



Curriculum Framework

Sheetfed Offset Machine Minding



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1 Introduction:

Sheetfed Offset is a well established and defined trade in a fast growing industry. Technological advancement in the last decade has left the only structured mode of learning, namely apprenticeships, far behind.

It has therefore become necessary to address the currency and quality of the curriculum for apprenticeships.

The introduction of the amendment to the Skills Development Act has also strongly influenced the approach to this curriculum framework. There is a shift from the established Competency Based Modular Training system to an Outcomes Based approach.

In addition to the shift to Outcomes Based education, there is also a shift to strong occupationally based exit level outcomes. In an attempt to recognise occupations within the trade qualifications, previously unrecognised occupations like machine assistants, computer to plate operators and the like, will now find a recognised and formalised learning path.

The qualification framework also addresses the inclusion/exclusion of certain processes within the trade by using **elective** exit level outcomes. This will enable the employer and the apprentice to define the learning path that the apprentice will specialise in based on the company equipment and the apprentice areas of interest.

2 Background:

The Printing and Packaging industries have a legacy of above average artisan training. Implementation of apprentice training has gradually evolved from a time-based apprenticeship with the option to do a voluntary trade test, to CBMT (Competency Based Modular Training) and now there is an inevitable shift to Outcomes Based training.

This evolution in delivery modes has strived to improve the control over context and quality of learning. The benefit of Outcomes Based training lies in an approach that has a strong focus on occupations and the fundamental, core and elective learning that will enable the learner to not only master a skill, but apply it in a fast developing economy.

In order to compete in the global economy, the apprenticeship system and its curricula has to transform into a mode of delivery that will produce artisans who are knowledgeable, skilled and adaptable with strong critical thinking and problem solving abilities.

This curriculum framework is the culmination of the best technical experts and curriculum development experts applying a clean slate approach without discarding the work previously done by advisory groups and technical committees.



3 Purpose of the qualification:

This qualification is to be registered at level 3 / 4 on the National Vocational Qualifications framework.

It is designed to equip learners with an integrated practical and theoretical grounding in the basic principles and practices of of Sheetfed Offset environment.

It will equip learners to be able to successfully complete the Sheetfed Offset processes within a range of printing industry contexts.

It will include broad areas of learning including, the impact of printing on the environment and the basics of mechanical, pneumatical, hydraulic and electronic equipment.

Learners acquiring this qualification will demonstrate competencies across areas including maintenance and the operation of high speed Sheetfed Offset presses, and various ancillary operations.

Further to these qualifying learners will be able to specialise in various elective components which will include quality and colour standards and inline coating operations.

The fundamental learning will prepare the learner for the business environment, communication, mathematical, scientific and computer abilities together with life skills.

Learners completing this qualification will be able to operate proficiently in this fast growing high speed printing environment.

Learning to be assumed to be in place:

Learners will be assumed to be competent in the following abilities:

Using Science and Technology	NQF level 2 / grade ten
Solving mathematical problems	NQF level 2 / grade ten
Literacy & Numeracy	NQF level 2 / grade ten



4 Range Statement:

The learning will cover all aspects of the trade / related trades limited to the printing industry. The learning will cover all aspects of the Sheet Fed operation, related practices such as environmental, health and safety and all related theoretical underpinning knowledge.

The learning is intended to act as an entry level programme, initiating a potential career in the printing industry. The learning in this qualification will not cover subject matter at an advanced level (assumed to be contained in a future programme designed for advanced / technician studies.

The learning will be primarily practical or on site training with the learner exposed to theoretical training in traditional 'block release programmes.

5 Assumptions:

This Qualification Framework assumes that learners will be in possession of a minimum of a grade ten qualification?

Learners will be assessed to determine whether they have the aptitude to deal with the level of learning required;

The level of reading / writing and arithmetic assumed to be in place will be at a NQF level of 2 or the minimum of a grade ten;

The printing industry will continue to require the trades to be defined narrowly in a functional specific manner as Sheetfed as an example;

The industry will define trades in two levels, one of technicians for more complex environments and one of trades for more rudimentary purposes of learning;

Learning will be provided by a range of learning providers, but primarily by the industry accepted 'colleges' of learning for the foundational aspects and by the workplace providers and workplace context;

Learners will be assigned to accredited workplaces to complete there workplace context learning requirements;

The qualification framework will serve as a guide until such time as the vocationally based qualification frameworks are released / approved by the relevant ETQA;



6 Criteria for inclusions / Exclusions:

Inclusion Criteria:	Exclusion Criteria:
<p>Core Sheetfed Offset processes; Broad underpinning knowledge to ensure flexibility; Critical cross field outcomes to be provided through delivery modality; Generic applications; Minimum plant practices such as overall operating procedures / health & safety / small groups, etc.</p>	<p>Plant specific training requirements; Dated machine technologies (to be covered by plant specific training if required); Plant specific applications / technologies; International Best Practices (Learners should be able to carry special credits but not required for minimum pass rates)</p>



7 Applied Competence (Exit Level Outcomes)

Fundamental		Core		Elective	
		9.	Demonstrate an understanding of and perform press production		
8.	Demonstrate an understanding of the printing industries impact on the environment	8.	Demonstrate competence and the understanding of a Basic Make Ready Process and procedure.		
7.	Demonstrate and understanding basic printing science	7.	Understand the principles of Densitometry .		
6.	Apply basic mathematical calculations specific to the printing environment	6.	Understand and perform dampening system setup operations.		
5.	Demonstrate an understanding of production economics for a printing / bookbinding operation.	5.	Understand and perform inking system setup operations.		
4.	Demonstrate an understanding of the principles of mechanical , pneumatic, hydraulic and electronic components of bookbinding equipment.	4.	Understand and perform printing unit setup operations.	4.	Understand and implement colour standards
3.	Demonstrate an understanding of printing industry processes , terms, concept and principles.	3.	Understanding the register system	3.	Understanding and implement National and international Quality Standards
2.	Demonstrate an understanding of basic computer skills and the use of Graphic User Interface equipment.	2.	Understand and perform an assistant's role in a litho environment.	2.	Demonstrate an understanding of the inline coating process.
1.	Demonstrate an understanding of company policies and procedures as applied to your specific work area.	1.	Understand different paper handling operations in a Sheetfed Offset Environment	1.	Understand and operate computer to plate production.



8 Specific Outcomes

Fundamental Outcomes:

Exit Level Outcomes:

F1: Demonstrate an understanding of company policies and procedures as applied to your specific work area.

Specific Outcome:	
SP1:	They must have a basic understanding of discipline, grievance & appeals.
SP2:	A basic understanding of the company policies.
SP3:	A basic understanding of basic health and safety act as applied to their workplace.
SP4:	A basic First Aid understanding.
SP5:	A basic understanding of HIV & AIDS.
SP5:	An Understanding of company structure, roles and responsibilities of their reporting line.
SP6:	An understanding of basic legislation as applied to their role.

Exit Level Outcomes:

F2: Demonstrate an understanding of basic computer skills and the use of Graphic User Interface equipment.

Specific Outcome:	
SP1:	Learners must have an understanding of computer hardware and peripherals.
SP2:	An basic understanding of the computer operating system.
SP3:	A basic understanding of mail applications and the internet.
SP4:	A basics understanding of MS Office applications.
SP5:	Understand the basics of (GUI) graphic user interface applications.



Exit Level Outcomes

F3: Demonstrate an understanding of printing industry processes, terms, concept and principles. (Induction to printing)

Specific Outcome:	
SP1:	An overview of the history of the entire printing industry.
SP2:	Understand the production flow of the publishing environment.
SP3:	Understand the pre-press processes and environment.
SP4:	An understanding of the major printing processors and their markets.
SP5:	Understand the history, current state and future of Sheetfed Offset.

Exit Level Outcomes:

F4: Demonstrate an understanding of the principles of mechanical, pneumatic, hydraulic and electronic components of Sheetfed Offset equipment.

Specific Outcome:	
SP1:	Understand basic mechanical principles.
SP2:	Understand the basic principles of pneumatics.
SP3:	Understand the basic principles of hydraulics.
SP4:	Understand the basic principles of electronic components.
SP5:	Understand the basics of problem solving techniques.
SP5:	Understand maintenance aspects in the Sheetfed Offset environment.



Exit Level Outcomes:

F5: Demonstrate an understanding of production economics for a printing / bookbinding operation.

Specific Outcome:	
SP1:	Understanding the cost implications of raw materials.
SP2:	Understand the cost implications of labour costs and value added costs.
SP3:	Understand the cost implications of maintenance and replacement.
SP4:	Understand the basics of estimating.
SP5:	Understand work tickets.

Exit Level Outcomes:

F6: Apply basic **mathematical** calculations specific to the printing environment

Specific Outcome:	
SP1:	Understand arithmetic.
SP2:	Understand basic algebra applied to the printing industry.
SP3:	Understand basic geometry applied to the printing industry.
SP4:	Understand units of measurement methods.



Exit Level Outcomes:**F7:** Demonstrate and understanding of basic printing science

Specific Outcome:	
SP1:	An understanding of basic science.
SP2:	An understanding of heat and humidity.
SP3:	Understand the properties of fluids.
SP4:	Understand chemical types and reactions.
SP5:	Understand PH in printing.
SP6:	Understand light and colour.
SP7:	Understand metals.
SP8:	Understand the properties and principles of inks, varnishes and adhesives.

Exit Level Outcomes:**F8:** Demonstrate an understanding of the printing industries impact on the environment.

Specific Outcome:	
SP1:	Have a good understanding of waste management.
SP2:	Have a good understanding of pollution.
SP3:	Have a good understand of supplier accreditation.
SP4:	Have a good understanding of energy management.



Core Outcomes:**Exit Level Outcomes:**

C1: Understand different Paper handling operations in a Sheetfed Offset Environment

Specific Outcome:	
SP1:	Understand The Manufacturing process.
SP2:	Understand Characteristics and problems relating to paper.
SP3:	Understanding international Paper sizes

Exit Level Outcomes:

C2: Understand and perform an assistant's role in a litho environment.

Specific Outcome:	
SP1:	Understand the basic press operations
SP2:	Understand the feeder operation
SP3:	Understand the delivery
SP4:	Assist during the run
SP5:	Understand basic quality control of printed matter
SP6:	Washing up the press



Exit Level Outcome:**C3:** Understanding the register system.

Specific Outcome:	
SP1:	Setting up of front and side register guides / front lays and side lays
SP2:	Understanding of the infeed transfer Devices
SP3:	Understand sheet transfer devices
SP4:	Registration of sheet on work and turn and work and tumble operations
SP5:	Understand fit and the equipment used to achieve fit.

Exit Level Outcome:**C4:** Understand and perform printing unit setup operations.

Specific Outcome:	
SP1:	Printing unit configuration
SP2:	Understand the Impression cylinder
SP3:	Understanding Bearer Pressures
SP4:	Understanding undercut and plate and blanket packing
SP6:	Packing the Plate and/or Blanket Cylinder
SP7:	Mounting and removing a Printing Plate
SP8:	Mounting and removing Printing Blanket



Exit Level Outcome:

C5: Understand and perform inking system setup operations.

Specific Outcome:	
SP1:	Understand the Inking System Configuration
SP2:	Understand the Ink Duct operation
SP3:	Understand the setting devices in the inking train
SP4:	Understand the rubber properties of an inking roller
SP6:	Replacing and setting an inking Distributor roller
SP7:	Replacing and setting an inking forme / Contact roller

Exit Level Outcome:

C6: Understand and perform dampening system setup operations.

Specific Outcome:	
SP1:	Understand the operation of the different dampening systems
SP2:	Understand the configuration of the dampening unit
SP3:	Replacement and / or Adjustment of the Water Metering System
SP4:	Adjustment of the dampening forme to the metering system
SP6:	Replacement and / or Adjustment of the Damper forme to the Plate



Exit Level Outcome:

C7: Understand the principles of Densitometry.

Specific Outcome:	
SP1:	Understand the standard colour Bar and company specific colour bar.
SP2:	Understand the basic operation of a densitometer and its uses.
SP3:	Understand trapping controls and purpose
SP4:	Understand Dot gain Controls and purpose
SP6:	Understand Slur and Slur Gauge Controls and purpose
SP7:	Understand Greyscale Controls and purpose
SP8:	Understand The Solid Density Patch and its Controls and purpose

Exit Level Outcome:

C8: Demonstrate competence and the understanding of a Basic Make Ready Process and procedure

Specific Outcome:	
SP1:	Perform Pre Make-ready
SP2:	Mount the correct plates
SP3:	Making a make-ready book
SP4:	Load Paper and setup Feeder and delivery
SP6:	Pre setting ink ducts according to press specifications
SP7:	Obtain Machine register
SP8:	Obtain colour and fit
SP9:	Obtain a press pass



Exit Level Outcome:**C9:** Demonstrate an understanding of and perform press production

Specific Outcome:	
SP1:	Ensure or place side and front lay marks
SP2:	Maintain register and fit quality at production speeds
SP3:	Maintain colour to the Press pass or required density
SP4:	Maintain general print quality
SP6:	Maintain quantity control



Elective Outcomes**Exit Level Outcome:**

E1: Understand and operate computer to plate production.

Specific Outcome:	
SP1:	Understand the operating system and relevant CTP software
SP2:	Preview relevant imposed file/s
SP3:	Imaging of imposed file to CTP device.
SP4:	Loading of a plate
SP6:	Processing a plate
SP7:	Plate / Quality control

Exit Level Outcome:

E2: Demonstrate an understanding of the inline coating process.

Specific Outcome:	
SP1:	Understand the operation of inline coating systems
SP2:	Setup of the inline coating system
SP3:	Identify the correct type of coating
SP4:	Adjusting coating thickness using the press specific system
SP6:	Mounting / replacing "plate/Blanket" and packing
SP7:	Production quality control



Exit Level Outcome:**E3:** Understanding and implement National and international Quality Standards

Specific Outcome:	
SP1:	Research various quality standards
SP2:	Analyse their benefits
SP3:	Apply an international quality standard to achieve consistent quality control
SP4:	Understand the difference between the various quality standards
SP6:	Understand the electronic colour control systems

Exit Level Outcome:**E4:** Understand and implement colour standards

Specific Outcome:	
SP1:	Research various colour standards
SP2:	Analyse their benefits
SP3:	Apply an international colour standard to achieve consistent colour control
SP4:	Understand the difference between the various colour standards



9. Critical Cross Field Outcomes:

1	Identifying and solving problems in which responses display that responsible decisions using critical and creative thinking have been made;	✓✓✓
2	Working effectively with others as a member of a team, group, organisation, community;	✓
3	Organising and managing oneself and one's activities responsibly and effectively;	✓
4	Collecting, analysing, organising and critically evaluating information;	✓
5	Communicating effectively using visual, mathematical and/or language skills in the modes of oral and/or written persuasion;	✓
6	Using science and technology effectively and critically, showing responsibility towards the environment and health of others;	✓✓
7	Demonstrating an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation;	✓
8	Contributing to the full personal development of each learner and the social and economic development of the society at large, by making it the underlying intention of any programme of learning to make an individual aware of the importance of: Reflecting on and exploring a variety of strategies to learn more effectively; Participating as responsible citizens in the life of local, national and global communities; Being culturally and aesthetically sensitive across a range of social contexts; Exploring education and career opportunities; and Developing entrepreneurial opportunities.	✓ ✓ ✓



10 Learning Map (Proposed structure of learning)

In order for an apprentice to qualify in Sheetfed Offset it is necessary to complete the whole fundamental component, the whole core component and a choice of **at least three electives** based on the companies equipment and the chosen field of specialisation.

The following occupations within the qualification can also be completed as skills programmes.

10.1. Sheetfed Offset Assistant

In order for a learner to gain recognition as an assistant in the Sheetfed Offset environment it is necessary to complete the following core and fundamental exit level outcomes.

Fundamental Exit Level Outcomes
F1 Demonstrate an understanding of company policies and procedures as applied to your specific work area.
Core Exit Level Outcomes
C1 Understand different Paper handling operations in a Sheetfed Offset Environment
C2 Understand and perform an assistant's role in a Sheetfed Offset environment.
Elective Exit Level Outcomes
No electives required.



10.2. Computer to plate operator

In order for a learner to gain recognition as a computer to plate operator in the Heatset Offset environment it is necessary to complete the following core and fundamental exit level outcomes.

Fundamental Exit Level Outcomes	
F1	Demonstrate an understanding of company policies and procedures as applied to your specific work area.
F2	Demonstrate an understanding of basic computer skills and the use of Graphic User Interface equipment.
F3	Demonstrate an understanding of printing industry processes, terms, concept and principles.
F5	Demonstrate an understanding of production economics for a printing environment.
F8	Demonstrate an understanding on the printing industries impact on the environment
Core Exit Level Outcomes	
C7	Understand the principles of Densitometry
Elective Exit Level Outcomes	
E1	Understand and operate computer to plate production.



11 References

- Current registered apprentice course maps and training programmes
- Work done by advisory committees.
- GATF training programme.
- Heidelberg handbook of print media
- Printing Science by F. Pateman & L. C Young
- Sappi resource material.
- Internet resources.

12 Review Period

This curriculum, once approved should be subject to the monitoring and continuous improvement guidelines and policies of the South African Qualifications Authority.

This would imply continuous improvement as technology evolves and a formal review every three years.

14 Definitions

CBMT	Competency based modular training
ETQA	Education training quality assurance body
Apprenticeship	A formally registered tri-party contract that culminates into a qualified artisan.
Skills Programme	A credit or non-credit bearing formal learning programme.
Exit Level Outcome	A group of specific standards, knowledge and skills defined as an outcome.
Fundamental	An underpinning knowledge component that supports the gaining of skills.
Core	The essential skills and knowledge based training component.
Elective	A field of specialisation within the formal training programme.
NQF	National Qualifications Framework.
VQF	Vocational Qualifications Framework.
Occupation	A combination of knowledge and skills that culminate in a recognised job.

