Four-Year B.Ed. Course Manual

ICT PC MAINTENANCE AND LABORATORY MANAGEMENT

The Government of Ghana

FOREWORD

These initial teacher education course manuals were developed by a team consisting of members from colleges of education, and four universities namely, university of Ghana, Kwame Nkrumah university of science and technology, university of education, Winneba, and university of development studies. this team was constituted to support the delivery of the new B.Ed. curriculum as part of Ghana's teacher education reforms supported by T-Tel with assistance from UK aid and overseen by the National Council for Tertiary Education (NCTE).

The course manuals have been produced for use as general guides for the delivery of the new four-year B.Ed. curriculum in colleges of education in collaboration with their affiliated universities. They are designed to support student teachers, tutors and lecturers in delivering a complete B.Ed. course for training student teachers which meets the requirements of the national Teachers' standards (NTS), thus enabling them to teach effectively in basic schools.

The structure and sequence of the manuals follows a process developed through a collaboration by key stakeholders. The first section is focused on the course information and vision for the new four-Year B.Ed. curriculum. The second section presents the course details, Goal for the subject or learning area, course description, Key contextual factors as well as core and transferable skills and cross-cutting issues, including equity and inclusion which will be addressed through the course. the third section is a list of course learning outcomes and their related learning Indicators. the fourth section presents the course content which is broken down into units for each week, the topic and sub-strands and their related teaching and learning activities to achieve the learning outcomes and the teaching and learning strategies. this is followed by course assessment components in section five. The relevant aspects of the national Teachers' standards to be assessed through each assessment are identified. each course is accompanied by the required reading and reference lists as well as teaching and learning resources. The final section presents course related professional development for tutors and lecturers to be able to use each section of the manual.

In all, there are 12 lessons for each course manual. The set of first year manuals present the general courses for the beginning teacher. The second, third and final year manuals deal with specialisms and specialist programmes for student teachers. The different manuals for each successive year cover beginning teaching, developing teaching, embedding teaching, and extending teaching.

field instructions to guide supported teaching in school are integrated into the course manuals to provide the student teacher with the nucleus of practicing and developing teaching throughout the entire period of study to be able to meet the requirements of the NTS and the National Teacher education curriculum framework (NTECF). To ensure maximum benefit the course manuals should be used in addition to other resources such as the NTS, NTCEF, assessment Policy and inclusion Policy. This will help to ensure that learning by student teachers' is integrated within the wider teacher education policy framework.

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INTRODUCTION TO COURSE MANUALS

Welcome to this B.Ed. Course manual.

Following the accreditation of the B.Ed. by the national accreditation Board with its recognition as a world class teacher education curriculum, the decision was taken to support effective implementation through the development of course manuals. the course manuals provide tutors and lecturers with the materials necessary to support teaching each of the B.Ed. courses. The manuals adhere directly to, and emphasise, the principles and standards set out in the NTS, NTECF and in the B.Ed. and will help ensure operationalising the Government's teacher education reform Policy.

The manuals serve the following purposes:

- they are the key educational agreements between the training institution and the student teachers. In this way student teachers know what the expectations are for them and for the training they will receive.

- they lay out the course outcomes, content, strategies, and assessment, thereby providing direction to and consistency in training and B.Ed. implementation among tutors across the country.

- they are explicit documents that provide other institutions with information on which to base transfer/ articulation decisions.

Specifically, they also:

- support coherent lesson planning and teaching which will enable student teachers to achieve the NTS and become good teachers who ensure all pupils' learning whilst offering tutors the flexibility for adaptation for local needs and contexts.

- Provide a lesson by lesson overview of the course, building on and developing the material in the course specifications.

- Inform tutors, student teachers and others working with student teachers about:

    1. What is to be taught and why.

    2. how it can be taught.

    3. how it should be assessed.

- Provide opportunities for student teachers to develop and apply knowledge during supported teaching in school, creating a strong bond between learning in school and in the training institution.

- Reflect the stage of student teacher development, set out in the model for progress across the four years of the B.Ed.

- Can be used as self-study tools by student teachers.

- Ensure that all information necessary to inform teacher training is in one place (serves as reference document).

- The manuals are the basis of the codes and university professional development sessions to ensure Principals, tutors, lecturers and heads of department are fully familiar with the details of: courses, outcomes, content, approaches, assessments and lessons.

Who are course manuals for:

- College of Education Tutors

- Teacher Education University Lecturers

- Student Teachers

- Mentors and Lead Mentors

- All Those with An Interested In Teacher Education.

USING THIS MANUAL

Writers of the manuals engaged widely with colleagues in each subject area at each stage of development. Besides, writers envisaged themselves in varied contexts as they wrote, to suggest methodologies and strategies for teaching the strands which would ensure student teachers are enabled to achieve the learning outcomes. In view of our commitment to creativity, problem solving, collaboration and to lifelong learning, we expect that individual tutors will "own" their manuals and become user-developers. lessons in the manuals will be strands for weekly Pd meetings where tutors/lecturers will situate the lessons in the contexts of their colleges and their student teachers, to maximize the benefits.

It is also expected that tutors will model the best pedagogic practices for student teachers. Key among such practices is the communication of the importance of having a personal teaching philosophy. We expect that tutors and lecturers will explicitly communicate their personal teaching philosophies to their student teachers during the first meeting of every course. in preparation for this, we suggest you set out your personal teaching philosophy and how it will be demonstrated in your teaching using, or adapting, the sample sentence introductions below.

My teaching philosophy is   ………………………………………………………………………………………………......

In view of this philosophy, I will facilitate this course by/through ………………………………….............................

Course Manual Writing Format

A. Course Information

Title Page

The vision for the New Four-Year B.Ed. Curriculum

To transform initial teacher education and train highly qualified, motivated new teachers who are effective, engaging and fully prepared to teach the Basic School Curriculum and so improve the learning outcomes and life chances of all learners they teach as set out in the National Teachers' Standards. This is to instil in new teachers the Nation's core values of honesty, integrity, creativity and responsible citizenship in order to achieve inclusive, equitable, high quality education for all learners.

Course Details

Course name	**Laboratory Management and PC maintenance**					
Pre-requisite	None					
Course Level	400	Course Code		Credit Value	3	Semester	2

Table of contents

Goal for the Subject or Learning Area

The goal of the course is to introduce student teachers to the management of computer laboratories. They will also be introduced to compatibility issues relating to hardware specifications that are required to various run operating systems and various application program. The course will also provide students teachers with hands-on knowledge of computer hardware, enabling them to troubleshoot and fix the computer hardware, software problems. Student teachers will be required to actively participate in a computer laboratory setting to equip them with knowledge and skills used ICT facility management and maintenance

Key Contextual Factors

There is a high mobile communication device ownership in Ghanaian society. Most students and teachers have interest and experience in using these devices for social and personal interactions. However, the integration of ICT into teaching and learning is low in Ghanaian schools. Ghanaian schools, particularly the public schools, can be categorised as low technology learning environments.

The following challenges affect teaching and account for this low integration of ICT in teaching and learning:

1. Inadequate support
    a. Most schools have inadequate technical support
    b. Teachers also lack institutional support in their use of ICT for teaching and learning
    c. Inadequate teaching and learning materials in ICT
    d. Inadequate professional technology training opportunities and capacity building

Course Description

This course is designed to introduce student teachers to information and communication technologies, computer-based information systems, their applications, implications and issues surrounding their use. It provides student teachers with background information in the use of computers and serves to meet the general technology/computer literacy requirement (*National Teachers' Standard: 2c, 2e, 3a, 3e, 3h, 3i, 3k, 3p/ NTECF: Pillar 1, 2 & 3, crosscutting issues; Core skills, Assessment*). The course provides practical skills in various ways to incorporate technology into the student teacher's personal educational programme as well as integrating word processing, spreadsheets, presentation software, internet applications and services in teaching and learning (*National Teachers' Standard: 1a, 1b, 3b, 3c, 3e, 3d, 3n/NTECF: Pillar crosscutting issues; Core skills, Professional values and attitudes*). The course will also explore past and present developments in the field of ICT and expose student teachers to various issues surrounding the use of ICT including ethics, health and safety, privacy, security and intellectual property, inclusivity and equity and other social issues which come up when using ICT within the context of Ghanaian core values, such as honesty, creativity, informed citizenry and lifelong learning to inform professional practice. It adopts methodologies that incorporate authentic assessment and innovative teaching methods to prepare student teachers for operating in diverse learner and learning environments. (*National Teachers' Standard: 1a, 1b, 3b, 3c, 3e, 3d, 3n/NTECF: Pillar crosscutting issues; Core skills, Professional values and attitudes*).

Core and transferable skills and cross cutting issues, including equity and inclusion

Technology literacy of student teachers will be enhanced by giving them the opportunities to learn how to use various ICT tools to solve educational and national development problems (CLO 2).

Critical thinking will be developed by allowing student teachers to analyse issues relating to technology and to express their conceptions, misconceptions, biases and philosophies freely and to examine them (CLO 1, 2 and 3).

Collaboration will be fostered through assigning group projects and presentations of various topics across units and thereby encouraging healthy team work (CLO 1, 2 and 3).
Communicative skills of student teachers would be enhanced by giving them the opportunity to examine, interrogate and make presentations on how to apply ICT in education and national life (CLO 1, 2 and 3).
Respect for diversity would be engendered in student teachers by examining how ICT could be used to enhance inclusivity and deal with diversity (CLO 1, 2 and 3).
Commitment and passion for teaching would be enhanced when student teachers use ICT to develop and deliver inclusive, innovative and creative interactive lessons (CLO 1, 2 and 3).

Course Learning Outcomes	Learning Indicators
1. Identify computer systems/subsystems and discuss their functions and interactions	1.3 Explain the functions of the various components of a computer
2. Demonstrate knowledge and understand of how the various components of a computer fit together	2.1 Assemble and dissemble computers
3. Install, configure/customize system and application software	3.1 Install and configure operating systems & device drivers Install application software
4. Troubleshoot computers and computer peripherals such as printers	4.1 Diagnose and recommend remedial action to computer malfunction
5. Identify and apply the tools and test equipment associated with PC repair and maintenance activity.	5.1 Repair basic PC faults
6. Apply the concepts and techniques of maintenance	6.1 Plan and execute preventive and corrective maintenance

1. Course Content

Unit/ Week	Topic	Sub-topic if any)	Teaching and learning activity to achieve the learning outcomes
1	Components of computer	Introduction to the course 1.1 System Boards and Component Identification 1.2 Understanding Memory	Seminars (Talk for Learning) and interactive discussions (see creative approaches below) to critically examine the advent of the information society, the role of ICT in society, the skills required for the information society. Also, interactive multimedia presentations and video analysis (e.g. from YouTube) to evaluate the use of ICT in educational institutions. These strategies must respond to inclusivity and equity (should aim at expanding learning for diverse learners, e.g. people with visual impairment, dyslexia, dysgraphia). Identification of the instances when personal, cultural, and institutionalized discrimination are creating and/or sustaining barriers to learning for some student teachers. Using creative approaches (such as games, storytelling, role play, songs and modelling) to stimulate and involve students when they interact with other students or during lessons.
2	Components of computer	1.3 Working with Disk Drives 1.4 Installation and Support of Hard Drives 3 Power Supply	Inquiry-based learning (questioning), seminars (Talk for Learning), interactive discussions, interactive multimedia presentations to examine the affordances and effects of ICT in education, field trips to observe how ICT is transforming education and industry, tutorial and practical sessions, video analysis, e.g. YouTube to discuss the impact of ICT in education. These strategies must respond to inclusivity and equity (i.e. ICT as a tool for expanding

			learning to diverse learners, e.g. people with visual impairment, dyslexia, dysgraphia).
3	Building/Upgrading a computer.	Assembling components 2.1 Motherboard 3.1.1 Assembling the parts (Installing Power supply, processor, cables, Memory, Optical drives, Using PCI slots, Hard drives, heat sink, fan)	Project-, problem- (group work) and inquiry-based learning (questioning) to Illustrate the basic block diagram of the computer system, seminars (Talk for Learning), interactive discussions, interactive multimedia presentations and practical sessions, video analysis, e.g. YouTube to discuss the characteristics of the conceptual computer. These strategies must respond to inclusivity and equity (i.e. ICT as a tool for expanding learning to diverse learners, e.g. people with visual impairment, dyslexia, dysgraphia). Student teachers to create a wiki on "the state of ICT use in schools" during their school visits and to focus on how ICT is used in school. Wikis should also discuss barriers and possible solutions.
4	Software Installation I	3.1 Formatting and partitioning of drives 3.2 Operating system installation,	Project- and problem-based (group work) learning to apply information skills, and inquiry-based learning (questioning), seminars (Talk for Learning), interactive discussions, interactive multimedia presentations, tutorial and practical sessions, video analysis, e.g. YouTube to identify and discuss and practise information literacy techniques. These strategies must respond to inclusivity and equity for all pupils. (Self-awareness: biases, beliefs and practices, styles of learning, interests, etc.) Studentteachers to create a wiki on the subject "issues when relating to ICT use".
5	Software Installation II	3.2 Device and Driver installation 3.3 Application Software installation Antivirus and other utility software installation	Skills will be developed mainly through series of practical sessions to create educational artefacts, such as e-portfolios. Seminars (Talk for Learning), and interactive multimedia presentations to discuss project artefacts. Watching videos e.g. from YouTube to deepen understanding of the basics of operating systems. These strategies must respond to inclusivity and equity (i.e. ICT as a tool for expanding learning to diverse learners including people with differences in access to ICT, visual impairment, dyslexia, dysgraphia).
6	Troubleshooting common computer problems	4.1 Tools, diagnostic procedures, 4.2 troubleshooting techniques 6.1 Fixing Common PC problems	Skills will be developed mainly through series of practical exercises taught through project- and problem-based learning approaches and practical sessions (individual and group work) to create educational artefacts such as reports/lesson notes, newsletters, timetables. Interactive multimedia presentations, video analysis, e.g. YouTube, to discuss the concepts and techniques for using word processors. These strategies must respond to inclusivity and equity (i.e. ICT as a tool for expanding learning to diverse learners e.g. People with visual impairment, dyslexia, dysgraphia). Student teachers to create a wiki on "the use of word-processing software in education" based on information gathered during school visits and their personal experiences.

7	Computer maintenance and optimisation I	5.1 Types of maintenance 7.1 Maintenance scheduling	Skills will be developed mainly through series of practical exercises taught through project- and problem-based learning approaches and practical sessions (individual and group work) to create educational artefacts, such as sample lessons, presentation of school visit. Interactive multimedia presentations, video analysis, e.g. YouTube, to discuss the concepts and techniques for using presentation software. These strategies must respond to inclusivity and equity (i.e. ICT as a tool for expanding learning to diverse learners, e.g. people with visual impairment, dyslexia, dysgraphia). Student teachers to create a wiki on the use of Presentation software in education
8	Computer maintenance and optimisation II	8.1 5.3 Common maintenance activities	Skills will be developed mainly through series of practical exercises taught through project- and problem-based learning approaches and practical sessions (individual and group work) to create educational artefacts, such as gradebooks, budgeting for educational materials/field trips. Interactive multimedia presentations, video analysis, e.g. using videos to support discussing the concepts and techniques for using spreadsheet software. These strategies must respond to inclusivity and equity (i.e. ICT as a tool for expanding learning to diverse learners, e.g. people with visual impairment, dyslexia, dysgraphia). Student teachers to create a wiki on the use of spreadsheet software in education
9	Computer maintenance and optimisation III	5.2 Managing and Supporting basic operating systems problems 5.2.1 The boot process issues 5.2.2 MBR corruption 5.2.3 Boot sector corruption 5.2.4 System file corruption 5.2.5 Crashes or hangs 5.2.6 Driver or service startup failure 8.2 Logon problems	Skills will be developed mainly through series of practical exercises taught through project- and problem-based learning approaches and practical sessions (individual and group work) to create educational artefacts, such as gradebooks, budgeting for educational materials/field trips. Interactive multimedia presentations, video analysis, e.g. using videos to support discussing the concepts and techniques for using spreadsheet software. These strategies must respond to inclusivity and equity (i.e. ICT as a tool for expanding learning to diverse learners, e.g. people with visual impairment, dyslexia, dysgraphia). Student teachers to create a wiki on the use of spreadsheet software in education
10	Laboratory Configuration and Management I	8.3 Laboratory configurations for teaching and learning	Skills will be developed mainly through series of practical exercises taught through project- and problem-based learning approaches and practical sessions (individual and group work) to create educational artefacts, such as gradebooks, budgeting for educational materials/field trips. Interactive multimedia presentations, video analysis, e.g. using videos to support discussing the concepts and techniques for using spreadsheet software. These strategies must respond to inclusivity and equity (i.e. ICT as a tool for expanding learning to diverse learners, e.g. people with visual impairment, dyslexia, dysgraphia).

			Student teachers to create a wiki on the use of spreadsheet software in education
11	Laboratory Configuration and Management III	1.1. Software tools to manage computer laboratories 8.4	Skills will be developed mainly through series of practical exercises taught through project- and problem-based learning approaches and practical sessions (individual and group work) to create educational artefacts, such as gradebooks, budgeting for educational materials/field trips. Interactive multimedia presentations, video analysis, e.g. using videos to support discussing the concepts and techniques for using spreadsheet software. These strategies must respond to inclusivity and equity (i.e. ICT as a tool for expanding learning to diverse learners, e.g. people with visual impairment, dyslexia, dysgraphia). Student teachers to create a wiki on the use of spreadsheet software in education
12	Laboratory Configuration and Management III	1.1. Health and safety when working with computers 8.5	Skills will be developed mainly through series of practical exercises taught through project- and problem-based learning approaches and practical sessions (individual and group work) to create educational artefacts, such as gradebooks, budgeting for educational materials/field trips. Interactive multimedia presentations, video analysis, e.g. using videos to support discussing the concepts and techniques for using spreadsheet software. These strategies must respond to inclusivity and equity (i.e. ICT as a tool for expanding learning to diverse learners, e.g. people with visual impairment, dyslexia, dysgraphia). Student teachers to create a wiki on the use of spreadsheet software in education

2. Teaching and Learning Strategies

- Concept maps
- Cooperative learning, group and individual projects
- Individual and group presentations
- Writing of reflective notes
- Talk for learning approaches- always, sometimes, never true, convince yourself, convince a friend; pyramid discussion etc.
- Questioning

3. Course Assessment Components

Component 1: Portfolio Assessment: (30% overall score)
- Selected items of students work (3 of them – 10% each)- 30%
- Midterm Assessment – 20%
- Reflective Journal – 40%
- Organisation of subject portfolio – 10% (how it is presented/organized)

Summary of Assessment Method:
Create e-portfolios to contain but not limited to
a. A maintenance plan developed by the student teacher
b. reflective notes of their observation during school visit relating to how to maintain school computer laboratories
c. Presentations from Video Analysis, individual and group work on assembly of computer components and installation of operating systems.
d. One (1) test/ Assignment/group work/quiz/class exercise to examine their understanding PC maintenance and laboratory management concepts

Weighting: 30%
Assesses Learning Outcomes: CLO 3, CLO 4

Component 2: Subject Project (30% overall semester score)
- Introduction a clear statement of aim and purpose of the project – 10%

- Methodology: what the student teacher has done and why to achieve the purpose of the project – 20%
- Substantive or main section – 40%
- Conclusion – 30%

Summary of Assessment Method:
  i. Project-/problem-/inquiry-based assessment to develop application/database development skills: Identify, investigate, propose and create solutions using object-oriented concepts, use user interface design concepts, software testing and relational database design, entity-relationship diagrams, data normalization

Weighting: 30%

Assesses Learning Outcomes: CLO 3, CLO 4

Component 3: End of Semester Examination – 40% overall

Summary of Assessment Method:

A combination of these written assessment methods to assess student teachers knowledge and understanding:
  i. Practical examination to test their knowledge of database & OOP concepts.
  ii. Written examination to test their knowledge of database & OOP concepts.

Weighting: 40 %

Assesses Learning Outcomes: CLO1, CLO2

4. Required Reading and Reference List

Hunt, M., & Clemens, B. (2017). *Illustrated Microsoft Office 365 & Office 2016: Fundamentals*. Boston, MA

Lambert, J., Lambert, S., (2015).*Windows 10: Step by Step (1st ed)*. Microsoft Press

O' Leary, T. J., & O' Leary L. I. (2017). *Computing essentials, 26th edition*. New York: McGraw Hill.

Shelly, G. B., Vermaat, M. E. (2011). *Discovering computers 2012: Living in a digital world, Complete International Edition*. Boston, MA: Thompson Course Technology.

Shelly, R., Cashman, T.J., Gunter, G.A., and Gunter, R.E. (2013). Teachers Discovering Computers. Integrating Technology and Digital Media in the Classroom. (7th ed). Thomson Course Technology

Wempen, F. (2014).*Computing Fundamentals: Introduction to Computers.* New York: Wiley

* Selected articles and online resources (youtube.com, MOOCs: Khan Academy, TESSA [www.tessafrica.net], Udemy etc)

5. Teaching and Learning Resources

1. Smartphones
2. Laptops
3. Desktop computers
4. Tablets
5. TV and Radio
6. Open Educational Resources (Including: YouTube, MOOCS-Udemy/coursera, Khan academy, TESSA)
7. The iBox (CENDLOS)
8. Productivity tools
9. Subject based application software
10. Instructional laboratories (with multimedia equipment and smartboards)
11. Maintenance and repair workshops
12. Microsoft Encarta (2018). 1993-2005 Microsoft Corporation.

6. Course related professional development for tutors/lecturers

Talk for learning approaches

LESSON 1

Year of B.Ed.	4	Semester	2	Place of lesson in semester	1 2 3 4 5 6 7 8 9 10 11 12

Title of Lesson	Components of computer I		Lesson Duration	3 hours
Lesson description	This lesson focuses on the characteristics of the computer system unit. Student teachers will have an opportunity to examine the basic building blocks of the computer system unit.**This first lesson introduces student teachers to the course learning outcomes and the 3 assessment components of the course**			
Previous student teacher knowledge, prior learning (assumed)	Student teachers would have taken an introduction to ICT course			
Possible barriers to learning in the lesson	Large class sizes in some colleges and universities			

Lesson Delivery – chosen to support student teachers in achieving the outcomes	Face-to-face [√]	Practical Activity	Work-Based Learning	Seminars [√]	Independent Study [√]	e-learning opportunities [√]	Practicum

Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	**Face-to-face –** Discussion, interactive lecturette **e-learning opportunities –** Use multimedia(e.g. texts, audio and videos) to show impact of technology on modern societies.Multimedia contents should be shared on mobile devices for student teachers to access both prior to and in class and be able to cater for students with a variety of readiness levels, interests and learning profiles. **Seminars:** student and/or tutor led presentationsto enable in-depth examination and analysis of issues to generate knowledge **Group work:** Put the student teachers in diverse groups to interrogate various issues both in a face to face class and online. Create a social media group for each group (e.g. WhatsApp, Telegram) to enable them to interact outside class. **Independent study:** Any of the above methods will include an element of independent study to enable studentsto personally engage with relevant content. Tutors to direct student teachers to Open Educational Resources (e.g. YouTube, MOOCS-Udemy/coursera, Khan academy, TESSA) to support independent study.

• **Overarching outcome (what the student teachersare to achieve) serves as basis for the learning outcomes. An expanded version of the description.** • **Write in full aspects of the NTS addressed**	Student teachers should be able to demonstrate a clear understanding of how the system unit of a computer works (NTECF Crosscutting issue p.38 NTS 3J-p.14, 2C-p21, 3A-23).

• **Learning outcome for the lesson, picked and developed from the course specification** • **Learning indicators for each learning outcome**	**Learning Outcomes**	**Learning Indicators**	**Identify the cross cutting issues – core and transferable skills, inclusivity, equity and diversity. How will these be addressed or developed?**
	Identify computer systems/subsystems and discuss their functions and interactions	Explain the functions of the various components of a computer	Communication skills: through critiquing and presentations. Critical thinking: through the analysis of changes resulting from the introduction of ICT.

			Personal development: through presentations and developing of arguments. Respect and diversity: equity and inclusivity	
Topic Title: • Components of computer	**Sub-topic**	**Stage/time**	**Teaching and learning activities to achieve outcomes depending on the delivery mode selected. Teacher-led collaborative group work or independent work**	
			Teacher Activity	**Student Activity**
	Introduction to course	20 mins	**Questioning:** Tutor uses questioning to introduce the Course Manual, assessment components and review student teacher's experience with computers in general. (PDG Theme 2)	Student teachersengage in a discussion with tutor on their experience with computers.
	1.1 System Boards and Component Identification	100minutes	**Face-to-Face/ e-learning opportunities:**Tutor shows video of the types of system boards, the compatible components and how the components fits on the board(PDP Theme 2)	**Face-to-Face/ e-learning opportunities:**Student teacherswatches video of the types of system boards, the compatible components and how the components fits on the board. Student teacherwrites reflective notes and ask questions to clarify thinking. **Individual presentation:** Student teachers individually present their reflective notes on their analysis of the videos and/ or images shown to them.
	1.1 Understanding processors &Memory	100minutes	**e-learning opportunities:** Teacher shows videos/images of the types of computer processors &memory. **Group work:** Teacher puts student teachers in small diverse groups to interact (PDP Theme 4): • Identify the differences in processors &memory • Identify the advantages and disadvantages of each type of processors &memory	**Group work:** Student teachersundertake group discussions and makes notes and present the issues identified in a group. Develop a group wiki out of class(PDP Theme 4). **Individual presentation:**Student teachersindividually present their reflective notes on their analysisof the videos and/ or images shown to them.
	Lesson closure	20 minutes	Guide student teachers to recap their discussion and the points identified in their discussions.	Student teachers recap the ideas/concepts learnt in the lesson.

Lesson assessments – evaluation of learning: of, for and as learning within the lesson	**Formative Assessment**: (Individual and Group Presentation). (NTS 3J-p.14, 2C-p21, 3A-23, 3B, 3E) • Group presentations and wiki on the impact of ICT on society in general and education in particular. • Group presentations on the skills required to function in the information age and the need for teachers to have those skills. • Presentation of individual reflective notes on video analysis. • Core skills to be developed: critical thinking, collaboration and communicative skills, personal development
Instructional resources	Videos/images TESSA online education resource. Teacher education in Africa Laptops, projectors
Required text (core)	Andrews, J. (2007). A+ guide to managing and maintaining your PC: Comprehensive edition. Boston, MA: Thomson Mueller S. (2011) *Upgrading and Repairing PCs (20th Ed)* Pearson Education Shelly, R., Cashman, T.J., Gunter, G.A., and Gunter, R.E. (2013). Teachers Discovering Computers. Thomson Course Technology.
Additional reading list	Andrews, J., & Verge, T. (2007). A+ guide to managing and maintaining your PC: Comprehensive – Lab Manual. Boston, MA: Thomson Selected articles and online resources (youtube.com, MOOCs: Khan Academy, TESSA, Udemy etc) T-TEL (2015), Questioning, Handbook for PD Coordinators T-TEL (2016), Group Work, Handbook for PD Coordinators
CPD needs	Writing reflective notes Participating in a community of practice/conferences and accessing online magazines(E-zines) and journals to obtain up to date content. Team teaching and lesson observation to improve instructional strategies and practices. Supporting student teachers in collaborating in designing and developing a wiki.

LESSON 2

Year of B.Ed.	4	Semester	2	Place of lesson in semester	1 2 3 4 5 6 7 8 9 10 11 12

Title of Lesson	Components of computer II		Lesson Duration	3 hours
Lesson description	This lesson is to expose student teachers to and help them understand disk drives and power supply units and be able to choose which ones are suitable for use in the school system			
Previous student teacher knowledge, prior learning (assumed)	Student teachers have interacted and would have understood the basic concepts of ICT.			
Possible barriers to learning in the lesson	Negative views of ICT and large class sizes in some colleges and universities.			

Lesson delivery – chosen to support student teachers in achieving the outcomes	Face-to-face [√]	Practical Activity	Work-Based Learning	Seminars [√]	Independent Study	e-learning Opportunities [√]	Practicum

Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes	**Face-to-face –** student and/or tutor led discussion, interactive lecturettes **e-learning opportunities –**Use multimedia(e.g. texts, audio and videos) to show affordances of technology and their ability to support development, teaching and learning. Multimedia contents should be shared on mobile devices for student teachers to access both prior to and in class and be able to cater for students with a variety in readiness levels, interests and learning profiles. **Seminars:** student and/or tutor led seminars to enable in-depth examination and analysis of issues to generate knowledge **Group work:** put student teachers in small groups to examine various issues both in a face to face class and online. Create a social media group for each group (e.g. WhatsApp, Telegram) to enable them to interact outside class using their mobile or any other suitable device. **Independent study:** any of the above methods will include an element of independent study to enable students to personally engage with relevant content.Tutor to direct student teachers to Open Educational Resources (e.g. YouTube, MOOCS-Udemy/coursera, Khan academy, TESSA) to support independent study.

• **Overarching outcome (what the student teachers are to achieve) serves as basis for the learning outcomes. An expanded version of the description.** • **Write in full aspects of the NTS addressed.**	Student teachers should be able to demonstrate a clear understanding of the relevance of Information and Communications Technologies in modern societies in general and education in particular (NTECF Crosscutting issue p.38 NTS 3J-p.14, 2C-p21, 3A-23).

• **Learning outcome for the lesson, picked and developed from the course specification** • **Learning indicators for each learning outcome**	**Learning Outcomes**	**Learning Indicators**	**Identify cross cutting issues – core and transferable skills, inclusivity, equity and diversity. How will these be addressed or developed?**
	Identify computer systems/subsystems and discuss their functions and interactions	Explain the functions of the various components of a computer	Communication skills: through critiquing and presentations Critical thinking: through the critical analysis of how ICT has contributed to solving developmental problems Personal development:

Topic:	Sub-topic	Stage/time	Teaching and learning activities to achieve outcomes depending on the delivery mode selected. Teacher-led collaborative group work or independent work.	
				through presenting and developing arguments. Respect and diversity: equity and inclusivity
			Teacher Activity	**Student Activity**
Components of computer II	Introduction	20 minutes	**Face-to-face:** Tutor engages student teachers in a discussion onsystems boards, processors and memory to recap knowledge from previous lesson (PDP Theme 2)	**Face-to-face:** Student teachers identify and mention characteristicsof systems boards, processors and memory to recap knowledge from previous lesson(PDP Theme 2).
	Working with Disk Drives	60 minutes	**e-learning opportunities:** Tutor shows a video of the types of hard drives andengage the student teacher in a discussion of the types of hard drives identified from the videos and/or images shown to them	**e-learning opportunities:** Student teachers to engage the teacher and each other in a discussion of the types of hard drives identified from the videos and/or images shown to them and the types that are suitable in the school system
	Installation and Support of Hard Drives	60 minutes	**e-learning opportunities/discussion:** Tutor shows a video of the process of installing and managing hard drives andengage the student teacher in a discussion of the process of installing and managing of hard drives identified from the videos and/or images shown to them	**e-learning/discussion:** Student teachers to engage the teacher and each other in a discussion of the process of installing and managing hard drives identified from the videos and/or images shown to them
	Installation and Support of Power Supply units	60 minutes	**e-learning opportunities/discussion:** Tutor shows a video of the process of installing and managingpower supply units andbreak the class into groups to discussion of the process of installing and managing of power supply units identified from the videos and/or images shown to them	**e-learning/discussion:** Student teachers to engage the tutor and each other in a group discussion of the process of installing and managing power supply units identified from the videos and/or images shown to them
	Lesson closure	30 minutes	Tutor engages student teachers to recap lesson	Students engage in discussion to recap knowledge acquired in lesson. Student teachers develop wikis in their groups on "*the types of hard drives and power supply units and their suitability to the school system*"

Lesson assessments – evaluation of learning: of, for and as learning within the lesson	**In-lesson Assessment**(NTS 3J-p.14, 2C-p21). Group presentations and wiki on *"the types of hard drives and power supply units and their suitability to the school system"*
Instructional Resources	Images, videos Laptop, projectors and mobile phones
Required Text (core)	Andrews, J. (2007). A+ guide to managing and maintaining your PC: Comprehensive edition. Boston, MA: Thomson Mueller S. (2011) *Upgrading and Repairing PCs (20th Ed)* Pearson Education Shelly, R., Cashman, T.J., Gunter, G.A., and Gunter, R.E. (2013). Teachers Discovering Computers. Thomson Course Technology.
Additional Reading List	Andrews, J., & Verge, T. (2007). A+ guide to managing and maintaining your PC: Comprehensive – Lab Manual. Boston, MA: Thomson Selected articles and online resources (youtube.com, MOOCs: Khan Academy, TESSA, Udemy etc) T-TEL (2015), Questioning, Handbook for PD Coordinators T-TEL (2016), Group Work, Handbook for PD Coordinators
CPD needs	Writing reflective notes Participating in a community of practice/conferences and accessing online magazines(E-zines) and journals to obtain up to date content. Team teaching and lesson observation to improve instructional strategies and practices.

LESSON 3

Title of Lesson	Building/Upgrading a computer	Lesson Duration	3 hours
Lesson description	This lesson is to expose student teachers to and help them assemble and or upgrade the components of a computer.		
Previous student teacher knowledge, prior learning (assumed)	It is assumed that student teachers would have had understood the previous lessons on the components that make up a computer.		
Possible barriers to learning in the lesson	Student teachers may have had very limited prior experience of using ICT tools		

Lesson Delivery – chosen to support student teachers in achieving the outcomes	Face-to-face [√]	Practical Activity [√]	Work-Based Learning	Seminars [√]	Independent Study [√]	e-learning opportunities [√]	Practicum

| Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes. | **Face-to-face –** Discussion (group), interactive lecturettes, reflection should be used in facilitating lessons.
e-learning opportunities – Student teacherswould surf the internet using computers/mobile devices etc.and download relevant literature required for presentations and analyse images and videos. Multimedia contents should be shared on mobile devices for them to access both in and out of class.
Seminars – Student teacherswould prepare and givepresentations in groups and individually.
Independent Study – Student teacherswould be given themes and topics to research for presenting.Tutor to direct student teachers to open educational resources (e.g. YouTube, MOOCS-Udemy/coursera, Khan academy, TESSA) to support independent study.
Group work: Student teachers to work in small diverse groups to interrogate various issues both in a face to face class and online. Create a social media group for each group (e.g. WhatsApp, Telegram) to enable them to interact outside class using their mobile or any other suitable device. |

• **Overarching outcome (what the student teachersare to achieve) serves as basis for the learning outcomes. An expanded version of the description.** • **Write in full aspects of the NTS addressed**	To exhibit sound knowledge and understanding of the basic components of a computer, to classify these components and to exhibit knowledge of how they are used in the various aspects of Education(NTS 2C).

• **Learning outcome for the lesson, picked and developed from the course specification** • **Learning indicators for each learning outcome**	Learning Outcomes	Learning Indicators	Identify cross cutting issues – core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?
	Demonstrate knowledge and understand of how the various components of a computer fit together	2.1 Assemble and dissemble computers	Communication skills: through critiquing and presentations Critical thinking: through the critical analysis of how ICT has contributed to solving developmental problems

	Sub-topic	Stage/time	Teaching and learning activities to achieve outcomes depending on the delivery mode selected. Teacher-led collaborative group work or independent.	
				Personal development: through presenting and developing arguments. Respect and diversity: equity and inclusivity
			Teacher Activity	Student Activity
Topic Title: Building/Upgrading a computer	**Introduction**	30 minutes	**Face-to-Face:**lead discussion of wikis developed from the previous lesson on "*the types of hard drives and power supply units and their suitability to the school system*". Tutor leads brain storming session to discuss issues raised in wiki	**Face-to-Face:**Student teacher engages in discussion of wikis developed from the previous lesson on "*the types of hard drives and power supply units and their suitability to the school system*". Student teacher engages brain storming session to discuss issues raised in wiki
	Assembling components Motherboard Assembling the parts (Installing Power supply, processor, cables, Memory, Optical drives, Using PCI slots, Hard drives, heat sink, fan)	130 minutes	**Practical activity:**Tutor breaks class into small diverse groups and then lead them in a practical activity to assemble the components of a computer	**Practical activity:**Student teacher work in groups in a practical activity to assemble the components of a computer
	Closure	20 minutes	Tutor guides the student teachers to recap the discussions for the day	**Individual presentation:** Student teachers individually make reflective notes on the process of assembling a computer

Lesson assessments – evaluation of learning: of, for and as learning within the lesson	**Formative Assessment**: (Individual and Group Presentation) (NTS 1E, 2C, 3B) • Practical activity of assembling a computer • Presentation of individual reflective notes on the process of assembling a computer. Core skills to be developed: critical thinking, collaboration and communicative skills, personal development
Instructional Resources	Videos/images TESSA online education resource. Teacher education in Africa Laptop, projectors
Required Text (core)	O' Leary, T. J., & O' Leary L. I. (2017). *Computing essentials, 26th edition*. New York: McGraw Hill Wempen, F. (2014) *Computing Fundamentals: Introduction to Computers.* New York: Wiley
Additional Reading List	T-TEL (2015), Questioning, Handbook for PD Coordinators T-TEL (2016), Group Work, Handbook for PD Coordinators
CPD needs	Writing reflective notes Participating in a community of practice/conferences and accessing online magazines(E-zines) and journals to obtain up to date content on ICT technologies, including types of hardware and software. Team teaching and lesson observation to improve instructional strategies and practices.

LESSON 4

Year of B.Ed.	4	Semester	2	Place of lesson in semester	1 2 3 **4** 5 6 7 8 9 10 11 12

Title of Lesson	Software Installation I		Lesson Duration	3 hours
Lesson description	Student teacherswill be exposed to the nature of computer networks, the internet and the world wide web. They will have the opportunity to interrogate how these networks have changed the way people gather information, conduct research and learn, and how they have been used in teaching and learning. They will develop skills in using the tools which ran on these networks to interact with other learners andlocate learning resources.			
Previous student teacher knowledge, prior learning (assumed)	Student teachers have observed or used computer networks in the form of mobile phones, ATM machines, etc.			
Possible barriers to learning in the lesson	Student teachers have little personal experience in the use of a wide range of computer networks			

Lesson Delivery – chosen to support student teachers in achieving the outcomes	Face-to-face [√]	Practical Activity	Work-Based Learning	Seminars [√]	Independent Study [√]	e-learning opportunities [√]	Practicum

Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	**Face-to-face –** Discussion, lecturette,individual and group work should be used in facilitating lessons. **e-learning opportunities –** Student teacherswould surf the internet and download relevant literature and multimedia required for presentations and discussions. Multimedia contents should be shared on mobile devices for them to access both in and out of class. **Seminars –** Student teacherswould prepare and givepresentations in groups and individuals. **Independent Study –** Student teacherswould be given themes and topics to research for presentation and also develop their own teaching philosophies.Tutor to direct student teachers to Open Educational Resources (e.g. YouTube, MOOCS-Udemy/coursera, Khan academy, TESSA) to support independent study. **Group work:** Student teachers to work in diverse groups to interrogate various issues both in a face to face class and online. Create a social media group for each group (e.g. WhatsApp, Telegram) to enable them to interact outside class using their mobile or any other suitable device.
• **Overarching outcome (what the student teachersare to achieve) serves as basis for the learning outcomes. An expanded version of the description.** • **Write in full aspects of the NTS addressed**	Exhibit sound knowledge and understanding of what computer networks are, how they are classified and how touse the internet to find teaching and learning resources(NTECF p.68, NTS 2C, 1f).

• Learning outcome for the lesson, picked and developed from the course specification • Learning indicators for each learning outcome	**Learning Outcomes**	**Learning Indicators**	**Identify cross cutting issues – core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?**
	Install, configure/customize system and application software	3.4 Install and configure operating systems & device drivers Install application software	Communication skills: through critiquing and presentations Digital literacy: surfing the internet for relevant information on themes to be discussed.

			Personal development: through presenting and developing of arguments. Respect and diversity: equity and inclusivity

Software Installation I	Sub-topic	Stage/time	Teaching and learning activities to achieve outcomes depending on the delivery mode selected. Teacher-led collaborative group work or independent work.	
			Teacher Activity	**Student Activity**
	Introduction	10 minutes	**Face-to-face:** Tutor/lecturer reviews students'knowledge of assembling computers through questioning	
	Formatting and partitioning of drives	50 minutes	**Face-to-Face:** Tutor introduces student teachers to the formatting and partitioning drives and why it is necessary to format or partition. **E-learning:** Tutor shows images/videos on the process of formatting and partitioning drives. Tutor puts student teachersinto small groups based on a random criterion like the day or month of birth and tasks them to discuss how formatting may be used in school to support work in school computer laboratories	Student teachers engage in the interactive discussion and provide relevant responses Student teacherswork in smaller groups to discuss theaspects of formatting and partitioning drivesassigned to them and givea presentation to the class.
	Operating system installation,	30 minutes	**Face-to-Face:** Tutor introduces student teachers to the process of installing an operating system onto a computer. **E-learning:** Tutor shows images/videos on the process of installing an operating system onto a computer. Tutor puts student teachersinto small groups based on a random criterion like the day or month of birth and tasks them to discuss the options to choose when installing an operating system onto a computer in school to support work in school computer laboratories	Student teachers engage in the interactive discussion and provide relevant responses Student teacherswork in smaller groups to discuss theaspects of installing an operating system onto a computer assigned to them and give a presentation to the class.
	Formatting and partitioning of drives Operating system installation,	80 minutes	**practical:** Tutor guides students to format, partition and install an operating system on a computer	Student teachers under the guidance of the tutor format, partition and install an operating system on a computer

	Closure	10 minutes	Tutor guides the student teachers to recap the discussions for the day .	**Individual presentation:** Student teachers individually make their reflective notes on the discussions for the day.
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	**In-lesson Assessment**: (NTS 2C, 3B, 3N) Individual and group presentations of discussions in class to be assessed by student teachers themselves.			
Instructional Resources	Images and videos Projectors, computers and internet connectivity			
Required Text (core)	Andrews, J. (2007). A+ guide to managing and maintaining your PC: Comprehensive edition. Boston, MA: Thomson Mueller S. (2011) *Upgrading and Repairing PCs (20th Ed)* Pearson Education Shelly, R., Cashman, T.J., Gunter, G.A., and Gunter, R.E. (2013). Teachers Discovering Computers. Thomson Course Technology.			
Additional Reading List	Andrews, J., & Verge, T. (2007). A+ guide to managing and maintaining your PC: Comprehensive – Lab Manual. Boston, MA: Thomson Selected articles and online resources (youtube.com, MOOCs: Khan Academy, TESSA, Udemy etc) T-TEL (2015), Questioning, Handbook for PD Coordinators T-TEL (2016), Group Work, Handbook for PD Coordinators			
CPD needs	Writing reflective notes Participating in a community of practice/conferences and accessing online magazines(E-zines) and journals to obtain up to date content on current e-learning models and methods.			

LESSON 1

Year of B.Ed.	4	Semester	2	Place of lesson in semester	1 2 3 4 **5** 6 7 8 9 10 11 12

Title of Lesson	Software Installation II		Lesson Duration	3 hours
Lesson description	Student teachers will be exposed to the processes for installing an application/utility/antivirus software on a computer. They will have a hands-on segment to install some software onto computers			
Previous student teacher knowledge, prior learning (assumed)	Student teachershave been exposed to and used ICT.			
Possible barriers to learning in the lesson	Colleges of education and universities may have large class sizes that hinder practical lessons.			

Lesson Delivery – chosen to support student teachers in achieving the outcomes	Face-to-face [√]	Practical Activity	Work-Based Learning	Seminars [√]	Independent Study [√]	e-learning opportunities [√]	Practicum

Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes	**Face-to-face –** Discussion, lecturette, think, pair share should be used in facilitating lessons. **Role Play –** Student teachers will act out scenarios as a technique to elicit points for discussion **e-learning opportunities –** Student teachers would surf the internet and download relevant literature required for presentations and analyse videos of teaching philosophies shared by experienced teachers. Multimedia contents should be shared on mobile devices for them to access both in and out of class. **Independent Study –** Student teachers would be given themes and topics to research for presentation and also develop their own teaching philosophies.Tutor to direct student teachers to open educational resources (e.g. YouTube, MOOCS-Udemy/coursera, Khan academy, TESSA) to support independent study. **Group work:** Student teachers to work in diverse small groups to interrogate various issues both in a face to face class and online. Create a social media group for each group (e.g. WhatsApp, Telegram) to enable them to interact outside class using their mobile or any other suitable device to deal with large class sizes.

• Overarching outcome (what the student teachers are to achieve) serves as basis for the learning outcomes. An expanded version of the description. • Write in full aspects of the NTS addressed	Student teachers should be able to exhibit sound knowledge and understanding of relevant issues including ethics, intellectual property protection, health and safety, security and privacy arising as a result of the use of ICT.

• Learning Outcome for the lesson, picked and developed from the course specification • Learning indicators for each learning outcome	Learning Outcomes	Learning Indicators	Identify cross cutting issues – core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?
	Install, configure/customize system and application software	3.5 Install and configure operating systems & device drivers 3.6 Install application software	Communication skills: through critiquing and presentations Digital literacy:

			Teaching and learning activities to achieve outcomes depending on the delivery mode selected. Teacher-led collaborative group work or independent work.	
	Sub-topic	**Stage/time**	**Teacher Activity**	**Student Activity**
			understanding surfing the internet for relevant information on themes to be discussed. Personal development: through presenting and developing of arguments. Respect and diversity: using group activities with members having diverse characteristics.	
	Introduction	20 minutes	**Face-to-face:** Tutor engages student teachers in a discussion onformatting and partitioning of drives and installation of operating systems to recap knowledge from previous lesson (PDP Theme 2)	**Face-to-face:** Student teachers discusses with each other and tutor discussion onformatting and partitioning of drives and installation of operating systems to recap knowledge from previous lesson(PDP Theme 2).
Topic Title: Software Installation II	3.7 Device and Driver installation 3.8 Application Software installation 3.9 Antivirus and other utility software installation	40 minutes	**Face-to-face:** tutor/lecturer leads a review of the previous week's practical to ensure all operating systems are installed properly. **eLearning**: Tutor then shows student teacher videos of different instances on how to install application/utility/antivirus software .	Student teachersengage the review of previous week assignment and review of RPK. Student teachers engage in role play and in doing so identify the issues that determine the nature of ethics and how it manifests in teaching and learning. Examples could be obtained from student experiences during their supported teaching in school (PDP Theme 1).
		100 minutes	**practical:** Tutor guides students to format, partition and install an application/utility/antivirus software on a computer	Student teachers under the guidance of the tutor install application/utility/antivirus software on a computer
	Lesson closure	20 minutes	Tutor engages student teachers to recap lesson	Students engage in discussion to recap knowledge acquired in lesson. Student teachers develop wikis in their groups on *"the processes for installingan application/utility/antivirus software on a computer"*
2Lesson assessments – evaluation of learning: of, for and as learning within the lesson	**In-lesson Assessment:** • Quiz to evaluate knowledge on Installing system and application software • software Group development of a wiki on *"the processes for installing an application/utility/antivirus software on a computer"* • Individual student teachers develop reflective notes and ask questions to clarify thinking			

	Note: Wikis and reflective notes to go into portfolio
Instructional Resources	Images/ videos Projectors and computers
Required Text (core)	Andrews, J. (2007). A+ guide to managing and maintaining your PC: Comprehensive edition. Boston, MA: Thomson Mueller S. (2011) *Upgrading and Repairing PCs (20th Ed)* Pearson Education Shelly, R., Cashman, T.J., Gunter, G.A., and Gunter, R.E. (2013). Teachers Discovering Computers. Thomson Course Technology.
Additional Reading List	Andrews, J., & Verge, T. (2007). A+ guide to managing and maintaining your PC: Comprehensive – Lab Manual. Boston, MA: Thomson Selected articles and online resources (youtube.com, MOOCs: Khan Academy, TESSA, Udemy etc) T-TEL (2015), Questioning, Handbook for PD Coordinators T-TEL (2016), Group Work, Handbook for PD Coordinators
CPD needs	Writing reflective notes Participating in a community of practice/conferences and accessing online magazines(E-zines) and journals to obtain up to date content on the various issues including ethics, privacy and security, health and safety etc. arising out of the use of ICT.

LESSON 6

Year of B.Ed.	4	Semester	2	Place of lesson in semester	1 2 3 4 5 **6** 7 8 9 10 11 12

Title of Lesson	Troubleshooting common computer problems		Lesson Duration	3 hours
Lesson description	Student teachers would be introduced to the basics of troubleshooting a computer.			
Previous student teacher knowledge, prior learning (assumed)	Students have an understanding of what a computer is and what itscomponents are.			
Possible barriers to learning in the lesson	Students may have misconceptions about policies and their effects on teaching and learning in Ghana.			

Lesson Delivery – chosen to support student teachers in achieving the outcomes	Face-to-face [√]	Practical Activity	Work-Based Learning	Seminars [√]	Independent Study [√]	e-learning opportunities [√]	Practicum

Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	**Face-to-face** – Discussion, interactive lecturettes, should be used in facilitating lessons. **e-learning opportunities** – Student teachers be given some multimedia contents.Multimedia contents should be shared on mobile devices for them to access both in and out of class. **Seminars** – Student teachers would prepare and givepresentations in groups and individuals. **Independent Study** – Student teachers would be given themes and topics to research for presentation. Tutors to direct student teachers to open educational resources (e.g. YouTube, MOOCS-Udemy/coursera, Khan academy, TESSA) to support independent study. **Group work:** Student teachers to work in diverse groups to interrogate various issues both in a face to face class and online. Create a social media group for each group (e.g. WhatsApp, Telegram) to enable them to interact outside class using their mobile or any other suitable device.

• Overarching outcome (what the student teachers are to achieve) serves as basis for the learning outcomes. An expanded version of the description. • Write in full aspects of the NTS addressed	To be able to demonstrate an understanding of the basics of a computer operating system and how it is used to manage the resources of a computer system.

• Learning Outcome for the lesson, picked and developed from the course specification • Learning indicators for each learning outcome	Learning Outcomes	Learning Indicators	Identify cross cutting issues – core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?
	Troubleshoot computers and computer peripherals such as printers	4.1 Diagnose and recommend remedial action to computer malfunction	Communication skills: through critiquing and presentations Digital literacy: to perform basic tasks on a computer system using the operating system. Personal development: Through presenting and developing of arguments. Respect and diversity: using group activities with members having diverse characteristics.

Topic Title	Sub-topic	Stage/time	Teaching and learning activities to achieve outcomes depending on the delivery mode selected. Teacher-led collaborative group work or independent.	
			Teacher Activity	Student Activity
	Introduction	30 minutes	Face-to-Face: lead discussion of wikis developed from the previous lesson on *"the processes for installingan application/utility/antivirus software on a computer"*. Tutor leads brain storming session to discuss issues raised in wiki. Tutor introduces student teachers to computer repair and maintenance	**Face-to-Face:** Student teacher engages in discussion of wikis developed from the previous lesson on *"the processes for installing an application/utility/antivirus software on a computer"*. Student teacher engages brain storming session to discuss issues raised in wiki
Troubleshooting common computer problems	4.3 Tools, diagnostic procedures,	50 Minutes	**E-learning:** Tutor shows images/videos on the tools and diagnostic procedures for troubleshooting. Tutor puts student teachersinto small groups based on a random criterion like the day or month of birth and tasks them to discuss the characteristics and uses of diagnostic tools and diagnostic procedures for troubleshooting	Student teachers engage in the interactive discussion and provide relevant responses

Student teacherswork in smaller groups to discuss characteristics and uses of diagnostic tools and diagnostic procedures for troubleshooting. |
| | 4.4 troubleshooting techniques | 40 Minutes | E-learning: Tutor shows videos, e.g. from YouTube to deepen understanding of the other troubleshooting techniques. | Student teachers follow the video tutorial and have group discussions deepen understanding of the other troubleshooting techniques.. |
| | 4.5 Fixing Common PC problems | 40 Minutes | **E-learning:** Tutor shows images/videos on common PC problems and their fixes. Tutor puts student teachersinto small groups based on a random criterion like the day or month of birth and tasks them to discuss their experiences with some common PC problems and their fixes. | Student teachers engage in the interactive discussion and provide relevant responses

Student teacherswork in smaller groups to discuss their experiences with some common PC problems and their fixes. |
| | 4.6 | 20 minutes | Tutor guides the student teachers to recap the discussions for the day | **Individual presentation:** Student teachers individually make reflective notes on tools, diagnostic procedures, troubleshooting techniques, common PC problems and their fixes |

Lesson assessments – evaluation of learning: of, for and as learning within the lesson	**Formative Assessment:** Student teacher produce reflective notes on *"diagnostic tools, diagnostic procedures, troubleshooting techniques, common PC problems and their fixes"*
Instructional Resources	Images/ videos Projectors and computers
Required Text (core)	Andrews, J. (2007). A+ guide to managing and maintaining your PC: Comprehensive edition. Boston, MA: Thomson Mueller S. (2011) *Upgrading and Repairing PCs (20th Ed)* Pearson Education Shelly, R., Cashman, T.J., Gunter, G.A., and Gunter, R.E. (2013). Teachers Discovering Computers. Thomson Course Technology.
Additional Reading List	Andrews, J., & Verge, T. (2007). A+ guide to managing and maintaining your PC: Comprehensive – Lab Manual. Boston, MA: Thomson Selected articles and online resources (youtube.com, MOOCs: Khan Academy, TESSA, Udemy etc) T-TEL (2015), Questioning, Handbook for PD Coordinators T-TEL (2016), Group Work, Handbook for PD Coordinators
CPD needs	Writing reflective notes Participating in a community of practice/conferences and accessing up to date tutorials, online magazines(E-zines) and journals to obtain content and software updates. Team teaching and lesson observation to improve instructional strategies and practices. Supporting student teachers in creating e-portfolios.

LESSON 7

Year of B.Ed.	4	Semester	2	Place of lesson in semester	1 2 3 4 5 6 **7** 8 9 10 11 12

Title of Lesson	Computer maintenance and optimisation I		Lesson Duration	3 hours
Lesson description	The purpose of this lesson is to introduce student teachers to a word processing package			
Previous student teacher knowledge, prior learning (assumed)	Student teachers have an understanding of maintenance. Student teachers will be introduced preventive and corrective maintenance and they will plan for maintenance for their STS school.			
Possible barriers to learning in the lesson	Some student teachers may have very limited skill and experience using a computer.			

Lesson Delivery – chosen to support student teachers in achieving the outcomes	Face-to-face [√]	Practical Activity [√]	Work-Based Learning	Seminars	Independent Study [√]	e-learning opportunities [√]	Practicum

Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	**Face-to-face:** Using a tutor to guide students to explore a word processing package and create an educational artefact. There will be an opportunity for student teachers to explore other uses of a word processing software. **Practical work:** to enable student teachers to perform simple word processing tasks **E-learning *opportunities*** – This will involve providing the student teachers with access to multimedia tutorials to support their learning. Multimedia tutorials can be shared with students (e.g. via mobile platforms) prior to class to enable student teachers with limited exposure to familiarise themselves with the content before the face to face session. **Independent study:** Tutor to direct student teachers to Open Educational Resources (e.g. YouTube, MOOCS-Udemy/coursera, Khan academy, TESSA) to support independent study and practice both in and outside of class.

• **Overarching outcome (what the student teachers are to achieve) serves as basis for the learning outcomes. An expanded version of the description.** • **Write in full aspects of the NTS addressed**	Be able to use a word processing application to create simple documents(NTS 2C, 2D, 3J).

• **Learning Outcome for the lesson, picked and developed from the course specification** • **Learning indicators for each learning outcome**	**Learning Outcomes**	**Learning Indicators**	**Identify cross cutting issues – core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?**
	Identify and apply the tools and test equipment associated with PC repair and maintenance activity.	• 5.1 Repair basic PC faults	Computer literacy skills: through creating educational artefacts Respect and diversity: using group activities with members having diverse characteristics.

Topic Title	Sub-topic	Stage/time	Teaching and learning activities to achieve outcomes depending on the delivery mode selected. Teacher-led collaborative group work or independent.	
			Teacher Activity	Student Activity
	introduction	20 minutes	**Face-to face:** Tutor/lecturer uses questions to initiate discussion on what word processors are, their use in teaching and learning and the need to train teachers to use it.Tutor guides student teachers to explorethe uses (PDP Theme 2).	Student teachers engage in discussions on what word processors are, what they are used for and provide responses to questions asked (PDP Theme 2).
	Types of maintenance	50 minutes	**E-learning:** Tutor shows a video tutorial on the types of maintenance. Tutor then engages student teachers in a discussion on the types of maintenance and when they are needed **group practical work:** Tutor divides the class into groups and tasks them to identify maintenance issues required in their school computer laboratory.	Student teachers follow the video and identify the types of maintenance. Student teacher then engages student teachers in a discussion on the types of maintenance and when they are needed
Computer maintenance and optimisation I	Maintenance scheduling	50 minutes	**E-learning:** Tutor shows a video tutorial on the maintenance scheduling. Tutor then engages student teachers in a discussion on the types of maintenance and when they are needed **group practical work:** Tutor divides the class into groups and tasks them to use identify maintenance issues to develop a maintenance plan in their school computer laboratory.	Student teachers follow the video and identifiedissues to develop a maintenanceplan in their school computer laboratory.
	Closure	20 minutes	Tutor guides the student teachers to recap the discussions for the day	**Individual presentation:** Student teachers individually make reflective notes on the process of assembling a computer
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	**Formative Assessment:** (NTS 2C, 2D, 3J) Student produce a maintenance plan for a school computer laboratory Students write reflective notes on maintaining school computer laboratories			
Instructional Resources	Images/ videos Projectors and computers			
Required Text (core)	Andrews, J. (2007). A+ guide to managing and maintaining your PC: Comprehensive edition. Boston, MA: Thomson Mueller S. (2011) *Upgrading and Repairing PCs (20th Ed)* Pearson Education			

	Shelly, R., Cashman, T.J., Gunter, G.A., and Gunter, R.E. (2013). Teachers Discovering Computers. Thomson Course Technology.
Additional Reading List	Andrews, J., & Verge, T. (2007). A+ guide to managing and maintaining your PC: Comprehensive – Lab Manual. Boston, MA: Thomson Selected articles and online resources (youtube.com, MOOCs: Khan Academy, TESSA, Udemy etc) T-TEL (2015), Questioning, Handbook for PD Coordinators T-TEL (2016), Group Work, Handbook for PD Coordinators
CPD needs	Writing reflective notes Participating in a community of practice/conferences and accessing up to date tutorials, online magazines(E-zines) and journals to obtain content and software updates. Team teaching and lesson observation to improve instructional strategies and practices.

LESSON 8

Year of B.Ed.	4	Semester	2	Place of lesson in semester	1 2 3 4 5 6 7 **8** 9 10 11 12

Title of Lesson	Computer maintenance and optimisation II	Lesson Duration	3 hours
Lesson description	The purpose of this lesson is to develop student teachers' ability toperform specific maintenance tasks. The lesson will be a purely hands on session		
Previous student teacher knowledge, prior learning (assumed)	Student teachers have the ability to use basic word processing features		
Possible barriers to learning in the lesson	Some student teachers may not have enough basic skills to use word processing software.		

Lesson Delivery – chosen to support student teachers in achieving the outcomes	Face-to-face [√]	Practical Activity [√]	Work-Based Learning	Seminars	Independent Study [√]	e-learning opportunities [√]	Practicum
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	**Face-to-face:** Using a tutor to guide students to explore a word processing package and create an educational artefact. There will be an opportunity for student teachers to explore other uses of a word processing software. **Practical work:** to enable student teachers to perform advanced word processing tasks **E-learning *opportunities*** – This will involve providing the student teachers with access to multimedia tutorials to support their learning.Multimedia tutorials can be shared with students (e.g. via mobile platforms) prior to class to enable student teachers with limited exposure to familiarise themselves with the content before the face to face session. **Independent study:**Tutor to direct student teachers to open educational resources (e.g. YouTube, MOOCS-Udemy/coursera, Khan academy, TESSA) to support independent study and practice both in and outside of class.						

• **Overarching outcome (what the student teachers are to achieve) serves as basis for the learning outcomes. An expanded version of the description.** • **Write in full aspects of the NTS addressed**	Demonstrate their ability to use advanced features of word processing applications to enhance their professional work, improve productivity, demonstrate professionalism and save time in the creation, production, review, and distribution of documents(NTS 2C, 2D, 3J).

• **Learning Outcome for the lesson, picked and developed from the course specification** • **Learning indicators for each learning outcome**	**Learning Outcomes**	**Learning Indicators**	**Identify cross cutting issues – core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?**
	Apply the concepts and techniques of maintenance	6.1 Plan and execute preventive and corrective maintenance	Computer literacy skills: through creating educational artefacts Respect and diversity: using group activities with members having diverse characteristics Exhibit professionalism in producing documents for teaching

Topic Title	Sub-topic	Stage/time	Teaching and learning activities to achieve outcomes depending on the delivery mode selected. Teacher-led collaborative group work or independent.	
			Teacher Activity	Student Activity
		20 minutes	**Questioning:** Tutor/lecturer uses questions to review maintenance concepts discussed in the last lesson	Student teachers provide responses to questions posed (PDP Theme 2)
Computer maintenance and optimisation II	5.3 Common maintenance activities	140 minutes	**E-learning:** Tutor shows a video tutorial on how perform various maintenance tasks (blowing, updating system and application utilities, optimisation etc). **Practical Work:** Tutor guides student teachers to perform each task on a computer system	Student teachers follow the video and perform various maintenance task on a computer system
		20 minutes	Tutor guides the student teachers to recap the discussions for the day	**Individual presentation:** Student teachers individually make reflective notes on the computer maintenance
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	**Formative Assessment: Reflection:** Student teachers write reflective notes on how word processing applications can be used in school.			
Instructional Resources	Images/ videos Projectors and computers			
Required Text (core)	Andrews, J. (2007). A+ guide to managing and maintaining your PC: Comprehensive edition. Boston, MA: Thomson Mueller S. (2011) *Upgrading and Repairing PCs (20th Ed)* Pearson Education Shelly, R., Cashman, T.J., Gunter, G.A., and Gunter, R.E. (2013). Teachers Discovering Computers. Thomson Course Technology.			
Additional Reading List	Andrews, J., & Verge, T. (2007). A+ guide to managing and maintaining your PC: Comprehensive – Lab Manual. Boston, MA: Thomson Selected articles and online resources (youtube.com, MOOCs: Khan Academy, TESSA, Udemy etc) T-TEL (2015), Questioning, Handbook for PD Coordinators T-TEL (2016), Group Work, Handbook for PD Coordinators			
CPD needs	Writing reflective notes Participating in a community of practice/conferences and accessing up to date tutorials, online magazines(E-zines) and journals to obtain content and software updates. Team teaching and lesson observation to improve instructional strategies and practices.			

LESSON 9

Year of B.Ed.	4	Semester	2	Place of lesson in semester	1 2 3 4 5 6 7 8 **9** 10 11 12

Title of Lesson	Computer maintenance and optimisation III		Lesson Duration	3 hours
Lesson description	The purpose of this lesson is to introduce student teachers to a presentation application.			
Previous student teacher knowledge, prior learning (assumed)	Student teachers have an understanding of how computers work in terms of hardware and software (system software and application software).			
Possible barriers to learning in the lesson	Some student teachers may have very limited skillsand practice time using a computer.			

Lesson Delivery – chosen to support student teachers in achieving the outcomes	Face-to-face [√]	Practical Activity [√]	Work-Based Learning	Seminars	Independent Study [√]	e-learning opportunities [√]	Practicum

Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	**Face-to-face:**Tutor guides students to explore a word processing package and create an educational artefact. There will be an opportunity for student teachers to explore other uses of a word processing software. **Independent study:** to enable student teachers to perform simple word processing tasks **E-learning *opportunities*** – This will involve providing the student teachers with access to multimedia tutorials to support their learning. Multimedia tutorials can be shared with students (e.g. via mobile platforms) prior to class to enable student teachers with limited exposure to familiarise themselves with the content before the face to face session. **Independent study:**Tutor to direct student teachers to open educational resources (e.g. YouTube, MOOCS-Udemy/coursera, Khan academy, TESSA) to support independent study and practice both in and outside of class.

• **Overarching outcome (what the student teachers are to achieve) serves as basis for the learning outcomes. An expanded version of the description.** • **Write in full aspects of the NTS addressed**	Be able to use a presentation application to create simple documents.

• **Learning Outcome for the lesson, picked and developed from the course specification** • **Learning indicators for each learning outcome**	Learning Outcomes	Learning Indicators	Identify cross cutting issues – core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?
	Identify and apply the tools and test equipment associated with PC repair andmaintenance activity.	• 5.1 Repair basic PC faults	Computer literacy skills: through creating educational artefacts Respect and diversity: using group activities with members having diverse characteristics.

Topic Title	Sub-topic	Stage/time	Teaching and learning activities to achieve outcomes depending on the delivery mode selected. Teacher-led collaborative group work or independent work.	
			Teacher Activity	Student Activity
Computer maintenance and optimisation III	Introduction to presentation software (uses and advantages of presentation software)	20 minutes	**Face-to face:** Tutor/lecturer uses questions to recap maintenance tasks and concepts	Student teachers to engage in discussion and questions and toto recap maintenance tasks and concepts

	5.3 Managing and Supporting basic operating systems problems 5.3.1 The boot process issues 5.3.2 MBR corruption 5.3.3 Boot sector corruption 5.3.4 System file corruption 5.3.5 Crashes or hangs 5.3.6 Driver or service startup failure 5.3.7 Logon problems	140minutes	**e-learning:** Tutor shows a video tutorial on various operating system problems including boot process issues, MBR corruption, Boot sector corruption, System file corruption Crashes or hangs, Driver or service start-up failure and Logon problems. **Individual practical work:** Tutor then engages in a discussion of managing the various operating system issues.	**Practical Work:** Student teachers follow videoand engages in a discussion of managing the various operating system issues.
	Closure	20 minutes	Tutor guides the student teachers to recap the discussions for the day	**Individual presentation:** Student teachers individually make reflective notes on operating system problems

Lesson assessments – evaluation of learning: of, for and as learning within the lesson	**Formative Assessment:** (NTS 2C, 2D, 3J) Student teachers produce reflective notes on operating systems problems
Instructional Resources	Images/ videos Projectors and computers
Required Text (core)	Andrews, J. (2007). A+ guide to managing and maintaining your PC: Comprehensive edition. Boston, MA: Thomson Mueller S. (2011) *Upgrading and Repairing PCs (20th Ed)* Pearson Education Shelly, R., Cashman, T.J., Gunter, G.A., and Gunter, R.E. (2013). Teachers Discovering Computers. Thomson Course Technology.
Additional Reading List	Andrews, J., & Verge, T. (2007). A+ guide to managing and maintaining your PC: Comprehensive – Lab Manual. Boston, MA: Thomson Selected articles and online resources (youtube.com, MOOCs: Khan Academy, TESSA, Udemy etc) T-TEL (2015), Questioning, Handbook for PD Coordinators T-TEL (2016), Group Work, Handbook for PD Coordinators
CPD needs	Writing reflective notes Participating in a community of practice/conferences and accessing up to date tutorials, online magazines(E-zines) and journals to obtain content and software updates. Team teaching and lesson observation to improve instructional strategies and practices.

LESSON 10

Year of B.Ed.	4	Semester	2	Place of lesson in semester	1 2 3 4 5 6 7 8 9 **10** 11 12

Title of Lesson	Laboratory Configuration and Management I		Lesson Duration	3 hours
Lesson description	The purpose of this lesson is to develop student teachers' ability to work with more advanced presentation software features.			
Previous student teacher knowledge, prior learning (assumed)	Student teachers have the ability to use basic presentation application features			
Possible barriers to learning in the lesson	Some student teachers may not have enough basic presentation application skills.			

Lesson Delivery – chosen to support student teachers in achieving the outcomes	Face-to-face [√]	Practical Activity [√]	Work-Based Learning	Seminars	Independent Study [√]	e-learning opportunities [√]	Practicum

Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	**Face-to-face:** Using a tutor to guide students to explore a presentation package and create a presentation for alesson. There will be an opportunity for student teachers to explore other uses of a presentation software. **Practical work:** to enable student teachers to perform advanced word processing tasks **E-learning *opportunities*** – This will involve providing the student teachers with access to multimedia tutorials to support their learning. Multimedia tutorials can be shared with students (e.g. via mobile platforms) prior to class to enable student teachers with limited exposure to familiarise themselves with the content before the face to face session. **Independent study:**Tutor to direct student teachers to open educational resources (e.g. YouTube, MOOCS-Udemy/coursera, Khan academy, TESSA) to support independent study and practice both in and outside of class.

• **Overarching outcome (what the student teachers are to achieve) serves as basis for the learning outcomes. An expanded version of the description.** • **Write in full aspects of the NTS addressed**	Demonstrate their ability to create effective, high-impact and interactive presentations that will better engage and involve an audience using advanced presentation application features.

• **Learning Outcome for the lesson, picked and developed from the course specification** • **Learning indicators for each learning outcome**	**Learning Outcomes**		**Learning Indicators**	**Identify cross cutting issues – core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?**
	Install, configure/customize system and application software		3.10Install and configure operating systems & device drivers • Install application software	Computer literacy skills: through creating educational artefacts. Respect and diversity: using group activities with members having diverse characteristics. Exhibit professionalism in producing documents for teaching.

Topic Title	Sub-topic	Stage/time	Teaching and learning activities to achieve outcomes depending on the delivery mode selected. Teacher-led collaborative group work or independent.	
			Teacher Activity	**Student Activity**
Laboratory Configuration and Management I	Recap of knowledge of operating systems problems	20 minutes	**Face-to face:** Tutor/lecturer uses questions to review knowledge of operating systems problems	Student teachers listen and answer questions.

	Laboratory configurations for teaching and learning	140 minutes	**E-learning:** Tutor shows a video tutorial on the different configurations of computer laboratories in school and how advantages and disadvantages in supporting learning. **Discussions:** Tutor put class into small diverse groups and guides student teachers to discusses the computer laboratory configuration in their school and how it is working and how they can be improved.	**E-learning:** student teacher watch video tutorial on the different configurations of computer laboratories in school. **Discussions:**Student teacher in their groups discuss the computer laboratory configuration in their school and how it is working and how they can be improved.
		20 minutes	Tutor guides the student teachers to recap the discussions for the day	**Individual presentation:** Student teachers in groups develop a wiki on the *"advantages and disadvantages of various computer laboratory configurations"*
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	**Summative Assessment:Wiki**Group wiki on *"advantages and disadvantages of various computer laboratory configurations*.			
Instructional Resources	Images/ videos Projectors and computers			
Required Text (core)	Andrews, J. (2007). A+ guide to managing and maintaining your PC: Comprehensive edition. Boston, MA: Thomson Mueller S. (2011) *Upgrading and Repairing PCs (20th Ed)* Pearson Education Shelly, R., Cashman, T.J., Gunter, G.A., and Gunter, R.E. (2013). Teachers Discovering Computers. Thomson Course Technology.			
Additional Reading List	Andrews, J., & Verge, T. (2007). A+ guide to managing and maintaining your PC: Comprehensive – Lab Manual. Boston, MA: Thomson Selected articles and online resources (youtube.com, MOOCs: Khan Academy, TESSA, Udemy etc) T-TEL (2015), Questioning, Handbook for PD Coordinators T-TEL (2016), Group Work, Handbook for PD Coordinators			
CPD needs	Writing reflective notes Participating in a community of practice/conferences and accessing up to date tutorials, online magazines(E-zines) and journals to obtain content and software updates. Team teaching and lesson observation to improve instructional strategies and practices.			

LESSON 11

Year of B.Ed.	4	Semester	2	Place of lesson in semester	1 2 3 4 5 6 7 8 9 10 **11** 12

Title of Lesson	Laboratory Configuration and Management III	Lesson Duration	3 hours
Lesson description	The purpose of this lesson is to introduce student teachers to a spreadsheet application.		
Previous student teacher knowledge, prior learning (assumed)	Student teachers have an understanding of how computers work in terms of hardware and software (system software and application software).		
Possible barriers to learning in the lesson	Some student teachers may have very limited skill and experience using a computer.		

Lesson Delivery – chosen to support student teachers in achieving the outcomes	Face-to-face [√]	Practical Activity [√]	Work-Based Learning	Seminars	Independent Study [√]	e-learning opportunities [√]	Practicum

Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	**Face-to-face:**Tutor to guide students to explore a word processing package and create an educational artefact. There will be an opportunity for student teachers to explore other uses of a word processing software. **Independent study:** to enable student teachers to perform simple word processing tasks **E-learning *opportunities*** – This will involve providing the student teachers with access to multimedia tutorials to support their learning. Multimedia tutorials can be shared with students (e.g. via mobile platforms) prior to class to enable student teachers with limited exposure to familiarise themselves with the content before the face to face session. **Independent study:**Tutors to direct student teachers to open educational resources (e.g. YouTube, MOOCS-Udemy/coursera, Khan academy, TESSA) to support independent study and practice both in and outside of class.

• Overarching outcome (what the student teachers are to achieve) serves as basis for the learning outcomes. An expanded version of the description. • Write in full aspects of the NTS addressed	Be able to use a spreadsheetapplication to create simple documents (NTS 2C, 2D, 3J).

• Learning Outcome for the lesson, picked and developed from the course specification • Learning indicators for each learning outcome	**Learning Outcomes**	**Learning Indicators**	**Identify cross cutting issues – core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?**
	Install, configure/customize system and application software	3.11Install and configure operating systems & device drivers • Install application software	Computer literacy skills: through creating educational artefacts Respect and diversity: using group activities with members having diverse characteristics.

Topic Title	Sub-topic	Stage/time	Teaching and learning activities to achieve outcomes depending on the delivery mode selected. Teacher-led collaborative group work or independent.	
			Teacher Activity	**Student Activity**
Laboratory Configuration and Management III	Introduction	20 minutes	**Questrioning:** Tutor/lecturer uses questions to recap concepts of laboratory configuration to support teaching and learning.	Student teachers provide responses to questions posed (PDP Theme 2).
	1.1. Software tools to manage computer laboratories	120 minutes	**E-learning:** Tutor shows a video tutorial on computer laboratory management software. **Individual practical work:** Tutor puts student teachers into groups to discuss how such software can be used to manage activities in the computer laboratory in the STS school..	Student teachers follow video, identify the feature of the computer laboratory software and discuss in their groups how such software can be used to manage activities in the computer laboratory in the STS school.
	Closure	20 minutes	Tutor guides the student teachers to recap the discussions for the day	**Individual presentation:** Student teachers individually make reflective notes "*using computer laboratory management software to manage their STS school computer laboratory".*
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	**Formative Assessment:** (NTS 2C, 2D, 3J) Student teachers write reflective notes "*using computer laboratory management software to manage their STS school computer laboratory".*			
Instructional Resources	Images/ videos Projectors and computers			
Required Text (core)	Andrews, J. (2007). A+ guide to managing and maintaining your PC: Comprehensive edition. Boston, MA: Thomson Mueller S. (2011) *Upgrading and Repairing PCs (20th Ed)* Pearson Education Shelly, R., Cashman, T.J., Gunter, G.A., and Gunter, R.E. (2013). Teachers Discovering Computers. Thomson Course Technology.			
Additional Reading List	Andrews, J., & Verge, T. (2007). A+ guide to managing and maintaining your PC: Comprehensive – Lab Manual. Boston, MA: Thomson Selected articles and online resources (youtube.com, MOOCs: Khan Academy, TESSA, Udemy etc) T-TEL (2015), Questioning, Handbook for PD Coordinators T-TEL (2016), Group Work, Handbook for PD Coordinators			
CPD needs	Writing reflective notes Participating in a community of practice/conferences and accessing up to date tutorials, online magazines(E-zines) and journals to obtain content and software updates. Team teaching and lesson observation to improve instructional strategies and practices.			

LESSON 12

<table>
<tr><td style="background-color:red">Year of B.Ed.</td><td>4</td><td style="background-color:red">Semester</td><td>2</td><td style="background-color:red">Place of lesson in semester</td><td>1 2 3 4 5 6 7 8 9 10 11 12</td></tr>
</table>

Title of Lesson	Laboratory Configuration and Management III	**Lesson Duration**	**3 hours**
Lesson description	The purpose of this lesson is to develop student teachers' ability to work with more advanced spreadsheet software features.		
Previous student teacher knowledge, prior learning (assumed)	Student teachers have the ability to use basic spreadsheet application features.		
Possible barriers to learning in the lesson	Some student teachers may not have enough basic spreadsheet application skills.		

Lesson Delivery – chosen to support student teachers in achieving the outcomes	Face-to-face [√]	Practical Activity [√]	Work-Based Learning	Seminars	Independent Study [√]	e-learning opportunities [√]	Practicum

Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	**Face-to-face:** Tutor to guide students to explore a presentation package and create a presentation for a lesson. There will be an opportunity for student teachers to explore other uses of a presentation software. **Practical work:** to enable student teachers to perform advanced word processing tasks **E-learning *opportunities*** – This will involve providing the student teachers with access to multimedia tutorials to support their learning. Multimedia tutorials can be shared with students (e.g. via mobile platforms) prior to class to enable student teachers with limited exposure to familiarise themselves with the content before the face to face session. **Independent study:** Tutors to direct student teachers to open educational resources (e.g. YouTube, MOOCS-Udemy/coursera, Khan academy, TESSA) to support independent study and practice both in and outside of class.

• **Overarching outcome (what the student teachers are to achieve) serves as basis for the learning outcomes. An expanded version of the description.** • **Write in full aspects of the NTS addressed**	Demonstrate the ability to use more advanced functions of spreadsheet applications which enable them to produce more sophisticated reports and to perform more advanced mathematical and statistical calculations, thus saving time and improving productivity(NTS 2C, 2D, 3J).

• **Learning Outcome for the lesson, picked and developed from the course specification** • **Learning indicators for each learning outcome**	**Learning Outcomes**	**Learning Indicators**	**Identify cross cutting issues – core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?**
	Install, configure/customize system and application software	3.12 Install and configure operating systems & device drivers • Install application software	Computer literacy skills: through creating educational artefacts Respect and diversity: using group activities with members having diverse characteristics. Exhibit professionalism in producing documents for teaching.

Topic Title	Sub-topic	Stage/time	Teaching and learning activities to achieve outcomes depending on the delivery mode selected. Teacher-led collaborative group work or independent.	
			Teacher Activity	Student Activity
Laboratory Configuration and Management III	Recap of knowledge of computer laboratory management software	20 minutes	**Face-to face:** Tutor/lecturer uses questions to review knowledge of computer laboratory management software	Student teachers provide responses to questions posed (PDP Theme 2)
	Health and safety when working with computers	140 minutes	**E-learning:** Tutor shows a video tutorial on the risks when repairing computers and how to mitigate those risks. **Practical Session:** Tutor guides student teachers to practice the risk mitigation measure.	Student teacherswatch videos on the risks when repairing computers and how to mitigate those risks.Students write reflective notes on "*risks exposed to when repairing computers and their mitigation measure*"
	Review: Proofing, Comments, Changes, etc.	20 minutes	Tutor guides the student teachers to recap the discussions for the day	**Individual presentation:** Student teachers individually make reflective notes on "*risks exposed to when repairing computers and their mitigation measure*"
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	**formative Assessment:** (NTS 2C, 2D, 3B, 3J) • Quiz to evaluate knowledge on Installing system and application software • Students write reflective notes on "*risks exposed to when repairing computers and their mitigation measure*"			
Instructional Resources	Images/ videos Projectors and computers			
Required Text (core)	Andrews, J. (2007). A+ guide to managing and maintaining your PC: Comprehensive edition. Boston, MA: Thomson Mueller S. (2011) *Upgrading and Repairing PCs (20th Ed)* Pearson Education Shelly, R., Cashman, T.J., Gunter, G.A., and Gunter, R.E. (2013). Teachers Discovering Computers. Thomson Course Technology.			
Additional Reading List	Andrews, J., & Verge, T. (2007). A+ guide to managing and maintaining your PC: Comprehensive – Lab Manual. Boston, MA: Thomson Selected articles and online resources (youtube.com, MOOCs: Khan Academy, TESSA, Udemy etc) T-TEL (2015), Questioning, Handbook for PD Coordinators T-TEL (2016), Group Work, Handbook for PD Coordinators			
CPD needs	Writing reflective notes Participating in a community of practice/conferences and accessing up to date tutorials, online magazines(E-zines) and journals to obtain content and software updates. Team teaching and lesson observation to improve instructional strategies and practices.			
Course assessment	[1]**Component 1:** Portfolio Assessment: (30% overall score) • Selected items of students work (3 of them – 10% each)- 30% • Midterm Assessment – 20% • Reflective Journal – 40% • Organisation of subject portfolio – 10% (how it is presented/organized) [2]**Component 2: Subject Project (30% overall semester score)** • Introduction a clear statement of aim and purpose of the project – 10%			

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[1] See rubric on Subject Portfolio Assessment in Annex 6 of NTEAP
[2] See rubric on Subject Project Assessment in Annex 6 of NTEAP

| | Methodology: what the student teacher has done and why to achieve the purpose of the project – 20% Substantive or main section – 40% Conclusion – 30% **Component 3: End of Semester Examination – 40% overall** |