**International and National Perspectives of Technology Education**

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| **TOPIC** | **CONTENT** |
| Different perspectives of the term “Technology Education | * What does the South African teacher education

system understand by theterm “Technology Education”* What do teachers and teacher education systems inother countries understand by the term “Technology

Education”* Clarifying the difference between Technology

Education and Science from different perspectives* The characteristics and scope as well as the core concepts of Technology Education from various perspectives
 |
| Historical Development of Technology Education as part of the school curriculum | * History of Technology Education as part of the

school curriculum in different countries* Different perspectives on the role of Technology as part of the school curriculum
* Different Technology Teacher Education curriculums In different countries
* Impact of Technology Education for the education philosophy and conceptual

framework guiding teacher preparation |
|  International and national views on various aspects of Technology Education | * What do technology teachers understand as the

nature and purpose of Technology Education?* What constitutes the Technology teachers knowledge of the Technology Education curriculum?
* What are the pedagogies that teachers believe are suitable to teaching Technology?
* What types of assessment activities do the

Technology teachers utilize and how are theserelated to the content?* What technological teaching and learning resources do Technology teachers use?
* How do the Technology teachers integrate

Indigenous Technology systems in their teaching |
|  Different perspectives of Technology Teachers  | * Knowledge of the educational aims, purposes and values in their educational contexts regarding Technology Education
* Orientation towards the teaching of Technology

including their knowledge of the subject and their beliefs about it* Knowledge of the curriculum in terms of what and when to teach, why, what and how to assess, instructional strategies, general pedagogical knowledge and pedagogical content knowledge
* The learners understanding of the subject and the learners’ characteristics
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**Principles of Drawing in the context of Mechanical, Civil and Electrical Technology**

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| **TOPIC** | **CONTENT** |
| Design Elements and Basic Principles of  Design, Free hand Drawing and Geometrical  Drawing: Basic Introduction | * Line-uses of lines, types of lines
* Colour-attributes of colour
* Shapes-categories of shapes
* Texture
* Space
* Form
* Loci-helix,cam,mechanisms
* Unity-methods
* Point, Line and plane
* Balance-symmetrical and asymmaterical, focal

point, areas of interest* Hierachy
* Scale
* Dominance
* Similarity and Contrast
* Techniques of free hand drawing

**Plane Geometrical Drawing*** Square
* Rectangle
* Triangle

 **Solid Geometrical Drawing*** Sphere
* Cylinder
* Core
* Cube
* Prism
* Polygons
* Ellipse
 |
| Mechanical Engineering Drawing: Basic Introduction | * Machines and machining
* Machine parts
* Castings
* Simple assemblies
* Complex assemblies
* Welding
 |
| Civil Engineering Drawing: Basic Introduction | * Floor plans,
* Foundation to slab
* Foundation to ceiling
* Foundation to roof, electrical fixtures and site plans
* Perimeters and floor areas
* Annotations, tables, dimensioning and scales
* Hatching
* Roads
* Bridges
* Buildings
* Dams
 |
| Electrical Engineering Drawing: Basic Introduction | * Motors
* Starters
* Panels
* Generators
* Transformers
* Poles and towers
* Wiring Diagrams-paralell and series
 |

**Integrated Systems for Technology Education**

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| **TOPIC** | **CONTENT** |
| Introduction and Types of machines | * History of Machines- Industrial Revolution, Mechanisation and Automation
* Explanation of Systems
* Explanation of Mechanical Systems
* Explanation of Electrical Systems
* Simple machines: wheels and axles

 pulley systems chain and sprocket systems gear systems levers and linkages crank and slider cam and follower* Clocks: atomic,watch, pendulum, quartz
* Compressors and Pumps: Archimedes, screw,

 Eductor-jet, hydraulic ram, pump, Trompe, Vacuum pump* Heat Engines External Combustion Engine-

 steam, stirling Internal Combustion Engine- Internal reciprocity engine,  gas turbines |
|  Turbines and Linkages | * Gas turbines
* Jet turbines
* Steam turbines
* Water turbines
* Wind turbines
* Wind generator
* Windmills
* Watts linkage
* Hoeken’s linkage
* Chebyshev’s linkage
* Scott Russel linkage
* Peaucellier Lipkin Linkage
* Sarrus Linkage
* Klan Linkage
 |
| Types of Motion, Energy, Mechanisms and Motors | * Linear
* Rotary
* Reciprocity
* Oscillating
* Potential
* Kinetic
* Friction
* Planar mechanisms
* Spherical mechanisms
* Spatial mechanisms
* Electric motors
* Hydraulics
* Pneumatics
 |
| Electrical Systems | * Common components and concepts of an electrical system : batteries

 : electromagnetic switches and relays : magnetic switches : sensors : temperature senders : speed sensors : potentiometers : circuit protection : fusible links : load devices : glow plugs : solenoids : starter motors : alternators : diodes : ignition systems : maintenance |
|  Electrical Principles | * Electricity
* Basic electrical system requirements
* Basic circuits and circuit diagrams
* Basic electrical elements: current, voltage, resistance, Ohms law
* Electrical tools, measurement and testing: test lights, digital multimeter, diagnostics display meter, multimeter,voltmeter,ohmmeter, clamp(ammeter)meter
 |
| Electrical energy and power and Indigenous knowledge Systems | * Electromagnets
* electric motors
* fuses
* transformers
* electrocution and safety
* Interrelationship between Indigenous Knowledge Systems, Mechanical Technology, society and the environment
* Appropriate technology for sustainable solutions
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**Materials and Structures for Technology Education**

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| **TOPIC** | **CONTENT** |
|  Introduction to materials in modern  technology | * Structure of materials and their underlying principles
* Characteristics and composition of the following materials: steel, ferrous metals and alloys, non-ferrous metals and alloys, cast iron, thermo plastic, metals, ceramics, polymers
* Properties of materials in terms of mechanical, thermal, environmental and electrical properties for example toughness, hardness, elasticity, plasticity, ductility, malleability, brittleness

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|  Distinguishing between different materials | * Visual inspection
* Density test
* Sound test
* Filing test
* Spark test
* Break test
 |
| Manufacturing processes of materials | * Applied thermodynamics, heat transfer, energy conversion
* Fluid mechanics and fluid dynamics
* Mechanism design (including kinematics and dynamics)
* Manufacturing technology or processes
* Casting and castability
* Bulk forming
* Sheet metal forming
* Machining
* Joining
* Powder metallurgy
 |
|  Methods for enhancing the properties of  Materials | * Hardening- work, case, solid solution, precipitation, grain boundary strengthening and transformation hardening
* Tempering
* Annealing
* Normalising
 |
| Introduction to Structures | * Purpose of structures
* Dimensions of structures
* Materials and resources for structures
 |
|  Types of Structures and essential requirements for structures | * Natural-frame and shell
* Man- made- frame and shell
* Designing a structure
* Features of a good structure-strength, stability, rigidity
* Forces in framework structure
 |

**Computer-Aided Design (CAD) in the context of Mechanical, Civil and Electrical Technology**

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| **Topic** | **CONTENT** |
| Introduction | * Introduction to CAD
* Uses of CAD
* Types of CAD
* Advantages
 |
| AutoCAD | * Main functions of AutoCAD
* Components of AutoCAD
* of CAD
 |
| Using CAD for Drawing |  |
| Commands | * Basic commands
* Display commands
* Editing Commands
 |
| Dimensioning and Projections | * Dimensioning and Text
* Orthographic and Isometric Projection
* Sectional View
 |
| Modelling | * 2D and 3D modelling
* Co-ordinate Systems and Cartesian Co
* Ordinative systems
 |