain the types of fillers Explain the characteristics of fillers	Pictures Marker Video clips White board	Identify the appropriate type of fillers for different types of body damage	***Guide student to:*** Identify the appropriate type of fillers for different types of body damage	Body filler Putty Filler Plastic fiber Hardener Body Panel

	2.3 Differentiate between body fillers and putty fillers 2.4 Explain the importance of proper curing of fillers 2.5 Explain the common problem associated with fillers	Explain the difference between body fillers and putty fillers Explain the importance of proper curing of fillers Explain the common problems associated with fillers		Demonstrate the proper technique for mixing and applying filler on a flat surface Demonstrate the proper technique for applying filler on a curve surface	Demonstrate the proper technique for mixing and applying filler on a flat surface Demonstrate the proper technique for applying filler on a curve surface	

General Objective: 3.0 Select appropriate abrasive paper for body preparation						
Week	**Specific Objectives**	**Teacher Activity**	**Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	**Resources**
5-7	3.1 Explain the difference between closed coat and open coat sand paper 3.2 Explain the grit numbering of sand papers 3.3 Explain Hand sanding and Power Sanding	Explain closed coat and open coat sand paper Explain the grit numbering of sand papers and texture Explain Hand sanding and Power Sanding Explain common problems with sandpaper	Pictures Marker Video clips White board	Identify the different grits of sandpaper Demonstrate the proper technique for using sandpaper Use 220grit sandpaper to sand body filler on a surface Use a power sander to carry out sanding operation	***Guide student to:*** Identify the different grits of sandpaper Demonstrate the proper technique for using sandpaper Use 220grit sandpaper to sand body filler on a surface	Different grits of sandpapers Sanding Machine Sanding Block Water Bucket

	3.4 Explain common problems with sandpaper • Clogging • Uneven sanding 3.5 Explain Dry and Wet sanding	• Clogging • Uneven sanding Explain Dry and Wet sanding			Use a power sander to carry out sanding operation	

General Objective: 4.0 Understand the importance of masking						
Week	**Specific Objectives**	**Teacher Activity**	**Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	**Resources**
8-9	4.1 Explain Masking process 4.2 List the materials used for masking 4.3 Explain the importance of masking 4.4 List some critical masking areas 4.5 Explain why newspaper is suitable for masking	Explain Masking process Explain materials and tools used for masking Explain the importance of masking Explain some critical masking areas Explain why newspaper is suitable for masking	Pictures Marker Video clips White board	Identify the different types of masking materials Identify some critical masking areas Demonstrate proper technique for masking a vehicle prior to painting	***Guide student to:*** Identify the different types of masking materials Identify some critical masking areas Demonstrate proper technique for masking a vehicle prior to painting	Demo Car Masking Tape Masking Paper Cover cloth

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN AUTOBODY WORKS

MODULE : **CAB 33 SPRAY PAINTING AND REFINISHING**

DURATION: **192 HOURS**

GOAL: This module is designed to acquaint the students with knowledge and skills involve in spray painting operations

GENERAL OBJECTIVES:
On completion of this course the students should be able to: 1.0 Understand paint and its composition 2.0 Understand the types of automotive paint 3.0 Know the tools and equipment used in spray painting 4.0 Understand the techniques in spray painting

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN AUTOBODY WORKS.						
MODULE : SPRAY PAINTING AND REFINISHING				**Module Code : CAB 33**		**Contact Hours: 8hrs/week**
Module: Specification: Theoretical and Practical Content.						
General Objective: 1.0 Understand paint and its composition						
	Theoretical Content			**Practical Content**		
Week	**Specific Objectives**	**Teacher Activity**	**Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	**Resources**
1-2	1.1 Define Paint 1.2 List the composition of paint 1.3 Explain the properties of paint 1.4 Mention the types of paint 1.5 Differentiate between water soluble and oil soluble paint 1.6 Explain the functions of paint	Explain Paint Explain the composition of paint Explain the properties of paint Explain the types of paint and their application Explain the difference between water soluble and oil soluble paint Explain the functions of paint	Water Paint Oil Paint Pictures Marker Video clips White board	Identify various paint components Apply Emulsion paint on a surface Apply oil paint on a surface	***Guide student to:*** Identify various paint components Apply Emulsion paint on a surface Apply oil paint on a surface	Binder Pigment Additive Solvent Emulsion paint Oil Paint Brush

General Objective: 2.0 Understand the types of automotive paint						
Week	**Specific Objectives**	**Teacher Activity**	**Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	**Resources**
3-4	2.1 List the types of automotive paints 2.2 Describe the characteristics of different automotive paint 2.3 List the solvents used for automotive paint 2.4 Explain the term flammability 2.5 Explain the characteristics of different solvents	Explain the types of automotive paints Explain the characteristics of different automotive paint Explain the solvents used for automotive paint Explain the term flammability Explain the characteristics of different solvents	• Automotive paint • Nitrocellulose thinner • Pictures • Video clips • Marker • White board	Identify the following automotive paints • Autocryl paint • Autobase paint • Autoflex paint Apply autocryl paint on a surface Apply autobase paint on a surface	***Guide student to:*** Identify the following automotive paints • Autocryl paint • Autobase paint • Autoflex paint Apply autocryl paint on a surface Apply autobase paint on a surface	Autocryl paint Autobase paint Autoflex paint Brush

General Objective: 3.0 Know the tools and equipment used in spray painting						
Week	**Specific Objectives**	**Teacher Activity**	**Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	**Resources**
5-7	3.1 Mention the materials used in spray painting	Explain the materials used in spray painting	• Spray Gun • Pictures • Marker	Dismantle a spray gun	***Guide student to:*** Dismantle a spray gun	Gravity feed gun Suction feed gun Pressure feed gun

	3.2 List the tools and equipment for spray painting 3.3 Describe the types of spray gun 3.4 Describe the various parts of a spray gun 3.5 Explain how to maintain a spray gun 3.6 State the importance of an air compressor 3.7 Explain how to maintain an air compressor	Explain the tools and equipment for spray painting Explain the types of spray gun Explain the various parts of a spray gun Explain how to maintain a spray gun Explain the importance of an air compressor Explain how to maintain an air compressor	• Video clips • White board	Identify the various parts of a spray gun Assemble the spray gun Identify the following: • Gravity feed gun • Suction feed gun • Pressure feed gun	Identify the various parts of a spray gun Assemble the spray gun Identify the following: • Gravity feed gun • Suction feed gun • Pressure feed gun	Air compressor

General Objective: 4.0 Understand the techniques in spray painting						
Week	**Specific Objectives**	**Teacher Activity**	**Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	**Resources**
8-9	4.1 Enumerate the techniques involved in spray painting	Explain the techniques involved in spray painting	Spray Gun Pictures Marker Video clips White board	Demonstrate how to adjust the pattern of a spray gun	***Guide student to:*** Demonstrate how to adjust the pattern of a spray gun	Spray Gun Solvent Paint

	4.2 Explain spray gun adjustment 4.3 Explain paint thinning 4.4 Explain pattern overlap	Explain spray gun adjustment Explain paint thinning Explain pattern overlap		Demonstrate how to adjust the flow of paint from a spray gun Carry out paint thinning Demonstrate 50% overlap spraying	Demonstrate how to adjust the flow of paint from a spray gun Carry out paint thinning Demonstrate 50% overlap spraying	

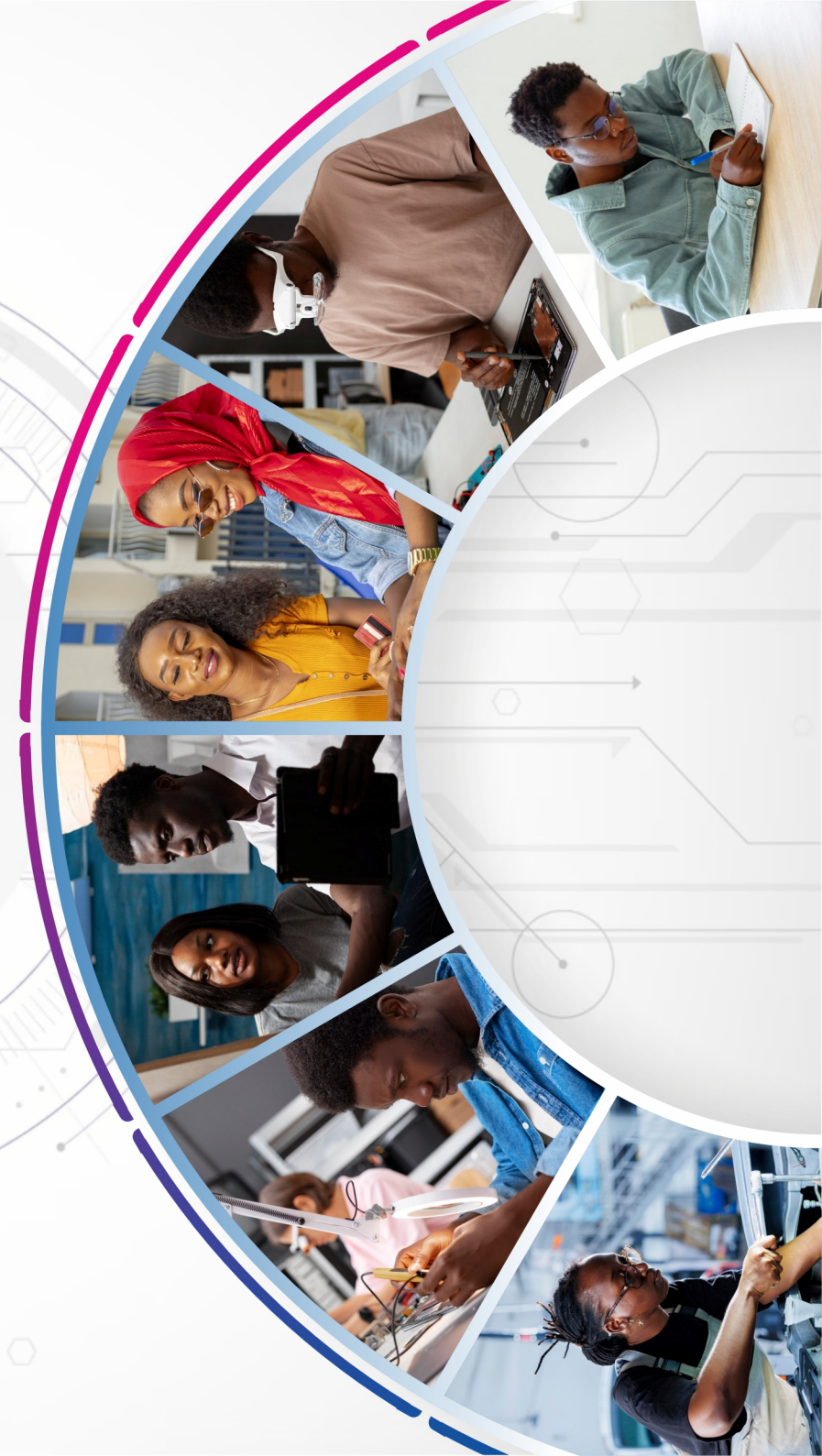
LIST OF TOOLS/EQUIPMENT/MACHINE

HAND TOOLS		
S/NO	EQUIPMENT	QUANTITY
1.	Planishing hammer	20
2.	Ball pein hammer	20
3.	Cross pein hammer	20
4.	Blocking hammer	20
5.	Rubber Mallet	20
6.	Raw hide Mallet	20
7.	Straight snip	30
8.	Universal snip	30
9.	Curve snip	15
10.	Set of dollies	30 set
11.	Pincers	20
12.	Flat spanner	10 set
13.	Ring spanner	10 set
14.	Panel lifter	20 set
15.	Body spoons (set)	20 set
16.	Bending dogs	20
17.	Hacksaw frames	40
18.	Hacksaw blades	12 dozen
19.	Set of chisels	10 set
20.	Set of drill bit	20 set
21.	Rivet set	20 set
22.	Grooving tools	5 set
23.	Set of screwdrivers (flat)	5 set
24.	Set of screw driver(star)	5 set
25.	Allen key	5 set
26.	Set of punch	5 set
27.	Plier (assorted)	10

28.	Socket spanner	2 Box
29.	G clamp	10
30.	F clamp	10
31.	Wire brush	20
32.	Trimming knife	20
33.	Rivet gun	5
34.	Notching tools	20
35.	Hand shear	5
36.	Potable power saw	5
37.	Scratching awl	10
38.	Pick hammer	10
39.	Wrenches	10
40.	Paint brush	Assorted 20
41.	Masking tape	20
42.	Brown paper	2 bundles
43.	Abrasive paper (rough and smooth)	50
44.	Primer	2 packs
45.	Air hose	2 rolls
46.	Regulator (oxygen and acetylene)	2 and 2
47.	Measuring and alignment tool	
48.	Sanders machine	4
49.	Cutting disc	10
50.	Wedge	20
51.	Axle stand	20
52.	Chain Puller	3

MACHINES AND EQUIPMENT		
53.	Guillotine	1
54.	Folding machine	1
55.	Wheeling machine	1
56.	Swagging machine	1

57.	Oxygen gas bottle	1
58.	Acetylene gas bottle	1
59.	Spot welding machine	1
60.	Phonematic hammer	1
61.	Hydraulic body jack	1
62.	Flow jack	1
63.	Electric drilling machine	1
63.	Body press	1
64.	Damage dozer	1
65.	Angle grander	1
66.	Air compressors	1
67.	Impact wrench	1
68.	Saw blaster	1
69.	Dustless sewing machine	1
	SPRAY PAINTING EQUIPMENT	
70.	Spray Gun	5
71.	Sanding Machine	3
72.	Polishing Machine	1
73.	Air Compressor	2
74.	Paint mixer	1
75.	Sandblasting Machine	1
76.	Paint washer	1
77.	Air drier	1
78.	Painting booth	1
79.	Safety equipment	1
80.	Hydraulic jack	1
81.	Axle stand	1
82.	Cleaning equipment	1
83.	Waste disposal equipment	1
84.	Dent repairs machine	3
85.	Body alignment machine	1
86.	Paint stripping machine	1



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