FOREWORD

The Ministry of Education and Skills Development is pleased to present the revised junior secondary school syllabuses. This marks a major milestone towards the attainment of quality education in Botswana. The revised syllabuses signals another major milestone in the attainment of the ideals reflected in the Revised National Policy on Education and brings closer the realization of the aspirations reflected in Vision 2016. The publication of these syllabuses is also a deliberate effort to provide accessible quality education for the creation of an educated labour force. It has been observed that countries with superior education systems are also the most economically successful. Thus, high quality education is seen as a vital pre-requisite in increasing productivity and competitiveness leading to national growth and development and subsequently, a higher standard of living for all citizens.

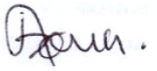
The revised junior secondary syllabuses come at a time of unprecedented knowledge explosion, technological changes, a fluid socio-economic context and an increasingly interdependent regional and global economy. In this age of global competitiveness, it is important that all countries foster human resources by developing requisite competencies among young people. Survival in this millennium depends on the ability to effectively accommodate and manage change, and to adapt to the changing socio-economic and cultural plains. It is the wish of the Ministry of Education and Skills Development to prepare young Batswana for future growth and adaptation to ongoing changes in the socio-economic context.

The revised junior secondary programme has not been drastically changed. It is still built on the ten year basic education philosophy that seeks to provide quality learning experiences. It provides students with a broad based education that equips students' with knowledge and skills that are transferable to everyday life. The content has been selected from the students' immediate environment to facilitate understanding and ease of transfer of skills. Furthermore, the programme aims at creating and sustaining a conducive environment for learning and teaching that allows students to excel within their own capabilities. A deliberate attempt has been made to infuse and integrate emerging issues such as Environmental Education, HIV/AIDS Education, Disaster Management, Anticorruption Culture, Emotional Intelligence, Civic Education and the world of work. The programme also pays attention to the all round development of the individual and the inculcation of attitudes and values that nurture respect for one's self and for others. Life skills education has been integrated into the programmes.

The learners are exposed to a range of knowledge and foundation skills such as numeracy, literacy, prevocational and problem solving skills. It also focuses on the development of desirable attitudes towards different types of work, social and moral values that are expected of them at the end of the program. The implementation of the revised programme begins in 2010.

Critical to the success of the revised junior secondary programme is the recognition of individual talents, needs and learning styles. Thus, the role of the teacher in the classroom must be that of a facilitator for effective learning to occur. The teacher must be conscious of the students' needs to take a certain measure of responsibility for their own learning. The teacher must also take cognissance of the broad range of ability of the student body and the different levels of achievement. This entails the use of participatory teaching and learning styles that provide a rich diverse learning environment.

On behalf of the Ministry of Education and Skills Development, I wish to record my appreciation to members of the National Panels and Standing Committees, school heads, teachers, institutions and other organisations for their invaluable contributions during the revision of these syllabuses.



Permanent Secretary
Ministry Of Education and Skills Development

ACKNOWLEDGEMENTS

The Curriculum Development and Evaluation wishes to express its sincere gratitude to the Design and Technology National Panel and Standing Committee members who worked tirelessly in the development of this Design and Technology Syllabus. The Department salutes them for their professional commitment and dedication..

However, special thanks and gratitude is due to the following members of the Standing Committee

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Appreciation also is extended to the following members of the; National Design and Technology Panel:

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The Curriculum Development and Evaluation would also like to thank all the teachers of Design and Technology who participated in the various consultative meetings in the different parts of the country. It is our hope and believe that this document reflects the outcomes of a genuine collegial and collaborative discourse across a wide educational spectrum. The Department also appreciates all those who contributed in one way or the other to make this a reality.

CONTENTS

INTRODUCTION

A relevant and realistic curriculum should amongst other things, prepare students for the realities of their post-school life. The Design and Technology Programme considers the increasing youth unemployment of junior secondary school leavers who still expect to find jobs in the formal sector and do not seem to consider other sources of income generation in their communities. The Design and Technology Programme seeks to instill a spirit of self-reliance in learners to enable them to become resourceful and economically active in their communities. The syllabus encourages a hand on experience in learners.

The Programme is designed to provide maximum flexibility to enable both teachers and learners to utilise it in the way that suits local contexts and the background and experiences of students in different communities. The syllabus is organised into foci with each of the three years having a different focus.

RATIONALE FOR THE DESIGN AND TECHNOLOGY PROGRAMME

Design and Technology is a subject that can empower young Batswana to become resourceful, self-reliant and economic participants in their communities. This programme begins by laying a firm foundation of generic skills, knowledge, values and attitudes that are useful to students for further training as well as the world of work. It is also useful to the majority of school leavers who might need to go into self employment projects. The Design and Technology Junior Secondary programme will equip learners with knowledge, skills, values and attitudes for manufacturing artefacts. In so doing the learners will be able to contribute to the economic, social and environmental development of their communities and their country in large. The programme will also stimulate their creativity and application of technological knowledge and principles to solve their day to day problems in real life situations.

HOW TO USE THIS SYLLABUS

This syllabus represents the minimum that students should acquire and the material that will be examined, at Junior Secondary Level. The syllabus is organised into foci with each focus stressing activities of a particular year. For instance the focus for Year 1 (Form 1) is *"Knowledge and "Skills Orientation"* and emphasises on comprehensive skills and knowledge development. From the focus, both general and specific objectives have been derived.. Appropriate incorporation of local materials and technologies is a requirement for all students and will form part of the criteria for assessing the projects in Year 2 and Year 3.

AIMS OF THE TEN-YEAR BASIC EDUCATION PROGRAMME

On completion of the Ten-Year Basic Education Programme, students should have:

1. Developed competence and confidence in the application of computation skills in order to solve day-to-day problems.
2. Acquired knowledge of business, everyday commercial transactions and entrepreneurial skills.
3. Developed critical thinking, problem-solving ability, individual initiative, creativity interpersonal and inquiry skills.

4. Developed desirable attitudes towards different types of work and the ability to assess personal achievement and capabilities realistically in pursuit of appropriate career/employment, opportunities/ possibilities and/or further education and training.
5. Acquired knowledge, skills and desirable agricultural production and industrial arts attitudes for self-reliance and self-sufficiency.
6. Developed literacy and understanding of the significance of ICT in the world of work and every sphere of life.
7. Acquired knowledge and understanding of their environment and the need for sustainable utilisation of natural resources.
8. Developed desirable values, attitudes and behaviour in interacting with the environment in manners that is protective, preserving and nurturing.
9. Acquired knowledge and understanding of society, appreciation of different cultures, religion and a sense of citizenship.
10. Develop tolerance towards different cultures. Pride in own culture and unity in diversity,
11. Developed the ability to express themselves clearly in English, Setswana, modern foreign language and/or a third language and sign language, using them as tools for further learning and employment.
12. Acquired science knowledge and skills and understanding of laws and principles governing the natural world.
13. Acquired knowledge, attitudes, moral standards, life skills and health practices including awareness and management of epidemics that will prepare them for responsible and productive family and community life.
14. Developed their special interests, talents and skills, including dexterity, physical strength, intellectual ability, aesthetics and/or artistic gift
15. Develop an appreciation of technology and technological skills including skills and safety precautions in handling tools and materials.
16. Acquire knowledge and ability to interact with and learn about their community, the government of their country, and the world around them.
17. Acquire knowledge and skills that promotes democracy, good governance, peace and security.

AIMS FOR THE THREE-YEAR JUNIOR SECONDARY DESIGN AND TECHNOLOGY PROGRAMME

The Design and Technology programme should enable learners to:

1. apply critical thinking, problem solving, computational, manipulative, inquiry and creative skills through designing, making and evaluating real life context.
2. apply technological principles and appreciate the effects of technology on the society and the environment.
3. understand technological innovations taking place worldwide and adapt them to the context of Botswana.
4. understand the qualities of a variety of materials and systems in order to apply processes appropriate for their manipulative and transformation.
5. develop entrepreneurial skills that they can apply in their day-to-day business transactions and to market their products effectively.
6. develop concepts and principles of systems including mechanical, electrical, electronic, computer aided controls etc.
7. understand and appreciate their culture and that of others and realise the importance of cultural influence on technology.
8. develop desirable attitudes towards different types of work and the ability to assess personal achievement and capabilities realistically

in pursuit of appropriate career/employment opportunities/ possibilities and/or further education and training.
9. develop literacy and understand the significance of ICT in the world of work and in every sphere of life.
10. acquire knowledge and understanding of current emerging issues.

CRITICAL COMPETENCIES

Upon completion of Design and Technology programme learners should enable to:

1. develop skills in using materials, tools, equipment and processes used in Design and Technology
2. appreciate and apply safety precautions in the use of materials, tools and equipment
3. use graphical communication skills
4. understand and apply principles and concepts of technology
5. appreciate the use of design process as a tool to solve real life problems
6. acquire creative and manipulate skills for designing and making products.
7. design and develop projects from simple themes or concepts
8. appreciate and use local materials and knowledge
9. demonstrate positive attitudes towards practical work and self – reliance
10. demonstrate interpersonal skills through participation in teamwork activities
11. appreciate the use of technology.

RECOMMENDED TEACHING METHODS

The syllabus is encouraging a learner – centered approach that lay emphasis on process skills, problem solving skills and the acquisition of hands on experience. Teachers should approach the teaching – learning process in a manner that will increase the participation and performance of all groups, including groups of different abilities, learners with special needs, boys and girls. Therefore, it means teachers should use a variety of methods such as inquiring, demonstration, practical work, project work (management), field trips, discussions; computers guided learning to achieve this.

In order to facilitate a learner – centered approach there should be pre – planning of activities as well as adequate working space to accommodate these activities.

Teaching methods should expose learners to solve real life problems. Design and Technology should be presented in an interesting and challenging way that should popularise it and encourage learners to opt to pursue careers in technology related fields.

ASSESSMENT

The assessment should take cognisance of the rationale for Design and Technology. It should test both acquisitions of knowledge and requisite skills that learners have acquired. A number of assessment tools can be used including objective tests, continuous assessment and through projects. Assessment should take cognisance of learners with special needs.

FOCUS- YEAR 1: SKILLS AND KNOWLEDGE ORIENTATION		
UNIT 1: SAFETY AND FIRST AID		
TOPIC	**GENERAL OBJECTIVES**	**SPECIFIC OBJECTIVES**
	Learners should be able to:	Learners should be able to:
1. Safety Precautions	1.1 apply safety precautions in the workshop	1.1.1. use protective clothing in the workshop. 1.1.2. use tools and equipment safely applying universal safety precautions that prevent transmission of infections e.g. HIV etc. 1.1.3. store tools and equipment safely. 1.1.4. keep the workshop clean. 1.1.5. dispose waste safely. 1.1.6. use sockets and switches safely. 1.1.7. respond to the warning signs.
	1.2 understand and appreciate workshop hazards.	1.2.1 Discuss different forms of hazards. 1.2.2 identify area with common hazards.
2. First Aid	2.1 apply simple First Aid in the workshop.	2.1.1 treat cuts safely 2.1.2. treat bruises safely 2.1.3. treat burns safely 2.1.4. handle and treat shocks. 2.1.5. control bleeding 2.1.6 dispose clinical waste safely 2.1.7 discuss ways of handling contagious infections such as HIV and AIDS.

UNIT 2: MATERIALS		
TOPIC	**GENERAL OBJECTIVES**	**SPECIFIC OBJECTIVES**
	Learners should be able to:	Learners should be able to:
1. Timber	1.1 acquire knowledge and skills in the use of Timber.	1.1.1. classify timber 1.1.2 illustrate methods of seasoning 1.1.3 illustrate methods of conversion 1.1.4 select timber according to physical properties. 1.1.5 dispose timber waste safely 1.1.6 work with timber safely 1.1.6 re-use timber.
2. Manufactured Boards	2.1. develop skills in the use of Manufactured Boards.	2.1.1 identify manufactured boards. 2.1.2 select manufactured boards according to physical properties. 2.1.3 use manufactured board safely. 2.1.4 dispose manufactured boards waste safely.
3. Metals	3.1 use of Metals appropriately.	3.1.1 classify metals. 3.1.2 select metals according to their physical properties. 3.1.3 work with metals safely. 3.1.4 dispose metal waste safely.
4. Plastics	4.1 use plastics appropriately.	4.1.1 classify plastics. 4.1.2 select plastics according to their physical properties. 4.1.3 work with plastics safely. 4.1.4 dispose plastics waste safely.
5. Adhesives	5.1 apply knowledge and skills of Adhesives.	5.1.1 state the characteristics of each of the adhesives. 5.1.2 select the appropriate adhesives when joining materials. 5.1.3 demonstrate safe measures when applying adhesives. 5.1.4 store adhesives appropriately. 5.1.5 dispose adhesives waste safely.

6. Abrasives	6.1 acquire and apply knowledge and skills of Abrasives.	6.1.1 select appropriate abrasives when abrading materials. 6.1.2 state the different grades of abrasives. 6.1.3 demonstrate the correct order of abrading. 6.1.4 work safely with abrasives. 6.1.5 dispose abrasives waste safely.
7. Fixings	7.1 acquire and apply knowledge and skills of Fixings.	7.1.1 illustrate fixings. 7.1.2 label parts of fixings. 7.1.3 select appropriate fixings when joining material. 7.1.4 work safely with fixings to prevent spreading contagious infections.
8. Fittings	8.1 acquire and apply knowledge and skills of Fittings.	8.1.1 illustrate fittings. 8.1.2 label parts of fittings. 8.1.3 select appropriate fittings when joining material. 8.1.4 work safely with fittings.
9. Finishes and Finishing	9.1 acquire and apply knowledge and skills on Finishes and Finishing.	9.1.1 classify finishes. 9.1.2 state the characteristics of finishes. 9.1.3 select appropriate finishes and solvents. 9.1.5 store finishes and solvents appropriately. 9.1.6 prepare surface of materials for appropriate finish. 9.1.7 demonstrate the correct order of applying finishes. 9.1.7 work safely with finishes and solvents. 9.1.8 demonstrate care for finishing equipment. 9.1.9 demonstrate the safe disposal of finishes and solvents.

UNIT 3: COMMUNICATION		
TOPIC	**GENERAL OBJECTIVES**	**SPECIFIC OBJECTIVES**
	Learners should be able to:	Learners should be able to:
1. Graphics	1.1 use conversional methods in graphical communication.	1.1.1 construct lines. 1.1.2 bisect a line 1.1.3 divide a line into equal parts. 1.1.4 construct a perpendicular line. 1.1.5 construct and bisect angles. 1.1.6 construct quadrilaterals. 1.1.7 construct a circle and a tangencies 1.1.8 construct polygons 1.1.9 enhance drawings using different presentation techniques. 1.1.10 draw simple solids and blocks in orthographic using 1st angle projection
2. Marketing	2.1 develop skills in marketing	2.1.1 select appropriate advertising strategies. 2.1.2 identify a target market for their product. 2.1.3 identify ways of packaging their product. 2.1.4 determine the cost of their product.
3. Design Process	3.1 design and make products using own initiative.	3.1.1 conduct basic research 3.1.2 generate possible solutions. 3.1.3 produce production plan 3.1.4 produce a quality product. 3.1.5 evaluate a product.

UNIT 4: TECHNOLOGIES		
TOPIC	**GENERAL OBJECTIVES**	**SPECIFIC OBJECTIVES**
	Learners should be able to:	Learners should be able to:
1. Structures	1.1 apply knowledge and skills of Structures in problem solving	1.1.1 define a structure. 1.1.2 identify types of structures. 1.1.3 classify structures. 1.1.4 differentiate between types of structures. 1.1.5 use simple materials to produce a model structure
2.Mechanisms	2.1 apply knowledge and skills of Mechanisms.	2.1.1 define mechanisms. 2.1.2 identify different types of mechanisms. 2.1.3 explain forms of motion. 2.1.4 describe ways of recycling metals 2.1.5 use simple materials to produce a working model
3.Electricity and Electronics	3.1 acquire and apply knowledge of electricity and electronics.	3.1.1 define electricity. 3.1.2 define electronics. 3.1.3 state the uses of electricity. 3.1.4 identify electronic components. 3.1.5 Illustrate electronic component symbols using conventional methods. 3.1.6 construct a simple circuit.

UNIT 5: TOOLS AND PROCESSES		
TOPIC	**GENERAL OBJECTIVES**	**SPECIFIC OBJECTIVES**
	Learners should be able to:	Learners should be able to:
1. Measuring and Marking out tools.	1.1 acquires and apply techniques of Measuring and Marking out.	1.1 1 illustrate measuring and marking out tools 1.1.2 label the parts of measuring and marking out tools 1.1.3 select appropriate measuring and marking out tools 1 1.4 use measuring and marking out tools correctly 1.1.5 use measuring and marking out tools safely 1.1.6 check for squareness and flatness. 1.1.7 describe principles of marking out materials
2. Saws and Sawing	2.1 acquire and apply knowledge and skills of saws and sawing	2.1.1 classify saws 2.1.2 illustrate saws 2.1.3 state the specific use of saws 2.1.4 explain the function of parts of saws 2.1.5 demonstrate correct ways of sawing 2.1.6 select appropriate saws when cutting materials 2.1.7 work with saws safely 2.1.8 demonstrate care and maintenance of saws.
3.Planes and Planing	3.1. acquire and apply knowledge and skills of planes and planing	3.1.1 identify planes 3.1.2 state specific use of planes 3.1.3 explain functions of parts of planes 3.1.4 select appropriate planes for the correct job 3.1.5 handle planes safely 3.1.6 demonstrate care and maintenance for planes 3.1.7 demonstrate the correct ways of Planing.

4.Files and Filing	4.1 acquire and apply knowledge and skills of Files and Filing.	4.1.1 classify files 4.1.2 illustrate files. 4.1.3 state the specific use of files 4.1.4 explain the function of parts of files 4.1.5 demonstrate correct ways of filing 4.1.6 select appropriate files when filing materials 4.1.7 work with files safely 4.1.8 demonstrate care and maintenance of files
5.Drills, Drilling and Boring tools	5.1 apply skills of Drills, Drilling and Boring.	5.1.1 identify drill bits and boring bits 5.1.2 illustrate drill bits and boring bits 5.1.3 label parts of drill bits and boring bits 5.1.4 state specific use of drill bits and boring bits 5.1.5 identify types of holes 5.1.6 select appropriate drill bits and boring bits for the correct job 5.1.7 handle drill bits and boring bits safely 5.1.8 drill and bore holes in wood, metals and plastics accurately. 5.1.9 demonstrate correct ways of drilling and boring
6.Chisels and Chiseling	6.1 develop skills of Chiseling	6.1.1 classify chisels 6.1.2 illustrate chisels 6.1.3 demonstrate correct ways of chiseling 6.1.4 select appropriate chisels when chiseling 6.1.5 work with chisels safely 6.1.6 demonstrate care and maintenance of chisels.
7.Shears and Shearing	7.1 acquire and apply knowledge and skills of Shears and Shearing.	7.1.1 label parts of shears 7.1.2 demonstrate correct ways of shearing 7.1.3 select appropriate shears when shearing 7.1.4 work with shears safely 7.1.5 demonstrate care of shears

8 Holding and Cramping tools	8.1 apply skills of Holding and Cramping	8.1.1 identify holding and cramping tools 8.1.2 state uses of holding and cramping tools 8.1.3 use appropriate holding and cramping tools when working on material and assembling 8.1.4 handle holding and cramping tools safely 8.1.5 demonstrate care and maintenance for holding and cramping tools
9.Driving/ Impelling/Percussion Tools	9.1 acquire and apply knowledge and skills of Driving, Impelling, Percussion tools	9.1.1 identify driving and percussion tools. 9.1.2 demonstrate the correct use of driving and percussion tools 9.1.3 select appropriate driving and percussion tools 9.1.4 work with driving and percussion tools safely 9.1.5 demonstrate care of driving and percussion tools
10. Deforming	10.1 acquire and apply knowledge and skills of Deforming	10.1.1 define deforming. 10.1.2 discuss deforming processes. 10.1.3 identify materials and equipment used in deforming processes. 10.1.4 label equipment used in deforming 10.1.5 select appropriate deforming processes 10.1.6 work safely with deforming equipment 10.1.7 demonstrate care for deforming equipment.
11. Joining and Fabrication	11.1 acquire and apply knowledge and skills of Joining and Fabricating materials.	11.1.1 identify methods of joining and fabricating materials. 11.1.2 state specific use of joints. 11.1.3 select the appropriate methods of joining and fabricating materials. 11.1.4 make an appropriate joint for the job.
	11.2 acquire and apply knowledge and skills of Joining and Fabricating equipment.	11.2.1 identify joining and fabricating tools and equipment. 11.2.2 select appropriate tools and equipment when constructing joints 11.2.3 handle joining and fabricating tools and equipment safely. 11.2.4 demonstrate care of joining and fabricating tools and equipment.

FOCUS- YEAR 2: DESIGN TASKS AND PROJECT ORIENTATION		
UNIT 2: MATERIALS		
TOPIC	**GENERAL OBJECTIVES**	**SPECIFIC OBJECTIVES**
	Learners should be able to:	Learners should be able to:
1. Timber	1.1 acquire knowledge and skills in the use of Timber.	1.1.1 select timber according to working properties. 1.1.2 illustrate methods of storing timber. 1.1.3 identify commercially available sections of timber. 1.1.4 work with timber safely. 1.1.5 dispose timber waste safely 1.1 6 .identify timber defects. 1.1.7 re-use timber.
2. Manufactured Boards	2.1 apply skills in the use of Manufactured Boards.	2.1.1 select manufactured boards according to properties. 2.1.2 illustrate methods of storing manufactured boards. 2.1.3 use manufactured board safely. 2.1.4 dispose manufactured boards waste safely.
3. Metals	3.1 acquire and apply knowledge and skills in the use of metals	3.1.1 select metals according to their working properties. 3.1.2 illustrate methods of storing metals. 3.1.3 identify commercially available sections of metals. 3.1.4 work with metals safely. 3.1.5 dispose metal waste safely. 3.1.6 re-use metals. 3.1.7 describe ways of recycling metals 3.1.8 demonstrate perseverance when working with metals
4. Plastics	4.1 acquire knowledge and skills in the use of plastics.	4.1.1 select plastics according to their working properties. 4.1.2 illustrate methods of storing plastics. 4.1.3 identify commercially available sections of plastics. 4.1.4 work with plastics safely. 4.1.5 dispose plastics waste safely. 4.1.6 re-use plastics.

		4.1.7 describe ways of recycling plastics
5. Additional Materials	5.1 acquire and use the knowledge of locally available materials appropriately	5.1.1 identify the materials and their sources. 5.1.2 incorporate locally available materials in projects. 5.1.3 work safely with additional materials. 5.1.4 dispose material waste safely
6. Adhesives	6.1 apply knowledge and skills in the use of Adhesives.	6.1.1 state the characteristics of each of the adhesives. 6.1.2 select the appropriate adhesives when joining materials. 6.1.3 demonstrate safe measures when applying adhesives. 6.1.4 dispose adhesives waste safely.
7. Abrasives	7.1 apply knowledge and skills in the use of Abrasives.	7.1.1 select appropriate abrasives when abrading materials. 7.1.2 state the different grades of abrasives. 7.1.3 demonstrate the correct order of abrading. 7.1.4 work safely with abrasives. 7.1.5 dispose abrasives waste safely.
8. Fixings	8.1 develop knowledge and skills in the use of Fixings.	8.1.1 illustrate fixings. 8.1.2 label parts of fixings. 8.1.3 select appropriate fixings when joining material. 8.1.4 differentiate fixings into temporary and permanent. 8.1.5 work safely with fixings
9. Fittings	9.1 acquire knowledge and skills in the use of fittings.	9.1.1 illustrate fittings. 9.1.2 label parts of fittings. 9.1.3 select appropriate fittings when joining material. 9.1.4 work safely with fittings.
10. Finishes and Finishing	10.1 apply knowledge and skills on Finishes and Finishing.	10.1.1 prepare surface of materials for appropriate finish. 10.1.2 demonstrate different methods of finishing. 12.1.3 demonstrate safe measures when using finishes and solvents. 10.1.4 demonstrate the correct order of applying finishes. 10.1.5 work safely with finishes and solvents. 10.1.6 select appropriate finishes and solvents.

		10.1.7 demonstrate care for finishing equipment. 10.1.8 Demonstrate the safe disposal of finishes and solvents waste.

UNIT 3: COMMUNICATION		
TOPIC	**GENERAL OBJECTIVES**	**SPECIFIC OBJECTIVES**
	Learners should be able to:	Learners should be able to:
1. Graphics	1.1 use IT and conventional methods in graphical communication.	1.1.1 construct a circle and tangencies using IT. 1.1.2 construct polygons using IT. 1.1.3 produce 2-dimensional and 3-dimensional sketches using both IT and Conventional methods. 1.1.4 draw objects in 1 - point and 2 - point perspective using both IT and Conventional methods. 1.1.5 enhance drawings using different presentation techniques using both IT and Conventional methods. 1.1.6 draw complex solids and blocks in orthographic using 1st angle projection using both IT and Conventional methods. 1.1.7 produce annotations using IT 1.1.8 convert Isometric projection drawing into orthographic projection 1.1.9 convert orthographic projection drawing into Isometric projection
2. Marketing	2.1 acquire and apply knowledge and skills in Marketing	2.1.1 select appropriate advertising strategies. 2.1.2 identify a target market for a product. 2.1.3 design a package for product 2.1.4 determine the cost of a product. 2.1.5 use IT in advertising
3. Design Process	3.1 develop the ability to design and make products using own initiative.	3.1.1 analyse a given theme. 3.1.2 derive a situation from the theme. 3.1.3 identify a problem from a situation. 3.1.4 formulate a design brief. 3.1.5 formulate relevant specifications. 3.1.6 explore a variety of possible solutions. 3.1.7 select a solution to the problem 3.1.8 show logical progression of all aspects of development

		3.1.9 produce a working drawing. 3.1.10 produce a detailed production plan 3.1.11 produce a quality product. 3.1.12 evaluate their product.

UNIT 4: TECHNOLOGIES		
TOPIC	**GENERAL OBJECTIVES**	**SPECIFIC OBJECTIVES**
	Learners should be able to:	Learners should be able to:
1. Structures	1.1 apply knowledge and skills of Structures in problem solving	1.1.1 differentiate between static and dynamic forms of forces. 1.1.2 describe types of forces. 1.1.3 describe the principle of triangulation. 1.1.4 apply the principle of triangulation. 1.1.5 discuss causes of structural failure. 1.1.6 select an appropriate structure to meet the demands of a design situation.
2.Mechanisms	2.1 develop knowledge and skills of Mechanisms.	2.1.1 illustrate various forms of motion. 2.1.2 classify levers. 2.1.3 describe different types of linkages. 2.1.4 describe different types of pulleys. 2.1.5 calculate the speed of the driver and driven pulleys. 2.1.6 demonstrate various motions performed by mechanisms. 2.1.7 select and use appropriate mechanisms in a design situation.
3. Energy	3.1 acquire and apply knowledge and skills of Energy in problem solving.	3.1.1 define energy. 3.1.2 describe the different forms of energy. 3.1.3 identify different sources of energy.
4. Electricity And Electronics	4.1 acquire and apply knowledge and skills of electricity and electronics	4.1.1 illustrate electronic components symbols 4.1.2 state uses of electronic components. 4.1.3 interpret a circuit diagram. 4.1.4 draw a circuit diagram using IT. 4.1.5 design simple electronic circuits using IT 4.1.6 use Ohm's law to determine voltage, current and resistance. 4.1.7 work safely with electronic equipment. 4.1.8 construct an electronic product in response to a design situation.

UNIT 5: TOOLS AND PROCESSES		
TOPIC	**GENERAL OBJECTIVES**	**SPECIFIC OBJECTIVES**
	Learners should be able to:	Learners should be able to:
1. Measuring And Marking out tools.	1.1 acquire and apply techniques of Measuring and Marking out.	1.1.1 illustrate measuring and marking out tools 1.1.2 label the parts of measuring and marking out tools 1.1.3 select appropriate measuring and marking out tools 1 1.4 use measuring and marking out tools correctly 1.1.5 use measuring and marking out tools safely 1.1.6 check for squareness and flatness.
2. Saws and Sawing	2.1 apply knowledge and skills of Saws and Sawing	2.1.1 illustrate saws 2.1.2 state the specific use of saws 2.1.3 explain the function of parts of saws 2.1.4 demonstrate correct ways of sawing 2.1.5 select appropriate saws when cutting materials 2.1.6 work safely with saws 2.1.7 demonstrate care and maintenance of saws.
3. Planes and Planing	3.1 demonstrate knowledge and understanding of Planes and Planing processes.	3.1.1 identify planes 3.1.2 state specific use of planes 3.1.3 explain functions of parts of planes 3.1.4 identify different processes of planing materials 3.1.5 select appropriate planes for the correct job 3.1.6 handle planes safely 3.1.7 demonstrate care and maintenance for planes 3.1.8 demonstrate the correct ways of Planing.
4. Files and Filing	4.1 demonstrate knowledge and understanding of files and filing processes..	4.1.1 classify files 4.1.2 illustrate files. 4.1.3 state the specific use of files 4.1.4 explain the function of parts of files 4.1.5 demonstrate correct ways of filing

		4.1.6 select appropriate files when filing materials 4.1.7 work with files safely 4.1.8 demonstrate care and maintenance of files
5. Drills, Drilling and Boring tools	5.1 apply knowledge and skills of Drills, Drilling and Boring.	5.1.1 identify drill bits and boring bits 5.1.2 illustrate drill bits and boring bits 5.1.3 label parts of drill bits and boring bits 5.1.4 state specific use of drill bits and boring bits 5.1.5 select appropriate drill bits and boring bits for the correct job 5.1.6 handle drill bits and boring bits safely 5.1.7 drill holes in wood, metals and plastics accurately 5.1.8 bore holes in wood accurately 5.1.9 demonstrate correct ways of drilling and boring
6. Chisels and Chiseling	6.1 acquire and apply knowledge and skills of Chisels and Chiseling	6.1.1 classify chisels 6.1.2 illustrate chisels 6.1.3 demonstrate correct ways of chiseling 6.1.4 select appropriate chisels when chiseling 6.1.5 work with chisels safely 6.1.6 demonstrate care and maintenance of chisels.
7. Shears and Shearing	7.1 acquire and apply knowledge and skills of Shears and Shearing.	7.1.1 label parts of shears 7.1.2 demonstrate correct ways of shearing 7.1.3 select appropriate shears when shearing 7.1.4 work safely with shears 7.1.4 demonstrate care of shears
8. Holding and cramping tools	8.1 acquire and apply knowledge and skills of holding and cramping tools	8.1.1 identify holding and cramping tools 8.1.2 state uses of holding and cramping tools 8.1.3 use appropriate holding and cramping tools when working on material and assembling 8.1.4 handle holding and cramping tools safely 8.1.5 demonstrate care and maintenance for holding and cramping tools

9.Driving,Impelling and Percussion tools	9.1 demonstrate knowledge and understanding of driving, impelling and percussion tools	9.1.1 demonstrate the correct use of driving and percussion tools 9.1.2 select appropriate driving and percussion tools 9.1.3 work with driving and percussion tools safely 9.1.4 demonstrate care of driving and percussion tools
10. Forming Plastics	10.1 acquire and apply knowledge and skills of forming tools	10.1.1 define forming. 10.1.2 discuss forming processes 10.1.3 identify materials and equipment used in forming processes 10.1.4 label parts of equipment used in forming 10.1.5 select appropriate forming processes 10.1.6 work safely with forming equipment 10.1.7 demonstrate care for forming equipment
11. Deforming	11. acquire and apply knowledge and skills of deforming	11.1.1 define deforming 11.1.2 discuss deforming processes 11.1.3 identify materials and equipment used in deforming processes 11.1.4 label parts of equipment used in deforming 11.1.5 select appropriate deforming processes 11.1.6 work safely with deforming equipment 11.1.7 demonstrate care for deforming equipment
12. Joining and Fabrication	12.1 demonstrate knowledge and understanding of joining and fabricating materials	12.1.1 identify methods of joining and fabricating 12.1.2 illustrate joints. 12.1.3 classify joints as temporary and permanent 12.1.4 state specific use of joints 12.1.5 select the appropriate methods of joining and fabricating materials 12.1.6 make an appropriate joint for the job.
	12.2 demonstrate knowledge and understanding of joining and fabricating materials	12.2.1 identify joining and fabricating tools and equipment 12.2.2 select appropriate tools and equipment when constructing joints 12.2.3 handle joining and fabricating tools and equipment safely. 12.2.4 demonstrate care of joining and fabricating tools and equipment.
12. Screen	13.1 acquire working	13.1.1. use screen printing frame

printing	knowledge of screen printing.	13.1 2 design and cut a stencil for screen printing 13.1 3 make a screen printing 13.1.4 care for screen printing 13.1.5 incorporate screen-printing where appropriate in practical activities.

FOCUS-YEAR 3: SKILLS, PRODUCT DESIGN AND MANUFACTURING		
UNIT 3: COMMUNICATION		
TOPIC	**GENERAL OBJECTIVES**	**SPECIFIC OBJECTIVES**
	Learners should be able to:	Learners should be able to:
1. Graphics	1.1 use IT in graphical communication.	1.1.1 enhance drawings using different presentation techniques. 1.1.2 draw design solutions in orthographic using 1st angle projection. 1.1.3 construct design solutions using CAD
2. Marketing	2.1 apply knowledge and skills of Marketing	2.1.1 select appropriate advertising strategies. 2.1.2 identify a target market for a product. 2.1.3 design a package for product. 2.1.4 use IT in advertising 2.1.5 determine the cost of a product.
3. Design Process	3.1 develop the ability to design and make products using own initiative.	3.1.1 analyse a given theme 3.1.2 derive a situation from the theme. 3.1.3 identify a problem from a situation. 3.1.4 formulate a design brief. 3.1.5 formulate relevant specifications. 3.1.6 explore a variety of possible solutions. 3.1.7 select a solution to the problem 3.1.8 show logical progression of all aspects of development 3.1.9 produce a working drawing. 3.1.10 produce a detailed production plan 3.1.11 produce a quality product. 3.1.12. evaluate their product.

UNIT 4: TECHNOLOGIES		
TOPIC	**GENERAL OBJECTIVES**	**SPECIFIC OBJECTIVES**
	Learners should be able to:	Learners should be able to:
2. Mechanisms	2.1 develop knowledge and skills of Mechanisms.	2.1.1 calculate the speed of the driver and driven pulleys. 2.1.2 discuss gears. 2.1.3 demonstrate various motions performed by mechanisms. 2.1.4 calculate gear ratio to determine speed. 2.1.5 illustrate the direction of movement of mechanisms. 2.1.6 illustrate cams and followers. 2.1.7 select and use appropriate mechanisms in a design situation.
3. Energy	3.1 acquire and apply knowledge of Energy in problem solving	3.1.1 discuss ways of conserving energy. 3.1.2 demonstrate ways of conserving energy. 3.1.3 select an appropriate energy source in response to a design situation. 3.1.4 describe energy conservation
4. Electricity and Electronics	4.1 acquire and apply knowledge of Electricity and Electronics.	4.1.1 use Ohm's law to determine voltage, current and resistance. 4.1.2 work safely with electrical and electronic equipment. 4.1.3 construct an electronic product in response to a design situation. 4.1.4 carry out minor repairs and maintenance in electrical appliances

UNIT 5: TOOLS AND PROCESSES		
TOPIC	**GENERAL OBJECTIVES**	**SPECIFIC OBJECTIVES**
	Learners should be able to:	Learners should be able to:
1. Measuring and Marking out tools.	1.1 apply techniques of Measuring and Marking out.	1.1.1 select appropriate measuring and marking out tools 1.1.2 use measuring and marking out tools correctly 1.1.3 use measuring and marking out tools safely 1.1.4 Check for squareness and flatness.
2. Saws and Sawing	2.1 apply knowledge and skills of Saws and Sawing	2.1.1 demonstrate correct ways of sawing 2.1.2 select appropriate saws when cutting materials 2.1.3 work with saws safely 2.1.4 demonstrate care and maintenance of saws.
3. Planes and Planing	2.1 apply knowledge and skills of planes and planing	3.1.1 identify different processes of planing materials 3.1.2 select appropriate planes for the correct job 3.1.3 handle planes safely 3.1.4 demonstrate care and maintenance for planes 3.1.5 demonstrate the correct ways of Planing.
4. Files and Filing	4.1 apply knowledge and skills of Files and Filing.	4.1.1 demonstrate correct ways of filing 4.1.2 select appropriate files when filing materials 4.1.3 work with files safely 4.1.4 demonstrate care and maintenance of files
5. Drills, Drilling and Boring tools	5.1 know and apply skills of Drills, Drilling and Boring.	5.1.1 select appropriate drill bits and boring bits for the correct job 5.1.2 handle drill bits and boring 5.1.3 drill and bore holes in wood, metals and plastics accurately 5.1.4 set drill speeds to suit different materials and drill bit sizes. 5.1.6 demonstrate correct ways of drilling and boring
6. Chisels and Chiseling	6.1 apply knowledge and skills of Chisels and Chiseling	6.1.1 demonstrate correct ways of chiseling 6.1.2 select appropriate chisels when chiseling 6.1.3 work with chisels safely 6.1.4 demonstrate care and maintenance of chisels.

7. Shears and Shearing	7.1 apply knowledge and skills of Shears and Shearing.	7.1.1 demonstrate correct ways of shearing 7.1.2 select appropriate shears when shearing 7.1.3 work with shears safely 7.1.4 demonstrate care of shears
8. Holding and Cramping Tools	8.1 use knowledge and skills of Holding and Cramping tools	8.1.1 use appropriate holding and cramping tools when working on material and assembling 8.1.2 handle holding and cramping tools safely 8.1.3 demonstrate care and maintenance for holding and cramping tools
9. Driving/ Impelling/ Percussion Tools	9.1 apply knowledge and skills of Driving, Impelling, Percussion tools	9.1.1 demonstrate the correct use of driving and percussion tools 9.1.2 select appropriate driving and percussion tools 9.1.3 work with driving and percussion tools safely 9.1.4 demonstrate care of driving and percussion tools
10. Forming Plastics	10.1 apply knowledge and skills of Forming plastics	10.1.1 identify materials and equipment used in forming processes. 10.1.2 select appropriate forming processes 10.13 work safely with forming equipment 10.1.4 demonstrate care for forming equipment
11. Deforming	11.1 acquire and apply knowledge and skills of Deforming	11.1.1 identify materials and equipment used in deforming processes. 11.1.2 select appropriate deforming processes 11.1.3 work safely with deforming equipment 11.1.4 demonstrate care for deforming equipment.
12. Joining and Fabrication	12.1 apply knowledge and skills of Joining and Fabricating materials.	12.1.1 select the appropriate methods of joining and fabricating materials. 12.1.2 make an appropriate joint for the job. 12.2.1 identify joining and fabricating tools and equipment.
	12.2 apply knowledge and skills of Joining and Fabricating equipment.	12.2.2 Select appropriate tools and equipment when constructing joints 12.2.3 handle joining and fabricating tools and equipment safely. 12.2.4 demonstrate care of joining and fabricating tools and equipment.