

2018 HANDBOOK School of Education

ARTS & DESIGN

HANDBOOK FOR 2018

FACULTY OF Arts & Design

SCHOOL OF EDUCATION

MISSION of SCHOOL OF EDUCATION

Promotion of quality teaching, learning and research in educational institutions by:

- Empowering students with knowledge, skills and values relevant to their careers.
- Encouraging innovative teaching and learning in education.
- Promoting active research in education to benefit communities and societies.

The School of Education will achieve this by:

- Considering pre-service and in-service education and training as parts of the same professional development continuum;
- Delivering professional education and training of the highest quality, in accordance with relevant South African legislation and the requirements for expressed development needs of educators;
- Engaging in educational research, with particular reference to problems experienced in KwaZulu-Natal educational institutions;
- Providing or facilitating advice and assistance in response to any requests from the educational community in South Africa and its neighbours;
- Exemplifying the principles of equity and transparency in all dealings with students and the broad educational community.

What is a University of Technology?

A university of technology is characterised by being research informed rather than research driven where the focus is on strategic and applied research that can be translated into professional practice. Furthermore, research output is commercialised thus providing a source of income for the institution. Learning programmes, in which the emphasis on technological capability is as important as cognitive skills, are developed around graduate profiles as defined by industry and the professions.

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IMPORTANT NOTICE

The departmental rules in this handbook must be read in conjunction with the University of Technology's General Rules contained in the current General Handbook for Students.

NOTE TO ALL REGISTERED STUDENTS

Your registration is in accordance with all current rules of the Institution. If, for whatever reason, you do not register consecutively for every year/semester of your programme, your existing registration contract with the Institution will cease. Your re-registration anytime thereafter will be at the discretion of the Institution and, if permitted, will be in accordance with the rules applicable at that time.

I. CONTACT DETAILS

All School gueries to: Secretary: Tel No: Fax No: Location of Department:

All Faculty gueries to: Faculty officer: Tel No: Fax No:

Location of Faculty: Executive Dean: Tel No[.] Fax No:

Ms Upasna Rampersadh 033 8458927 033 8458936 Indumiso Campus, PMB

Mr Pragasen Reddy 031 3736522 031 3736518

City Campus, Durban Office Dr Rene Smith 031 3736516 031 3736518

Location of Executive: Deans Office City Campus, Durban

2. STAFFING Head of School	Name and Qualification Dr D Mzindle, STD (Indumiso College), BA, (UniZulu), B.Ed;(UNP) M. Ed (UKZN); D. Ed (UniZulu)
Professor:	Professor S Mago, PGDHET (Univ. of Fort Hare) MBA (Zimbabwe Open Univ.), BSc [Hons] (Univ. of Zimbabwe) PhD (Univ. of Fort Hare)
Senior Lecturers	Dr JP Abraham, BSc (Univ. of Kerala); MSc (Sardar Patel Univ.); M Phil (Univ. of Kerala); PhD (Univ. of Kerala)
	Dr N H Gcabashe, JSTC; BA; BEd, MA (UniZulu); D Ed (Potchefstroom)
	Dr MA Thamae, BSc; PGCE (NUL); BSc (Hons); MSc Chemistry converted to PhD (Rhodes University)
Lecturers	Dr T Chamane, STD (Indumiso College); FDE (Natal Technikon); ABET (UNISA); BEd (Hons) (UKZN); MEd (UKZN) PhD in Education (Unisa)
	Dr GK Zulu, SPTD (Umbumbulu College), FDE (UNP), B Ed (Hons) & M Ed (UKZN), D Ed (UniZulu)
	Dr MSA Maeko, ND Technical Education; B Tech; B Ed Hons(WSU); M Ed (TUT); D Ed (TUT)
	Dr J Mangundu, BSC; MSC: Information Systems (Midlands State University – Zimbabwe) Ph D (UKZN)
	Dr VZ Shilenge, STD, (Eshowe College), FDE,(Springfield College), B Ed (Hons), M Ed (UKZN) Ph D (UKZN)
	Mrs A Hiralaal, BA Degree; ND in Business; HED; BEd (Hons); B Comm(Hons); M Ed (UKZN)
	Mr C Makwara, B Comm Hons: Education (UZ); MBA Midlands State University (ZIM)
	Mr K Naidoo, BEd; B.Sc. (UDW); NHD: Post SchEd (ML Sultan); M.Ed (UKZN)
	Mr P C Balachandran Pillai, B Ed; B Sc; M Sc (India)
	Ms E Khonyane, B Ed; BA; UED (Fort Hare)
	Mr DTS Sotsaka, Dip Architectural Drawing (Intec College) STD (Indumiso); N6 Diploma: Civil (Soshanguve Tech); B Tech (TSA) BEd [Hons]; (UKZN) MEd (UKZN)
	Mr E Conradie, HDE (TN); FDE (NCE); BEd (Hons) (UNP); M Ed (UKZN) Mr R Holmes, HDE (UN); NTD (PMB. T) NCT (Olifants; B Ed Hons (UNP) M Ed (UKZN)
	Mr S Maharaj, ND: Electrical; BTech Electrical Engineering (DUT). M Tech (DUT)
	Mr B Tarr, SSTC (NOSA); NTTD (Dept. of Manpower); NTD (TN); FDE (NCE)

Lab Technician Secretary Administrative Assistant Vacant Ms U Rampersadh, BTech Degree (Commercial Administration) (MLST) Ms Sandra Khonyane, BA Library and Information Science (Fort Hare); BA (Hons) Library Information Science (UCT).

3. PROGRAMMES OFFERED BY THE SCHOOL

A programme is offered in this School which, upon successful completion, will lead to the award of the following qualification:

Qualification	SAQA NLRD Number
Bachelor of Education [BEd]	73076
Bachelor of Education Honours	99644
[Technology Education]	
Doctor of Education [DEd]	1533

4. PROGRAMME INFORMATION AND RULES

Bachelor of Education Degree in FET Teaching

The purpose of the B Ed FET Teaching Programme is:

To prepare and empower future teachers for a career in teaching at the FET band and to develop them for further studies.

All normal rules for undergraduate degrees apply. See the General Handbook for details. This qualification is an **annual** programme.

In addition to the requirements of Rule G17, the following rules shall apply:

- (a) To pass a year of study, all subjects as prescribed in the Instructional Programme must be passed with the exception of conditions (b) and (c) below
- (b) (i) The pass mark for any level of each of the subjects; General Subject Didactics, Skills and Life Orientation and Communication is a continuous assessment average of 50%
- (ii) However, a student who fails to comply with b(i) in any one or more of these subjects and has obtained a minimum average mark of 40% in such subjects, may be allowed to proceed to the next year of study with permission from the School Board. The student has to repeat and pass the subject/s by the third year of study. The student will not be allowed under any circumstances to proceed to the fourth year of study
- (iii) If a student obtains less than the average mark of 40% for the subject in b(i), the student may not proceed with the next level of study in that subject
- (c) If after a supplementary examination, a student still fails, it is the responsibility of the student to re-register for the failed subject and pass. No special arrangement for this will be made on the time-table.
- (d) The elective which does not continue beyond the first year. If a student fails the third major in the first year of study, he/she can still proceed to the next level of study provided no other subjects have been failed. The student is allowed to carry the failed major until third year. If other subjects are failed, the student will not be allowed to proceed to the next year of study.

ALL SUBJECTS MUST BE PASSED BY THE THIRD YEAR. If the student has an outstanding subject, he/she cannot proceed to the fourth year of study. The student will have to repeat the year

- (e) No student will be allowed to register for the next level of a subject without passing the previous level nor will the students be allowed to register for two levels of a subject simultaneously.
- (f) Special Examinations A student cannot just apply for a special examination. The student must satisfy

the following conditions. The student must pay the prescribed fee and the application form must reach the relevant Office within 5 working days from the date on which the examination was supposed to be written. The student must be registered for the subject in the year that the examination was supposed to have been written. The student can apply for special examinations provided the student could not write the examinations due to extenuating circumstances that were beyond the control of the student. Extenuating circumstances **EXCLUDES** any clash of subjects or any misrepresentation of any examination timetable, illness or death of any distant relative or acquaintance, participation in any event unless to represent a province or South Africa. The student must provide documentary proof of the extenuating circumstances. Students who attempted the examination will not be allowed to apply for a special examination. The DP mark of the examination. Students cannot use DP marks from previous years

(g) Maximum time for completion of the qualification. The qualification must be completed within six years. Failure to comply with this rule precludes registration in the School of Education

MINIMUM ADMISSION REQUIREMENTS

- A National Senior Certificate (NSC) with endorsement for entry into Bachelor studies with relevant subject combinations and levels of achievement for students who matriculated after 2008.
- A National Senior Certificate with Matriculation Exemption for students who matriculated before 2008
- A minimum of 30 points excluding Life Orientation
- 2x approved languages one of which must be English. Students who ma- triculated before 2008 must have either a "E" symbol on the Higher Grade or a "C" symbol on the Standard Grade for English. Students who matriculated after 2008 must have a "Level 4" pass in English
- Students in possession of a recognised certificate or diploma in EDUCATION may also present their qualifications for departmental consideration
- Students with Nated (N4, N5 and N6) and NCV qualifications from TVET colleges with relevant subject combinations and levels of achievement as prescribed by the institution may present their qualifications for consideration regarding admission to the B Ed Degree. Entry into the B Ed programme is at the discretion of the relevant department.

ADMISSION BASED UPON WORK EXPERIENCE, AGE AND MATURITY

- a) A student may subject to such requirements as the Senate may determine, be admitted to the Bachelor of Education Degree, who is in possession of a National Senior Certificate, Senior Certificate or an equivalent certificate, but lacks minimum requirements for admission to the degree provided that:
 - i) The person shall have reached the age of 23 in the first year of registration and shall have at least:
 - 3 years appropriate work experience or
 - capacity for the proposed instructional programme which shall be assessed

by a Senate-approved admission test; and the person has obtained

- ii) a conditional certificate of exemption from the Matriculation Board (when in possession of the Senior Certificate (SC); OR has met
- iii) the requirements of the Senate discretionary admission (when in possession of the NSC or equivalent) where Senate is satisfied the applicant has shown sufficient academic ability to ensure success, and that the person's standard of communication skills and/or work experience are such that the person, in the opinion of the Senate, should be able to complete the proposed instructional programme successfully
- iv) the person's application for admission in terms of Rule G7(3) is approved prior to registration

CRITERIA FOR SELECTION OF STUDENTS INTO THE B ED PROGRAMME

- Students who matriculated before 2008 choosing the EMS area of specialisation must pass Accounting at NQF Level 4 (Matric) with either an "E" symbol on the Higher Grade or a "C" symbol on the Standard Grade. Students who matriculated after 2008 must have a "Level 4" pass in Accounting
- 2. Students who matriculated before 2008 choosing the Natural Science area of specialization must pass Mathematics at NQF Level 4 (Matric) with an "E" symbol on the Higher Grade or a "C" symbol on the standard grade. Students who matriculated after 2008 must have a "Level 4" pass in mathematics
- 3. Students who matriculated before 2008 choosing the Technology area of specialization must pass Mathematics OR Mathematical Literacy OR Physical Science on NQF level 4 (Matric) with an "E" symbol on the Higher Grade or a "C" symbol on the Standard Grade. Students who matriculated after 2008 must pass Mathematics OR Mathematical Literacy OR Physical Science with a "Level 4 pass If Electrical Technology is selected, students who matriculated before 2008 must pass Mathematics with either an "E" symbol on the Higher Grade or a "C" symbol on the Higher Grade or a "C" symbol on the 3 selected before 2008 must pass Mathematics with either an "E" symbol on the Higher Grade or a "C" symbol on the Standard Grade. Students who matriculated before 2008 must pass Mathematics with either an "E" symbol on the Higher Grade or a "C" symbol on the Standard Grade. Students who matriculated before 2008 must pass Mathematics Who matriculated before 2008 must pass Mathematics Who matriculated before 2008 must pass Mathematics Students who matriculated Students who Mathematics Studen

EXEMPTION OF SUBJECTS

- 1. A student may on formal application and payment of the prescribed fee, and for the purpose of such student obtaining a qualification at the institution, be granted an exemption from registration for a subject(s) which the student has already passed as part of an instructional programme which is accredited by the Council on Higher Education (CHE)at the institution or any other institution registered with the Department of Higher Education and Training (DHET) as a higher education and training provider and regarded by the Council as equivalent to a university of technology towards a tertiary qualification which is registered with South African Qualifications Authority (SAQA) provided that:
- a student must write and pass at the institution:
 50% or more by FTE weight of the student's subjects which must include at least
 50% by FTE weight of the student's final level subjects (if the number of subjects that must be passed is not an integer, then it must be rounded up to the nearest whole number or) All the student's final level subjects
- 3. Such exemption shall not be granted with distinction
- 4. Exemption granted for Work Integrated Learning (WIL) in accordance with the

requirements set by the School of Education

- 5. No exemptions will be granted for portions of a subject
- 6. Except in special circumstances as approved by the relevant Faculty Board, no subject appearing on a LOWER level qualification already granted to a student can be offered for exemption purposes towards a higher level qualification for which the former is a prerequisite

5. PROGRAMME STRUCTURE

Bachelor of Education in FET Teaching in Technology Education: First Year									
Code	Subjects:	Compulsory	Annual Assessment NQF Pre-						
					Method	Level	requisite		
CVTCI0I ELTCI0I MCTCI0I	Civil Technology Electrical Technology Mechanical Technology	*Mathematics Compulsory if Electrical Technology is	Select I of 3	~	Examinations	5	See Criteria for selection		
EGDS101	Engineering Graphics and Design	Compulsory		√	Examinations	5			
MTMC101	Mathematics Mathematical Literacy Physical Science		Select I of 3	\checkmark	Examinations	5			

Bachelor of Education in FET Teaching in EMS Education: First Year									
Code	Subjects:	Compulsory		Annual Assessment NQF Pre-					
					Method	Level	requisite		
ACCT101	Accounting	Compulsory		\checkmark	Examinations	5	See Criteria		
							for selection		
ECON101	Economics		Select	\checkmark					
CAPTIOI	Computer Application		2 of 5						
	Technology								
BSMN101	Business Management								
MTHLI0I	Mathematical Literacy								
	or								
MTMC101	Mathematics								

Bachelor of Education in FET Teaching in Natural Sciences Education: First Year										
Code	Subjects:	Compulsory		Annual	Assessment Method	NQF Level	Pre-requisite			
MTMC101	Mathematics	Compulsory		~	Examinations	5	See Criteria for selection			
PHSE101	Physics		Select	\checkmark	Examinations	5	See Criteria			
CHED101	Chemistry		2 of 3				for selection			
BIOE10	Biology									

Bachelor of Education in FET Teaching in Technology Education: Second Year									
Code	Subjects:	Compulsory		Annual Assessment NQF Pre-					
					Method	Level	requisite		
CVTCI0I ELTCI0I MCTCI0I	Civil Technology Electrical Technology Mechanical Technology	*Mathematics Compulsory if Electrical Technology is chosen	Continue with subject selected in First Year	~	Examinations	6	See Criteria for selection		
EGDS201 MTMC201 MTHL201	Engineering Graphics and Design Mathematics Mathematical Literacy		Continue with 2 of the 3 subjects selected in First Year		Examinations	6	See Criteria for selection		

Bachelor of Education in FET Teaching in EMS Education: Second Year								
Code	Subjects:	Compulsory		Annual	Assessment	NQF	Pre-	
					Method	Level	requisite	
ACCT201	Accounting		Continue with 2 of	\checkmark	Examinations	6	l st year	
ECON201	Economics		the 3 subjects				level	
CAPT201	Computer		selected in first year					
BSMN201	Application							
MTMC201	Technology							
MTHL201	Business							
	Management							
	Mathematics							
	Mathematical							
	Literacy							

Bachelor of Education in FET Teaching in Natural Sciences Education: Second Year								
Code	Subjects:	Annual Assessment NQF Pre						
				Method	Level	requisite		
PHSE201	Physics	Continue with 2 of	\checkmark	Examinations	6	l st year		
CHED201	Chemistry	the 3 subjects				level		
BIOE201	Biology	selected in first						
MTMC201	Mathematics	year						

Bachelor of I	Bachelor of Education in FET Teaching in Technology Education : Third Year									
Code	Subjects:	Compulsory Annual Assessment NQF Pre-								
					Method	Level	requisite			
CVTC301	Civil Technology	*Mathematics	Continue	\checkmark	Examinations	7	2nd year			
ELTC301	Electrical	compulsory	with subject				level			
MCTC301	Technology	if Electrical	selected in							
	Mechanical	Technology	second year							
	Technology	is chosen								
EGDS201	Engineering Graphics and		Continue	\checkmark	Examinations	7	2nd year			
MTMC201	Design		with				level			
MTHL201	Mathematics		subject							
	Mathematical		selected							
	Literacy		in second							
			year							

Bachelor of Education in FET Teaching in EMS Education: Third Year Management Sciences Teaching:									
Code	Subjects		Annual	Assessment	NQF	Pre-			
				Method	Level	requisite			
ACCT301	Accounting	Continue	\checkmark	Examinations	7	2nd year level			
ECON301	Economics	with 2							
CAPT301	Computer Application Technology	subjects							
BSMN301	Business Management	selected in							
MTMC301	Mathematics	second year							
MTHL301	Mathematical Literacy	2							

Bachelor of Education in FET Teaching in Natural Sciences Education: Third Year									
Code	Subjects:		Annual	Assessment	NQF	Pre-requisite			
				Method	Level	-			
PHSE301	Physics	Continue with 2	\checkmark	Examinations	7	2nd year level			
CHED301	Chemistry	subjects selected in				-			
BIOE301	Biology	second year							
MTMC301	Mathematics								

6. ASSESSMENT RULES

All assessments rules shall be accordance with the Assessment policy of the School of Education

7. RE-REGISTRATION RULES

This rule must be read in conjunction with Rule GI (2) in the General Handbook of the University: A student will be refused re-registration at the School of Education if she/he due to unsatisfactory academic progress, to complete the instructional programme for which he/she is, or has not most recently been registered within the maximum period for registered study stipulated in the relevant rules (Rule G19 to G25) in the General Handbook for Students refers.

8. ACADEMIC MONITORING AND SUPPORT GUIDELINES FOR STUDENTS AT RISK

MISSION

The intent of Academic monitoring and support is to enhance student engagement in the learning process, encourage higher levels of academic performance, further critical thinking skills and to support and assist underperforming students. The School of Education acknowledges that academic monitoring and support is a pre-requisite for academic success.

AIM

These guidelines commit the School of Education to identify under-performing students timeously and to provide the necessary academic support to assist students to graduate in the minimum time possible. Appropriate interventions and systems of support are expected to reduce dropout rates and exclusions and to improve throughputs and completion rates.

COPE OF THESE GUIDELINES

These guidelines apply to all students registered in the School of Education. The students that are assessed as academically underperforming are classified by the School of Education as being "STUDENTS AT RISK".

STAFF RESPONSIBILITY

Staff have the responsibility of delivering quality teaching and assessment, ensuring that students have the opportunity and means to assess and monitor their performance on a regular basis, identifying underperforming students timeously and providing these students with appropriate academic support. Co-ordinators of focus areas need to take an active role in assuring that staff identify such students timeously.

STUDENT RESPONSIBILITY

Students are expected to assume responsibility for their own learning by committing themselves fully to their studies, monitoring their academic performance on a regular basis, informing relevant academic staff of the difficulties they may be experiencing and to take advantage of all the resources and support made available to them in order to improve their academic performance and complete their studies successfully and preferably in the minimum time recommended for their qualification but not exceeding the maximum duration allowed.

THE GUIDELINES

Student's performance after each assessment will be assessed to identify students who underperforming in a subject. Underperformance is identified as attaining a mark less than less than 50% in any assessment. According to Rule G14 in the General Handbook for students, 50% is the final pass mark for all subjects in an examination hence this standard will be maintained.

The names of "At Risk Student will be submitted to the Academic Monitoring and Support Committee after each assessment. The committee will then interview the student together with the subject lecturer and the focus area co-ordinator to determine the reason for the underperformance.

Depending on the reason for the underperformance, the committee together with the focus area co-ordinator and the subject lecturer will take a decision on what intervention strategy is required to support and assist the student. The Academic Monitoring and Support Committee will carefully monitor the performance of all "Students at Risk" by holding regular meetings with the subject lecturer and the student to determine whether the intervention strategies have been effective. However, if underperformance persists after all attempts have been made to support and assist the student, then the Academic Monitoring and Support Committee will have to meet and make a decision. Students are referred to Rule G 17 in the Handbook.

"G 17 UNSATISFACTORY ACADEMIC PROGRESS

- (a) A student will be refused re-registration at the Institution for any instructional programme if he/she is unable, due to unsatisfactory academic progress, to complete the instructional programme for which he/she is, or has most recently registered, within the maximum period of registered study stipulated in the relevant Rule (Rule G 19 to G25 refer)
- (b) Notwithstanding Rule G17(1), the executive Committee of the relevant Faculty Board may, in circumstances which they deem exceptional, grant a student a further period/s of registration for completion of any instructional programme.
- (c) A student may appeal against the application of Rule G17(1) in accordance with Rule G1 (8)"

ACADEMIC MONITORING COMMITTEE

The academic monitoring committee is headed by the Head of Department of the School of Education who will be assisted by the programme co-ordinator and all focus area co-ordinators.

9. INDICATIVE CONTENT

NB: Students to read this section in conjunction with the relevant student guides. Core Subjects are Compulsory for all B Ed Students EDUCATION I (EDUC 101)

- I. Education and Its Purpose
- 2. Basic Educational Concepts (Formal, Non-Formal and Informal Education)
- 3. Introduction to: Philosophy of Education
- Psychology of Education (theories of Human Development)
- History and Comparative Education
- Sociology of Education
- 4. Curriculum Design (OBE: NCS)

EDUCATION II (EDUC 201)

I. Issues in Education [Gender, Equity and Inclusive Education]

What is Inclusive Education?

An overview of the conceptual and operational framework that informs the strategy of inclusive education.

Discussions on inclusive education will include:

- The shift from categories of disability to levels of support
- The description and role of full-service schools
- \bullet $\;$ The description and role of resource centres and their role in the implementation of inclusive education

Multicultural Education

Gender Issues in Education

Quality Education

2. Theories of Human Development II: Piaget — Cognitive Development

- Kohlberg's Theory Moral Development
- Vygotsky The Zone of proximal development
- Maslow Hierarchy of needs

3. Information Processing Approach: Perkins (a self-study)

EDUCATION III (EDUC 301)

- I. Concept of Research
- 2. Research Processes Defining a research problem Problem Identification Delimiting a research problem
- 3. Approaches to research Qualitative Research Quantitative Research
- 4. Types of Research
- 5. Hypothesis/Research question
- 6. Literature Review
- 7. Research Designs
- 8. Sampling Techniques
- 9. Measuring Instruments
- 10. Data collection, organization and presentation
- II. Measure of Central Tendency
- 12. Leadership and Management What is classroom management Effective classroom management Planning a classroom management task Managing change in Education Parent involvement and classroom management Collegiality (teaching, mentoring and support)

13. Education Policies General Legislation Bill of Rights

Labour Relations Act Employment Equity Act

14. National Education Policy Act (84/1996)

National Policy on HIV/AIDs for learners and educator in public schools and students educators in FET Institutions. Norms and standards for Educators

15. South African Schools Act (84/1996)

Learners representative Councils

The formation and the role of School Governing Bodies (SGBs). Guidelines for consideration of Governing Bodies

In adopting a code of conduct for learners. National Norms and standards for School funding Exemption of parents from paying fees Employment of Educators Act South African Council of Educators Act (SACE)

EDUCATION IV (EDUC 401)

- I. Partnerships in Education:
 - Role of Industry in Education
 - Role of Parents/Community in Education
 - Role of Government in Education
 - Role of SACE
- 2. Education and Law
- 3. Leadership and Management
- 4. Ethical issues in Education
 - Ethics of Justice
 - Ethics of Care
 - Ethics in the Workplace
 - Ethics and the South African Code of Conduct for Educators
- 5. Submission of research projects

GENERAL SUBJECT DIDACTICS I (GSDI 101)

- I. Introduction to Didactics
- 2. What is teaching?
- 3. Teaching environment
- 4. Teaching approaches
 - Traditional approaches
 - OBE as an approach to teaching and learning
- 5. Introduction to Teaching and Learning Strategies
- 6. Teaching Methods
- 7. General Teaching Skills
- 8. Introduction to Media Applications

GENERAL SUBJECT DIDACTICS II (GSDI 201)

- Micro-Teaching Introduction to Outcomes Designing Lesson Plans Teaching and Learning Media Applications Collaborative Teaching
- 2. Classroom Management
- 3. Outcomes Based Assessment (OBA)
- 4. Teaching Large Groups

GENERAL SUBJECT DIDACTICS III GSDI 301)

- I. Micro-Teaching
 - * Teaching and Learning Strategies
 - * Questioning Techniques
 - * Development of Media and production of teaching materials
- 2. Curriculum Development: Planning Work Programmes for different learning areas
- 3. Assessment Approaches and Principles
- 4. Balancing a Question Paper
- 5. Quality Assurance in Education

PLANNING A LEARNING PROGRAMME

New Curriculum Framework Levels of Planning

GENERAL SUBJECT DIDATICS IV (GSDI 401)

- 1. Discipline in Education: Legislation around discipline in School
- 2. Decentralised School Governance: School Governing Bodies and their role

3. Portfolio Development Project

WORK INTEGRATED LEARNING (WIL) (EXBE 101)

- 1. 4 weeks: Academic Literacy and Micro-Teaching.
- 2. Portfolio and Logbook.

WORK INTEGRATED LEARNING (WIL) (EXBE 201)

- I. 4 weeks: Guided Observation
- 2. Portfolio and Logbook.

WORK INTEGRATED LEARNING (WIL) (EXBE 301)

- I. 4 weeks: Guided Observation and Collaborative Teaching
- 2. Portfolio and Logbook.

WORK INTEGRATED LEARNING (WIL) (EXBE 401)

- I. 6 months, full time teaching
- 2. Portfolio and Logbook.
- An experienced senior educator to be appointed as a mentor.
- 3. Students must comply with rules and regulations of the institution in which they are placed and are required to comply with DoE and the SACE: Code of Conduct for Educators.

Fundamental Subjects are Compulsory for all students:

ENGLISH FOR THE ARTS EGLA (101)

- I. Overview of English for the Arts
- 2. Theoretical Approaches to Language
- 3. Social Context of Language
- 4. Structures of the English Language
- 5. Receptive and Productive skills
- 6. Semantics
- 7. Text and Discourse Analysis
- 8. Academic Writing and Verbal Presentation

COMMUNICATION IN ENGLISH II (LANGUAGE X) (CO 201)

- I. Organisational Communication
- 2. Intercultural communication
- 3. Report writing
- 4. Non-verbal communication
- 5. Speaking in groups and meetings
- 5. How we read/improving your reading skills
- 6. Text analysis

COMMUNICATION IN ENGLISH III (LANGUAGE X) (COEN 301)

- I. Organisational Correspondence: Application of writing skills
- 2. Linguistic issues and topics
- 3. Aspects Regarding Language Usage In The Context of The Teaching and Learning situation
- 4. Legislation and Professional issues pertaining to teaching and learning
- 5. Scientific investigations into linguistic issues

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SKILLS AND LIFE ORIENTATION I (SKLO 101)

- I Basic Study Methods
- 2 Community Involvement
- 4. Role of the Individual in the Economy
- 5. Entrepreneurship
- 6. Computer Literacy I
 - Basic Concepts: Theory
 - The Operating System
 - Managing Dropbox and files
 - Impact of Computer Technology on socio-economic, environmental, political and ethical issues.
 - Word Processing
 - Use of the Internet, TLZ (Internet) and Email

SKILLS AND LIFE ORIENTATION II (SKLO 201)

- I. Comparative Religion Views
- 2. Self-Management Skills
- 3. Meeting Procedures
- 4. Loss Control
- 5. Computer Literacy
 - Word Processing: Microsoft Word
 - Spreadsheet
 - Education Documents and lesson plans: Tables, Documents of meetings, Job
 - Application, Legal Documents
 - Guide to the Internet, TLZ (Internet) and Email

SKILLS AND LIFE ORIENTATION III (SKLO 301)

- I. Personal Development and Well-Being
- 2. Citizenship Education
- 3. Career and Career Choices
- 4. Recreation and Physical Well-being
- 5. School Sports

Athletics Soccer/Netball Volleyball/ Tennis (lawn/table) Basketball Indigenous Games

6. Outdoor Sport

Additional optional language subjects

COMMUNICATION IN ISIZULU I (LANGUAGEYI) (COZU 101)

- I. IsiZulu njengolunye Iwezilimi zabantu abamnyama eAfrika eseNingizimu
- 2. Ukubhala
- 3. Ukukhuluma
- 4. Ukulalela

COMMUNICATION IN ISIZULU II (LANGUAGE YI) (COZU 201)

- I. Ukubhala
 - Ukukhombisa inhlonipho lapho ubhala noma ukhuluma

- Ulimi lwesimo
- Amagama anembayo
- 2. Ukukhuluma
 - Inkulumo eyongayo neyonga amagama
 - Imiyalezo ethunyelwa yisitho zomzimba lapho ukhuluma
 - Ukuqikelela ukuthi kuzwakale kahle okushoyo
 - Ulimi nozwelomagama
 - IsiZulu soqobo
- 3. Ukufunda
 - Izinhlobo zezindlela zokufunda
 - Ukufunda okufanelene nohlobo lombhalo
 - Izinhlobo zemibhalo yesiZulu
 - Ukufingqa inkulumo
- 4. Ukwenza ucwaningo

COMMUNICATION IN AFRIKAANS I (LANGUAGE Y2) (CMAF 101)

- I. Speaking
 - Using appropriate words
 - Using the everyday expressions correctly
 - Using good idiomatic expressions
 - Making a distinction between "borrowed' words and genuine [suiwer] Afrikaans words
 - Getting to the point
- 2. Reading
 - Reading and pronouncing words properly
 - Observing punctuation marks
 - Showing understanding of what is being read
- 3. Writing
 - Writing words and sentences properly
 - Letter —writing
 - Writing passages to observe punctuation marks
- 4. Research to discover new words and expressions and their meaning

COMMUNICATION IN AFRIKAANS II (LANGUAGE Y2) (CMAF 201)

- I. Advanced Oral Skills
- 2. Advanced Reading Skills
- 3. Advanced Listening Skills
- 4. Advanced Writing Skills

B Ed (FET): Specialisation Economics and Management Sciences ACCOUNTING (EDUCATION) I (ACCT 101)

- I. Introduction to Accounting and Nature of Accounting
- 2. Accounting Concepts Procedures and Principles according to GAAP
- 3. Users of Financial Information to make informed decisions.
- 4. Basic business calculations eg. VAT, Cost Price , Discounts and Percentages.
- 5. Book-Keeping: CRJ, CPJ, DJ, DAJ, CJ, CAJ, PCT, GJ/posting to ledgers, preparing of trial balances, income statements and balance sheets.
- 6. Year adjustments of a sole trading.
- 7. Perpetual and periodic inventory systems.
- 8. Bank Reconcilation procedures.
- 9. Analyzing financial statements

ACCOUNTING (EDUCATION) II (ACCT 201)

I. VAT

- 2. Partnerships: Formation, financial statements, dissolution, liquidation
- 3. Departmental Accounting: Cost allocation departmental journals, departmental financial Statements, inter-departmental transfers.
- 4. Cash Budgets: Preparing cash budgets from given information
- 5. Asset Disposal
- 6. Non Profit Organisations

ACCOUNTING (EDUCATION) III (ACCT 301)

- I. Companies: Statutory Reporting, Financial statements, disclosure of information by way of notes.
- 2. Cash flow: Use given information from previous years and additional information.
- 3. Interpretation and Ratio Analysis
- 4. Manufacturing Accounting
- 5. Branch Accounting

BUSINESS MANAGEMENT (EDUCATION) I (BSMN 101)

Semester One

I. Introduction to Business Management as a Science

The business world and business management Needs and needs satisfaction The main economic systems

Needs satisfying institutions of the free market

2. Entrepreneurship

What is entrepreneurship? What entrepreneurs do and why they do it? The role of entrepreneurs in society The small business The entrepreneurial process Skills required for entrepreneurship

3. The establishment of a business Legal forms of ownership and their formation in South Africa

4. The business environment

The organization and environment change The three sub-environments [micro, market and macro environments]

5. The general management principles

The role of management Different levels and types of management in businesses Skills at different managerial levels The role of managers

6. The basic elements of planning

- 7. Organizing management
- 8. Leadership —leading people in the organization
- 9. Meeting human resource requirements and developing effectiveness in HR
- 10. The legal environment and human resources

II. Controlling the management process-the importance of control

The control process

The focus of control

The characteristics of an effective control system

Second Semester

- 1. The marketing process Evolution of marketing thought Defining marketing The components of the marketing process Marketing research
- 2. The marketing instruments

The key to the market; product decisions, brand decisions Price decisions, distribution decisions, marketing communication decisions

3. The integrated marketing strategy The marketing concept Marketing strategy during the product life cycle Marketing planning and control

4. Public Relations The nature of public relations Public relations management The communication programme

5. The financial function and financial management Concepts in financial management The objective and fundamental principles of financial management

6. Asset management: the investment decision The management of current assets Long-term investment decisions and capital budgeting

7. The operations management function

- 8. The purchasing and supply function
- 9. Contemporary issues in business management

BUSINESS MANAGEMENT (EDUCATION) II (BSMN 201)

I. Managers and management, Managing in today's world

Functions of management Levels of managers and their essential roles Skills necessary for becoming successful managers

2. Foundations of planning, foundations of decision making

Benefits and drawbacks of planning

Types of plans and the steps of the strategic management process Steps in the decision making process

Approaches to decision making

3. Technology and operations, basic organizational design

Formula for calculating productivity Technology versus work obsolescence Elements of organizational structure Ways organizations may departmentalize Types of organizational structures

Leadership and trust, Communication and interpersonal skills

Theories on leadership Communication process Communication barriers Delegation and conflict

Second Semester

I. Competing with operations, Process Management

Operations as a function

The role of operations strategy as a source of competitive strength in a global market place Main process decisions and how they must relate to volume. Meaning of automation and economies of scope

2. Managing processes and managing technology

Major activities associated with successful project processes Network of interrelated activities in a project

The sequence of critical activities that determine the duration of a project Probability of completing a project on time

Meaning of technology

Fundamental role of the computer and information technology

Factors that managers must consider when making technological choices

3. Quality, capacity and location as well as layout

The principle of TQM Control charts Measuring capacity Capacity gaps

Economies and diseconomies of scale Basic layout types Factors affecting choice of location

4. Supply chain-management and forecasting

Nature of supply-chain management for both manufacturers and service providers Supply chain dynamics

Demand patterns that combine to produce a demand line series Forecasting techniques

BUSINESS MANAGEMENT (EDUCATION) III (BSMN 301)

- The goal of financial management Forms of business organizations, Functions of financial manager, Analysis of financial statements, Determining the influence of risk on the required rate of return, The role of time value for money and Capital budgeting techniques
- 2. Understanding marketing management Defining marketing in the 21st century, Developing marketing strategies and plans, Capturing marketing insights, Gathering information and scanning and environment Conducting marketing research and Forecasting demand

3. Building strong brands:

Creating brand equity, [what is brand equity?, building brand equity, measuring brand eq- uity, devising a branding strategy and customer equity].

Crafting the brand positions

Developing and communication a positioning strategy

Product life-cycle marketing strategies, and

Dealing with competition

4. Shaping the market offering:

Setting product strategy

Product characteristics and classifications, differentiation, product and brand relationships, packaging, labelling, warranties and guarantees, designing and managing services, the nature of services, marketing strategies for service firms, managing service quality, managing service brands, managing product-support services, developing pricing strategies and program, understanding pricing, setting the price, adapting the price, initiating and responding to price changes

5. Delivering Value:

Designing and managing value networks and channels, Marketing channels and value networks, The role of marketing channels, Channel-design decisions, Channel-management decisions, Channel integration and systems,

Conflict, co-operation and competition E Commerce marketing practices Managing retailing, Wholesaling and market logistics

6. Creating successful long-term growth:

Introducing new market offerings, New product options, Challenges in new-product development, Organizational arrangements, Managing the development process and Tapping into global markets

COMPUTER APPLICATION TECHNOLOGY (EDUCATION) I (CAPT 101)

I. Open and close one or more documents

Create a new document with or without using a template Save a document under a different name or in a different location or as a different type Use the help function and on-line help

Change view types Enter and edit data

Select data using a keyboard and/or a mouse

Copy, move and delete selected information using copy and paste tools and methods Apply the basic font styles of bold, italics and underlining

Change the font type, colour, size and effects (including subscript and superscript)

Align to left, right and centre

Find and replace

Use a spell and grammar check

Copy information or objects between applications (including OLE techniques) Input data from different formats

Use the undo and re-do functions

Change document orientation (portrait and landscape), margins and paper size Add headers and footers including page numbers, date, path and file name Proofread in terms of layout, presentation and accuracy

Preview a selection to print

Choose print output options such as range of pages, number of copies, odd or even pages, print quality and any other applicable printer optionsInsert and manipulate objects in an application including clip a charts

Use templates and wizards Use the drawing tools

Import / Export data

2 Specific word processing skills

Use a word processing programme to an advanced level to manipulate text and graphics Input data using various input devices, methods and procedures

Enter, edit and format text and graphics Create visual and printed matter. Design and layout documents

Use and manipulate columns Apply and copy styles and formats

Insert special characters or symbols Use automatic hyphenation

Show non-printing characters

Insert, remove and manipulate line breaks, page breaks and section breaks Indent paragraphs (left, right, first line, hanging)

Apply spacing within and between lines and paragraphs Use tabs (left, centre, right, decimal, leader, bar)

Use bullets and styles of bullets in a multilevel list Add borders and shading

Create, manipulate and format a table with cells, rows and columns $% \mathcal{T}_{\mathrm{C}}$ Use table properties Convert text to table and vice versa

Perform a mail merge by creating a form letter and using an internal or external data source such as a spreadsheet or table Use track changes

Insert reference

Insert table of contents

Insert auto text, fields, and comments Create, use and manipulate forms Compare and merge documents

3 Specific spreadsheets skills:

Process basic numerical data using a spreadsheet programme Insert, copy, delete and format rows and columns

Work with cells and ranges Format cells and worksheets Use basic formulas

Use basic functions

Mathematical functions such as sum, round, sqrt, power, sumif

Statistical functions such as average, min, max, count, large, small, mode, median, countif Date and time functions such as date, day, now, today

Text functions such as left, right, mid, len, value, text Logical

functions such as If

Create and edit charts

Use relative and absolute cell reference

Insert, delete and change the format of rows, columns and cells Select adjacent and non-

adjacent ranges

Sort

Insert, copy, delete and rename worksheets Work with and between worksheets Use the auto fill tool

Use the basic mathematical operators (addition, subtraction, multiplication, Interpret standard error values associated with using formulas Format and round of numbers

Format date and text data Split and merge cells

Manipulate text with wrapping and cell content orientation Add borders, colours and other effects to a cell range

?sion) in formulas Create different types of charts and graphs (column chart, bar chart, line) Change colours, labels, legends, titles and axes in a graph

Display gridlines, row and column headings and title rows for printing purposes

4 Specific database skills:

Create single table data sources to generate forms, queries and reports using a database programme Create a single table data source

Understand database organisation including records, tables, fields, data types, indexes and primary keys Manipulate tables, records and fields

Work with field properties including default values, validation rules, input mask Construct databases and basic table relationships

Filter, group and sort records

Create and design forms, queries and reports

Specify criteria in a query using the relational operators

Add extra fields with calculations in forms, queries and reports

End-user computer application programme of own choice:

Presentations or web authoring tools or desktop publishing software or any other

application software of own choice

Enter, edit and format text, numbers and graphics

Application of good design principles

5 Integration

Integration of end-user computer application programmes Work between spreadsheet, database and word processor

6 Email

Create, open, delete, send, forward, reply, flag Open attachments Save attachments

Attach documents to mail Send

carbon copies

Sort

Set up and use an address book Message rules

7 Internet:

Find a web site by using an URL Follow hyperlinks Use search engine to find information Keywords Evaluation of web sites Download files Save information to a disk

COMPUTER APPLICATION TECHNOLOGY (EDUCATION) II (CAPT 2 101)

I Computers in all walks of life

General concepts of information technology including hardware, software environments Types of computer systems

Typical components and characteristics of a computer Input and output devices

Types of system software and application software. Computer ethics, security and viruses.

Impact of computers on the environment and society. Safety and health issues. File management and trouble-shooting simple end-user computer-related hardware and software problems.

Utilising the features of a typical operating system.

- Graphics at an advanced level, using a word processing programme:
 proficiency in the input of data;
 - entering, editing and formatting text, numbers and graphics;
 - creation of visual and printed matter;
 - design and layout of documents;
 - use of templates.

2 Basic processing of numerical data, using a spreadsheet programme:

- working with cells and ranges;
- formatting cells and worksheets;
- basic functions and formulae, including SUM, AVERAGE, COUNT, IF, COUNTIF, MIN, MAX;
- creating and editing charts.
- 3 Creation of single-table data sources to generate forms, queries and reports, using a database programme:
 - creation of a single-table data source;
 - manipulation of records and fields;
 - generation of forms, queries and reports.
- 4 Presentations or web authoring tools or desktop publishing software or any other application software of own choice:
 - entering, editing and formatting text, numbers and graphics;
 - application of good design principles.

5 Integration of end-user computer application programmes:

- working between applications;
- linking and exchanging (importing/exporting) data with other applications.

6 Effective communication of information:

- different types of communication tools;
- different modes of communication;
- use different modes and tools of communication;
- select appropriate communication modes and tools.

7 Task definition:

- recognising information needs;
- defining problems;
- identifying the type and amount of information needed to solve problems

8 Information-finding strategies:

- considering possible information sources (e.g. various types of electronic resources for data gathering including databases, CD-ROM resources, commercial and Internet online resources, electronic reference works, community and government information electronic resources) as well as primary resources including interviews, surveys, experiments and documents that are accessible through electronic means;
- developing a plan/strategy for searching;
- identifying and applying specific criteria for evaluating resources;
- · identifying and applying specific criteria for constructing meaningful data gathering

tools;

- using a computer to generate modifiable flow charts, timelines, organisational charts and calendars which will help the student to plan and organise complex or
- group information problem-solving tasks;
- 9 using a computer or other devices to manage the process (e.g. track contacts and create to-do lists and schedules).
- **IO** Access information:
 - locating information from a variety of resources using appropriate computer resources and available technologies;
 - accessing specific information found within individual sources by using organisational systems and
 - tools specific to electronic information sources that assist in finding specific and general information.

II Use of information:

- engaging with information to determine its relevance;
- extracting relevant information through, for example, citations, note taking and summaries;
- processing and analysing statistical data;
- saving and backing up data gathered.

12 Synthesis:

- organising results of information gathering and processing;
- presenting results by selectively creating or generating printed reports, computergenerated graphics, charts, tables and graphs, original databases, electronic slide shows, overhead transparencies, Web pages, etc.

13 Evaluation of the effectiveness and efficiency of information management:

- content, format and design;
- spell and grammar checking capabilities;
- legal principles and ethical conduct related to information technology with special attention to copyright and plagiarism;
- netiquette when using Internet, e-mail, etc;
- information problem-solving process (efficiency)

COMPUTER APPLICATION TECHNOLOGY (EDUCATION) III (CAPT 301)

Advanced word processing and formatting skills. Advanced desktop publishing skills Multimedia presentations using text, sound, video, animation and graphics are designed and created.

Single table data source, simple forms, queries and reports are created and generalising a database program.

Proof readers signs, i.e. manuscript signs are interpreted and applied.

Written and electronic layout and editing instructions are interpreted to produce accurate output in a competent fashion.

Advanced integration techniques are demonstrated using multi-and appropriate programs. Various forms of data are located, collected, analysed and critically evaluated using technologies and relevant methods.

Information is organised, recorded and summarised in appropriate electronic formats. Information is presented and communicated in a professional fashion.

Paragraphs —numbered main-, sub, sub-sub paragraphs and bullets. Correspondence —Business letters, circulars and official letters Job Application —Letters of application/Appointment/Rejection

Testimonial and Curriculum Vitae

Programs Portrait, A5 Landscape, A4 landscape divided into three columns Tables —created in Microsoft Word Documents for meetings —Notice of meeting with an agenda, Minutes Templates and Wizards

Microsoft Excel —Formulas, Charts, integration

Microsoft Access —Create table and edit, queries, forms and reports

Microsoft Publisher — Create posters, invitation cards

Microsoft PowerPoint —slideshows application skills

Theory and Basic Concepts —Computer hardware, software, networks, computer ethics, viruses and Social issues.

Speed and accuracy — (40 wpm)

Research Project — integrating all software packages (Research process and Presentation)

ECONOMICS (EDUCATION) I (ECON 101)

- I. Numeracy and Graphical Skills
- 2. Introductory Concepts
- 3. Circular Flow of Economic Activity in a Two Sector Model
- 4. The Goods Market
- 5. Elasticity
- 6. The Labour Market
- 7. Production and Costs
- 8. Market Structures: Perfect Competition
- 9. Market Structures: Monopoly
- 10. Numeracy and Graphical Skills
- II. Introductory Concepts
- 12. Circular Flow of Economic Activity in a Two Sector Model
- 13. The Goods Market
- 14. Elasticity
- 15. The Labour Market
- 16. Production and Costs
- 17. Market Structures: Perfect Competition
- 18. Market Structures: Monopoly

ECONOMICS (EDUCATION) I (ECON 201)1. Consumer Behaviour

- I. Production
- 2. Market structures and Economics Behaviour
- 3. Alternative theories of the firm

MACRO-ECONOMICS

- I. The Keynesian model
- 2. The IS-LM Model
- 3. The Foreign Sector
- 4. The Aggregate Deman (AD) and Aggregate Supply (AS) approach: AD model
- 5. Different Schools of Thought on Microeconomic Theory and Policy

ECONOMICS (EDUCATION) III (ECON 301)

- I. Economic Policy in South Africa
- 2. Labour Economics
- 3. Economic Development Subject Didactics

MATHEMATICS (EDUCATION) I (MTMC 101)

- I. General Algebra Ist, 2nd and 3rd degree/inequalities equations, remainder/factor theorem
- 2. Function graphs and Transformation Exploration
- 3. Algebraic and graphical solutions to equations and simultaneous intersections

- 4. Polynomial and rational functions/equations
- 5. Algebraic and Graphical representation of exponential and logarithmic functions
- 6. Trigonometric Functions, identities, equations, graphs and simple harmonics
- 7. Analytical Geometry Lines

MATHEMATICS (EDUCATION) II (MTMC 201)

- I. Differential Calculus
- 2. Sequences, series and progressions
- 3. Analytical Trigonometry
- 4. Circle Geometry
- 5. Analytical Geometry Lines and Circles
- 6. Permutations, Combinations and Probability
- 7. Application of didactic principles to school grades 10 and 11 content

MATHEMATICS (EDUCATION) III (MTMC 301)

- I. Further Differential Calculus
- 2. Linear Algebra
- 3. Vectors Algebra
- 4. Complex Numbers
- 5. Implicit differentiation and first order equations
- 6. Introduction to Integral Calculus
- 7. Further series —infinite, power, binomial expansion
- 8. Didactic principles applied to school grade 12 NCS content

B Ed (FET): Specialisation Natural Sciences

Electives

BIOLOGY (EDUCATION) I (BIOE 101)

- 1. Introduction to Microscope and Laboratory equipment
- a. Investigating phenomenon in Biological Sciences Identify parts of a microscope Prepare slides/wet mouths Use microscope Identify structures under microscope Identify various laboratory equipment
- Constructing of knowledge in Biological Sciences Parts of microscope and their functions Use of various laboratory equipment
- c. Application of Biological Sciences History of microscope development and applications The electron microscope and its value and applications

2. General Ecology

2.1 Investigating phenomenon in Biological Sciences

Use of field guides for identifying species

Investigate community structure within a habitat and changes that take place within the habitat Use of sampling methods:

- quadrats
- transects
- traps
- direct observation Importance of random sampling

Identification and investigation of primary and secondary succession Investigate soil properties

2.2. Constructing of knowledge in Biological Sciences

Ecological terms Biotic and abiotic factors Interaction in ecosystem Energy transfer Special relationships Succession Soil Study

2.3. Application of Biological Sciences in Society

Human influence on community structure:

- Iron age settlement
- Industrialisation
- Urbanisation
- Farming practices
- Role of culling of animals

Parasitic infections; incidences in South Africa and relationship to sanitation, play habits. Aquatic EcoSystems

2.2 Investigating phenomenon in Biological Sciences

Identify water plants and animals

Investigate water pollution and its effects on plant and animal life

2.3 Constructing of knowledge in Biological Sciences

Differences between terrestrial and aquatic systems

Abiotic factors that have an effect on aquatic systems and their effect; Succession in aquatic systems;

Marine ecosystems, definition and types: Dunes formation and salt spray effect on plants

3. Application of Biological Sciences

Management of water pollution; Effect of uncontrolled sand mining; Dune mining Ecotourism

4. Population and Community Ecology

4.1. Investigating phenomenon in Biological Sciences Experiments in

investigating population size and movements; Graphical representations Investigate distribution patterns

4.2 Constructing of knowledge in Biological Sciences

Population dynamics and population parameters; Population growth patterns and factors affecting population size; Estimation of population size; Survival strategies; Competition

4.3 Application of Biological Sciences

Human population:

- Reasons for exponential growth in a natural system
- Interpret age and gender structure
- Human demands versus conversation needs [conservation of natural environment, hunting industry, sustainable harvesting of natural resources, creation and management of game reserves]
- Value systems with reference to biodiversity Wild Life management

5. Pollution and Conservation

5.1 Investigating phenomenon in Biological Sciences Conservation bodies and their roles; Conservation need in the local area and on a national level. Investigating pollution in local area and at national level.

5.2 Constructing of knowledge in Biological Sciences

Definition and causative factor of pollution; Identification of pollution Causes of water pollution:

- Household wastes and sewage
- Industrial pollution
- Oil pollution
- Chemical pollution
- Farming and soil erosion Preventive measures

Conservation and preservation of soil, air, water and natural resources, wilderness, etc

5.3 Application of Biological Sciences

Preventing pollution Joining of conversation body Active lobbying against pollution

6. Plant Water Relationship

6.1. Investigating phenomenon in Biological Sciences

Experiments to demonstrate diffusion and osmosis Demonstration:

- Water movement through xylem,
- Transpiration of water through leaves,
- Factors that bring about movement of water in plants
- Factors affecting transpiration in plant

6.2 Constructing of knowledge in Biological Sciences

Definition of diffusion and osmosis;

Uptake of water and mineral salts into a root and their transport to the leaves; Transpiration Definition and comparison with other types

Effect of variation in temperature, humidity and light intensity Wilting

6.3 Application of Biological Sciences in Society

Applications in agriculture

BIOLOGY (EDUCATION) II (BIOE 201)

I. Bioversity and Classification

- I.I Investigating phenomenon in Biological Sciences Demonstrate principles of classification; Classify organisms into groups Understanding distribution maps of species in South Africa
- **1.2 Constructing of knowledge in Biological Sciences** Extent of biodiversity and endemism in South Africa; Classification schemes;

Introduction to the main groups of animals and plants;

I.3 Application in Society

History of classification;

Some examples of classification systems; Naming things in science

Linnaeus and his classification system Threats to biodiversity in South Africa Value of retaining biodiversity

2. Plant Diversity

2.1. Investigating phenomenon in Biological Sciences Examine examples for the different groups of plants; Compare morphology

Compare monocotyledon and dicotyledon plants and their flowers Interpret phylogenetic tree representing evolutionary history

2.2. Constructing of knowledge in Biological Sciences

Structural plan and modifications

Habitat, external structure, nutrition and life cycle in examples of:

- Viruses
- Bacteria
- Mycophyta: Yeast cell and Bread mould
- Phycophyta: Chorella and Spirogyra
- Bryophta: Moss Funaria sp
- Pteridophyta: Ferns Dryopteris sp
- Cycadophyta: Cycad
- Spermatophyta: Gymospermae —*Pinus sp*

Angiospermae —a Monocot and a Dicot plant

2.3. Application in Society

Ancient and unique plant groups in Southern Africa, theft of plants and ecotourism; Agricultural plants;

Medicinal plants; Ecological importance; Economic importance

3. Animal Diversity

3.1. Investigating phenomenon

Interpret phylogenetic tree;

Identify South African examples of the different phyla; Examine external features of examples Illustrate biodiversity of the phyla and classes

3.2. Constructing of knowledge

Body plans and symmetry in different phyla; modifications. Habitat of different examples; External structure, nutrition; Reproduction/Life Cycle

- Protozoa: Amoeba sp.,
- -Trypanosama sp., Paramecium sp
- Coelenterata: Hydra and Aurelia
- Platyhelminthes: Planaria and Taenia sp.
- Nematoda: Ascaris sp. -
- Annelida: Earthworm and leeches
- Arthropoda: Characteristic features and examples of different classes; locust
- Molusca: Snail
- Echinodermata: Star fish
- Chordata: Cartilagenous fish, bony fish, frog, lizard, bird, rat/rabbit

3.3 Application in Society

Parasites: distribution, prevalence, effects on hosts, treatment, reducing spread Arthropods as parasites and vectors of pathogens

Role of invertebrates in agriculture and the ecosystem

Animal farming and sustainable use, economic and employment opportunities; Poaching **Evolutionary implications**

4. Bio-Geography

4.1. Investigating phenomenon in Biological Sciences

Worldwide distribution of animals [ostrich, emu, rhea, moa, kangaroo; Worldwide distribution of some plants

4.2 Constructing of knowledge

Diversity within continents

Specific animals and plants on land masses and islands

4.3 Application in Society

Nature of science

Charles Darwin's explanation Speciation

BIOLOGY (EDUCATION) III (BIOE 301)

I. Organic and Inorganic Compounds

1.1 Investigating phenomenon in Biological Sciences

Construct simple and complex molecules; Experiments on enzyme action; Food tests

1.2 Constructing of knowledge in Biological Sciences Inorganic compounds: Water, Macro and Micronutrients; Carbohydrates

Proteins Fats

Nucleic acids Enzymes and Vitamins

1.3 Applying in Biological Sciences in Society

Diseases in respect of micronutrients

Fertilizers in agricultural farms and related problems

Deficiently diseases in respect of carbohydrates, proteins and fats; Saturated and unsaturated fats- heart diseases and cholesterol

2. Genetics and Hereditary

2.1. Investigating phenomenon

Models of RNA and DNA;

Examine extractions of DNA using simple processes; Cell division —practical investigation Investigations of human genome, genetic disease and genetic engineering Investigation of the causes, prevalence and treatment of cancer

2.2 **Constructing of knowledge** Structure of DNA and RNA; DNA replication; Transcription; Translation; Mutations Cell division

Hereditary and inheritance including sex chromosomes, sex-linked diseases and solving simple genetic problems

2.3 Application in Society

Historical developments: DNA structure and Mentel's experiments; DNA fingerprinting; Importance of DNA sequencing;

Abnormalities in meiosis and consequences and attitudes; Polyploidy and its importance in agriculture;

Discovery of the principles of hereditary and genes; Medicinal and agricultural applications of genetic engineering; Genetics diseases, beliefs, attitudes and values; Genetic counselling;

Ethics and legislation in genetic testing and engineering

3 Cytology

3.1 Investigating phenomenon in Biological Sciences Investigations of plant and animal cells; Microscopic/models/micrographs

3.2 Constructing of knowledge in Biological Sciences

Characteristics of cells and cell components; Molecular make up of cells; Cell structure, adaptations and functions

3.3 Application in Society

The cell theory

In-vitro experimentations Cell tissue culture

4. Plant and Animal Tissue

4.1 Investigating phenomenon in Biological Sciences

Examine and identify plant and animal tissues; Draw observed cells to show specialized structure Investigate fields in biotechnology related to plant and animal tissues [cloning, stem cell research]

4.2 Constructing of knowledge

Concept of tissues;

Location and relationship between structure and function of:

- Plant tissues: epidermis, parenchyma, chlorenchyma, collenchymas, Sclerenchyma, xylem and phloem
- Animal tissues: epithelial, connective, muscle and nerve

4.3 Application in Society

IKS and Technology

Traditional technology —traditional medicine and healers

Medical Technology —immunity, antibiotics and blood transfusion Research in cloning, tissue and stem cell cultures

Current trends in tissue research

- 5. Plant and Animal Organs
- 5.1 Investigating phenomenon in Biological Sciences

Observation, interpretation and drawing of plant and animal organs

5.2 Constructing of knowledge in Biological Sciences

Concept of organs

External and internal structure in relation to function, of the following organs:

- Plant: Leaf, root or stem
- Animal: Lungs, Kidney or brain

5.3. Application in Society

Organ transplants Plant grafting

6 Manmalian Body Systems Skeletal (Supporting) system

6.1 Investigating phenomena Study of skeletons of vertebrates Analysis of X-rays of human bones Study of long bone structure

Experiments —minerals and organic fibres in bones Structure of skeletal muscles Models; Antagonistic muscles

6.2 Constructing knowledge

Identify bones of axial and appendicular skeleton Functions of different parts Structure of a long bone Joints

Antagonistic muscles and functioning

6.3 Application in Society Diseases of the muscle-skeletal Injuries

Importance of exercise

6.4 Human circulatory system

6.4.1 Investigating phenomena

Dissection of mammalian heart

Measuring pulse rate and the effects of exercise Identifying different blood vessels

64.2 Constructing of knowledge in Biological Sciences

Closed and open blood systems Different blood circuits Structure and protection of the heart Structure of blood vessels and differences The cardiac cycle Control of heart beat and rate

6.4.3 Application in Society

Cardiovascular diseases

Blood transfusions and blood types Heart transplants

6.5 The Lymphatic System

65.1 Investigating phenomenon in Biological Sciences Identifying lymph nodes in the human body

65.2 Constructing of knowledge in Biological Sciences

Blood and lymph as tissues Relationship between lymphatic system and blood system Structure of lymph glands and function of glands

General functions of the lymphatic system

6.6 Respiratory System in Man

- **66.1** Investigating phenomenon in Biological Sciences Measurement and comparison of breathing depth and interpretation Structure of lung —dissection Experiments on:
 - inspiration and expiration
 - expired air contains carbon dioxide

Effect of altitude and air pollution health and activities

6.6.2 Constructing of knowledge in Biological Sciences Distinction between cellular respiration, breathing Requirements for efficient gaseous exchange Parts of and structure of the respiratory system in mammals Mechanism of breathing

Gaseous exchange and the transport of gases

663 Application in Society Respiratory disorders and diseases Effects of smoking Artificial respiration

CHEMISTRY (EDUCATION) I (CHED 101)

- 1. Elementary statistics, precision and accuracy significant figures
- 2. Technical report writing
- 3. Laboratory practice and safety
- 4. Introduction to analytical chemistry
- 5. Sampling and sample handling
- 6. Introduction to volumetric and gravimetric analysis.
- 7. Matter and energy
- 8. Solutions
- 9. Acids and Bases
- 10. Redox, Electrochemistry
- 11. Chemical reaction reates and equilibrium
- 12. Introduction to inorganic chemistry
- 13. Introduction to organic chemistry

CHEMISTRY (EDUCATION) II (CHED 201)

- I. Chemical Bonding
- 2. Properties of Gases
- 3. Physical Properties of Colloids and Solutions
- 4. Chemical Thermodynamics
- 5. Chemical Equilibra
- 6. Acids and Bases
- 7. Solubility
- 8. Nomeclature of Alkyl Substituents

CHEMISTRY (EDUCATION) III (CHED 301)

- I. Electrochemistry
- 2. Chemical Kinetics
- 3. Solubility and Complexion Equilibria
- 4. The transition metals

Hydrogen, oxygen, nitrogen, phosphorous, sulphur and halogens

5. Organic Chemistry

PHYSICS (EDUCATION) I (PHSE 101)

- I. Introduction and mathematical concepts
- 2. Kinematics in one and two dimensions
- 3. Forces and Newton's Laws of motion
- 4. Impulse and momentum
- 5. Work, Energy and Power
- 6. Waves and sound
- 7. Electrostatics
- 8. Electricity

PHYSICS (EDUCATION) II (PHSE 201)

- I. Dynamics of uniform circular motion
- 2. Simple harmonic motion and elasticity
- 4. Fluids
- 5. Thermodynamics
- 6. Magnetic effects of electric current
- 7. Electromagnetic induction
- 8. Reflection and Refraction of light.

PHYSICS (EDUCATION) III (PHSE 301)

- I. Electric circuits
- 2. Alternating current circuits
- 3. Electronics
- 4. Electromagnetic Waves
- 5. Interference and Wave Nature of light
- 6. Nature of the Atoms
- 7. Nuclear Physics and Radioactivity

MATHEMATICS (EDUCATION) I (MTMC 101)

- I. General Algebra Ist, 2nd and 3rd degree/inequalities equations, remainder/factor theorem
- 2. Function graphs and Transformation Exploration
- 3. Algebraic and graphical solutions to equations and simultaneous intersections
- 4. Polynomial and rational functions/equations
- 5. Algebraic and Graphical representation of exponential and logarithmic functions
- 6. Trigonometric Functions, identities, equations, graphs and simple harmonics
- 7. Analytical Geometry Lines

MATHEMATICS (EDUCATION) II (MTMC 201)

- I. Differential Calculus
- 2. Sequences, series and progressions
- 3. Analytical Trigonometry
- 4. Circle Geometry
- 5. Analytical Geometry Lines and Circles
- 6. Permutations, Combinations and Probability
- 7. Application of didactic principles to school grades 10 and 11 content

MATHEMATICS (EDUCATION) III (MTMC 301)

- I. Further Differential Calculus
- 2. Linear Algebra
- 3. Vectors Algebra
- 4. Complex Numbers
- 5. Implicit differentiation and first order equations
- 6. Introduction to Integral Calculus
- 7. Further series —infinite, power, binomial expansion
- 8. Didactic principles applied to school grade 12 NCS content

B Ed (FET): Specialisation Technology

Civil Technology 101 (CVTC 101)

I. General Safety

Clothing Workshop and hand tools Preventing disease transmission in the workshop Machines Safe storage and housekeeping Fire

2. Foundations

Definition of: ground bearing, dead load, imposed load.

Setting out right angle corners

Purpose and functions, Types of soil and soil conditions, Strip and step foundations, Foundation walls

Description, sketches and location of: Pad foundations, Wide strip foundations, and short

bored (auger) pile foundations.

Reasons to compact soil

3. Concrete and Brickwork

Site preparation, Mix proportions, purpose of admixtures to concrete, Slump test, Levelling and compacting of concrete, Placing, curing, testing and Classification of concrete. Alternate plan courses.

4. Civil services and Installation

Drainage terms and definitions (Waste water, Waste water pipe, Waste fixture, Soil water, Soil water pipe, Soil fixture, Sewage, Drain).

Drainage installation: Pipe arrangements: Explanation of pipe arrangements (Single stack and stub stack systems of plumbing. Sanitary fitments -Waste fixture, Sink, Shower, Bath, Wash trough).

Hot water supply: Introduction to hot and cold water supply

- 5. Materials
- Applied mechanics-Forces Graphical representation of a force, Resultant, Equilibrant, Triangle of forces, Parallelogram of forces, Polygon of forces, Moments
- 7. Woodworking Doors, cantering, roofs
- 8. Quantities
 - Introduction to Quantities

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- 7. Woodworking Doors, centring, roofs
- 8. Quantities
 - Introduction to Quantities

Civil Technology 210 (CVTC 201)

- 1. Safety practices and regulations
 - Tools (Construction), Excavations, Scaffolding
- 2. Formwork and Shoring
 - Drawing of formwork (Square, round and rectangular columns) and methods of erecting and supporting: Beams, Floor slab, Straight flight of stairs.
 - Shoring-Single line diagrams showing the components of dead and flying shores.
- 3. Reinforcement
 - Reinforcing in concrete for: floors, beams, cantilever beams and columns.
 - Requirements for materials used for reinforcing
- 4. CIVIL SERVICES
 - Storm water management and regulations.
 - Cold and hot water supply
 - Basic plumbing in a house
 - Drainage
- 5. Woodworking
- 6. Applied mechanics-Calculations of reactions of beams with a maximum of three point loads without an overhang (including spread loads)

Civil Technology 301 (CVTC 301)

- I. Safety(Machinery and power tools)
- 2. Construction
 - Excavating basements (Perimeter trench-raking struts, cofferdams and diaphragm walls)
 - Brick work (Cavity walls, Waterproofing for floors, roofs and walls)
- 3. Woodworking (Timber, joints, doors, windows, cutting list)
- 4. Civil Services (Private sewers, drainage joints, pipe connections, testing of pipes)
- 5. Instruments and materials
- 6. Applied mechanics: Centroids of irregular shapes consisting of a combination of squares, rectangles and triangles
- 7. Forces: link polygon
- 8. Quantities: Method of extracting quantities for a one bedroom dwelling

MATHEMATICS (EDUCATION) I (MTMC 101)

- I. General Algebra I st, 2nd and 3rd degree/inequalities equations, remainder/factor theorem
- 2. Function graphs and Transformation Exploration
- 3. Algebraic and graphical solutions to equations and simultaneous intersections
- 4. Polynomial and rational functions/equations
- 5. Algebraic and Graphical representation of exponential and logarithmic functions
- 6. Trigonometric Functions, identities, equations, graphs and simple harmonics
- 7. Analytical Geometry Lines

MATHEMATICS (EDUCATION) II (MTMC 201)

- I. Differential Calculus
- 2. Sequences, series and progressions

- 3. Analytical Trigonometry
- 4. Circle Geometry
- 5. Analytical Geometry Lines and Circles
- 6. Permutations, Combinations and Probability
- 7. Application of didactic principles to school grades 10 and 11 content

MATHEMATICS (EDUCATION) III (MTMC 301)

- I. Further Differential Calculus
- 2. Linear Algebra
- 3. Vectors Algebra
- 4. Complex Numbers
- 5. Implicit differentiation and first order equations
- 6. Introduction to Integral Calculus
- 7. Further series —infinite, power, binomial expansion
- 8. Didactic principles applied to school grade 12 NCS content

MATHEMATICAL LITERACY (EDUCATION) I (MTHL101)

- I. Numbers, Operations and Finance
- 2. Functional Relationships
- 3. Graphs
- 4. Shape, Space, and Measurement
- 5. Solids
- 6. Data Handling

MATHEMATICAL LITERACY (EDUCATION) II (MTHL 201)

- I. Numerical solution of rate
- 2. Parameter and surface area of 2 D-shape
- 3. Functional relationships
- 4. Scale drawing
- 5. Interpretation of Data
- 6. Financial Mathematics

MATHEMATICAL LITERACY (EDUCATION) II (MTHL 301)

- I. Working with formulae
- 2. Taxation and inflation
- 3. Parameter, surface area and volume of 3D-shape
- 4. Interpretation of table and graph
- 5. Data interpretation
- 6. Statistical Methods
- 7. Grids and Maps
- 8. Data Display
- 9. Budget and Banking

MECHANICAL TECHNOLOGY I (MCTC 101)

- I. Safety in the workplace
- 2. Basic hand tools
- 3. Engineering Materials Ferrous and non-ferrous metals
- 4. Terminology of machines Drilling machines, grinding machines and cutting machines
- 5. Joining Methods semi permanent methods
- 6. Forces calculations of parallelogram, triangle and polygon of forces
- 7. Maintenance of operating systems
- 8. Mechanical systems and electrical control
- 9. Heat Engines two stroke and four stroke petrol and diesel engines

MECHANICAL TECHNOLOGY II (MCTC 201)

- I. Machine safety
- 2. Specialised engineering tools
- 3. Heat treatment of engineering materials
- 4. Terminology
- 5. Joining Methods Soldering, Gas and arc welding methods
- 6. Forces sheer force and bending moments calculations
- 7. Maintenance friction, balancing and alignment
- 8. Systems mechanical systems, hydraulics, pneumatics and electrical/electronic control
- 9. Pumps description and operation of different types of pumps

MECHANICAL TECHNOLOGY III (MCTC 301)

- 1. Machine safety including the OSH Act
- 2. Advanced engineering tools
- 3. Composites materials
- 4. Terminology of machinery and equipment milling machine
- 5. Joining Methods welding defects, inspection and testing of welds
- 6. Forces stress, strain, Young Modulus of Elasticity and safety factors
- 7. Maintenance lubricants, lubrication, bearings and linkages
- 8. Systems and Control calculations of mechanical drive systems
- 9. Turbines, Turbo-chargers and superchargers

ENGINEERING GRAPHICS AND DESIGN I (EGDS 101)

I. Introduction to Technological Design

Discuss the scope, educational and career opportunities related I to EGD. Include human rights, gender, inclusivity and HIV/AIDS issues.

2. Drawing principles as contained in the SANS code of practice as related to basic civil, electrical and mechanical drawing.

Practice line types according to the SANS Code of Practice (0111 & 0142 (elect) & 0143) and their application to: outline, construction, cutting plane line, line hatching, hidden detail and; centre line.

Practice the general lettering requirements according to the SANS code of practice.

3. Free-hand drawing

Practice the four basic hand movements need to reproduce proportional single, multi view and pictorial drawings using grid sheets and plain paper.

4. Setting up a Drawing Sheet

Paper sizes

Set up a drawing sheet showing all relevant information, eg. Name and. title blocks, appropriate symbols etc.

5. Instrument Drawing

Discuss, research and present in an appropriate form the dangers of the irresponsible use of sharp instruments that could cause bleeding and the transfer of HIV/AIDS Geometrical Constructions (need to know basis). Bisecting an angle, line, line division, circle through three points, perpendiculars, angles, line tangents, arc tangents, inscribed and circumscribed circle, polygons) 3. 4. 5. 6. 8, circle and ellipse.

Scale drawings. (2:1, 1:1, 1:2, 1:5, 1:10, 1:20, 1:50, 1:100)

6. Orthographic

Ist and 3rd angle orthographic projections as applied to simple castings from industry

- 7. Projection (no sectional views) Construction of polygons
- 8. Mechanical Drawings

Prisms, pyramid, cylinders and cones. The axis of the solids must include examples to be perpendicular, parallel and inclined to one principal plane.

9. Civil Drawings

Insert annotation, dimensioning and scale. Include floor plans and elevations that include: windows, doors and fixtures such as WC, bath, sink, shower, cupboard.

Apply colour coding according to building practice.

Show site plan and schedule of specifications. Include electrical, plumbing and drainage detail.

10 Descriptive geometry

Determine the orthographic views of points and line segments Segments that are: perpendicular, inclined and oblique.

Determine the true length of a line segment and the true inclination of a line segment to the HP and VP using different methods, e.g. projection and construction methods.

II. Electrical Drawing

Use given electrical and electronic component symbols to draw simple circuit diagrams. Draw parallel and series circuit diagrams that are relevant to; electrical appliances, house wiring etc. Include notes were appropriate and draw systems diagram

Draw wiring diagrams on floor plans of buildings.

Represent these as circuit diagrams and draw block diagrams.

12. Principles of Sectioning

Draw sectional views in 1st and 3rd angle of simple castings from Industry. Include the following: SANS code of practice, dimensioning techniques, title, notes and symbol of projection.

13. Mechanical Drawing

Draw outside, sectional, half sectional and part sectional views of simple assemblies that include temporary fasteners. SANS code of practice, dimensioning techniques, title, notes and symbol of projection.

Draw outside, sectional, half sectional and part sectional multi-views of complex assemblies that include fasteners.

SANS code of practice, dimensioning techniques, title, notes and symbol of projection. In- sert welding, machining and surface treatment symbols relevant to steel work.

Draw the sectional orthographic views of geometrical solids.

14. Solid Geometry

Prisms, pyramids and cylinders. The axis of the solids must be perpendicular, parallel and inclined to one principal plane.

True shapes and development.

15. Civil Drawings

All applications only need to include single story dwellings

Draw elevations and sectional elevation showing foundation to slab.

16. Principles of Pictorial Drawing

Draw simple to complex Isometric drawings including circles. (one point)

17. Visualisation cognitive and perceptual exercises

Analyse drawings and answer questions based on single multi-view and pictorial drawings within the context of civil, electrical and mechanical.

Visualization of cognitive and perception exercises

ENGINEERING GRAPHICS AND DESIGN II (EGDS 201)

- I. Loci
- a. Helix
- b. Cams
- c. Cycloidal curves
- d. Link mechanisms

2. Solid Geometry

- a. Sectional views
- b. Auxiliary views
- c. True shapes
- d. Interpenetrations
- e. Developments
- 3. Pictorial Drawing
- a. Perspective
- 4. Engineering Graphics & Design Didactics
- a. Lesson planning
- b. Lesson presentation

ENGINEERING GRAPHICS AND DESIGN III (EGDS 301)

- I. Mechanical drawing
- a. Development of transition pieces
- b. Dimensioning and annotation
- c. Auxiliary views
- d. Assembly drawings

2. Civil drawing

- a. Plan and elevations of dwellings
- b. Sectioned elevations
- c. Detailed drawings
- 3. Pictorial drawing
- a. Isometric drawings
- b. Sectioned isometric drawings
- 4. Computer aided drawing
- a. Mechanical drawing
- b. Civil drawing
- c. Isometric drawing
- d. Application in didactics
- 5. Engineering Graphics & Design Didactics
- a. Lesson plans preparation
- b. Lesson presentation

ELECTRICAL TECHNOLOGY 101

- Occupational Health and Safety Personal protection equipment Safety Practices in the work place
- **Basic Hand Tools** Basic hand tools Safety and tools
- Electrical/Electronic Circuits
 Atomic theory of electricity. Ohm's
 - Atomic theory of electricity Ohm's law
 - Theory of current law

Series circuit as voltage divider Parallel circuit as a current divider

That shows how simple electronic circuits and devices are used to make an output respond to an input signal (e.g. resistors, light-emitting diodes, transistors, push or magnetic switches, thermistors, light dependent resistors).

Temperature coefficient

Identify and describe the characteristics of electronic components such as:

- o Resistors
- o Light dependent resistors
- o Capacitors
- o Inductors
- o PN-diodes

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o Light emitting diodes Transformers

Earth leakage devices Distribution boards Energy and Power

Digital Electronic systems

Shows how electrical circuits with more than one input or control device which will work based on different logic conditions ('AND', 'NOT' and 'OR' logic) and represents them us- ing circuit diagrams, systems diagrams and truth tables.

Convert binary numbers to decimals, hexadecimal, octal.

Demonstrates knowledge and understanding of digital electronic systems:

Identify and comprehend binary circuits and build binary circuits relating to electrical circuits

ELECTRICAL TECHNOLOGY 201

I. Safety and instruments

- · Identify unsafe conditions and acts and apply
- · Tools and instruments correctly.
- · Identify unsafe conditions and acts when doing
- practical work and apply tools and instruments correctly to: Verify Kirchhoff's laws in AC-and DC circuits.

Demonstrate the effect of single-phase AC on R, L and C components and investigate the effect of combinations of series circuits, including the effect of frequency changes Test insulation, continuity and earth continuity on equipment.

- Describe the Occupational Health and Safety (OHS) Act with reference to general unsafe actions, dangerous practices and unsafe conditions.
- Explain the Occupational Health and Safety (OHS) Act dealing with unsafe actions, dangerous practices and unsafe conditions.

2. Electrical applications

Construct and comprehend single-phase circuits Construct and apply single-phase circuits. Describe the use and care of different types of tools and measuring instruments, such as pliers, screwdrivers, multimeters and continuity or insulation testers.

Explain the use and care for instruments and their correct application and interpretation to ensure accurate measurements such as a multimeter, continuity or insulation tester, function generator and oscilloscope.

Describe the principles of electricity with reference to: Atom theory

Ohm's law and calculations Theory of current flow

Series circuit as voltage divider Parallel circuit as a current divider Combination circuits Specific resistance Temperature coefficient

- · Describe the principles of electrostatics with reference to capacitance and electrostatic charge.
- Identify and describe the characteristics of electronic components such as Resistors Light dependent resistors Capacitors Inductors PN-diodes

Light emitting diodes and transformers

• Explain the principles and effect of AC on resistor, inductor and capacitor components with reference to:

Series combination circuits containing one resistor, one capacitor and one inductor Frequency changes

Phasor and wave representation Resonance Calculations

3. Electronics

- · Construct and comprehend electronic circuits.
- · Construct and apply electronic circuits.
- Describe the principles of electro-magnetism with reference to Faraday's law and Lenz's law and its application in a relay and DC motor.
- Describe the principles of operation and use of power sources like batteries and solar cells like internal resistance, capacity and VA rating.
- Describe the following logic concepts: Binary number systems Logic symbols
 Logic functions: AND, OR and NOT
- Describe and compare a variety of protective devices and applications such as fuses, miniature circuit breakers and earth leakage devices.
- Explain the principles of AC generation of a single-phase supply by a rotating
- · conductor loop in a two-pole magnetic field.

- · Explain the operating principles, characteristics curves and use of semi-conductor
- devices such as:
 PN diodes
 Bipolar transistors Thyristors
- 4. Digital electronics Construct, comprehend and apply digital circuits

ELECTRICAL TECHNOLOGY 301

- Occupational Health and Safety The consequences of the OHS act, risk assessment, human rights in the workplace, work ethics and emergencies
- Three Phase Transformers Principles of operation, calculations and application.
- Three Phase Motors & Starters
 Principle of operation, Testing and commissioning and starters
- RLC
 The effect of AC on Series and parallel RLC Circuits
- Amplifiers
 Principle of operation and application of operational amplifiers
- **Communications** Radio communications, antennas, modes of modulation, transmitters and receivers