YEAR 4

Semester 2

Four-Year B.Ed. Course Manual

ICE: LEGAL AND SECURITY ISSUES IN ICT

T-TEL
Transforming Teacher Education and Learning

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.

Professor Mohammed Salifu Executive Secretary

National Council for Tertiary Education

ACKNOWLEDGEMENTS

The course Manuals were developed over several months through the collaborative efforts of a team of individuals from colleges of education, university of Ghana, Kwame Nkrumah university of science and technology, university of education, Winneba, and university of development studies. they were produced in association with the national council for tertiary education of the Ministry of education, Ghana.

A participatory team approach was used to produce this set of resources for tutors/lecturers, mentors, and student teachers. We are grateful to the specialists who contributed their knowledge and expertise.

Special thanks to Professor Jophus Anamuah-Mensah - T-Tel Key Advisor, Dr. Eric Daniel Ananga - T-Tel Key Advisor for Curriculum reform and Beatrice Noble-Rogers who provided key editorial, review and content input and facilitated the process of drafting and finalising the course Manual.

Patricia Appiah-Boateng and Gameli Samuel Hahomene, served as typesetting and formatting coordinators and designed and produced the illustrations, tables, and other graphics which appear in the pages. they spent time and effort designing and redesigning the graphic layout and producing the camera-ready copy resulting in a set of materials that are easy to use, read, and reference.

Thanks also goes to all T-Tel staff members who worked to support production of these course manuals, particularly Beryl Opong-Agyei and Gideon Okai. Their frankness and co-operative attitude complimented the team approach used to produce this manual.

We are indebted to the Ministry of education and the national council for Tertiary education, (NCTE) for the general support and specific helpful advice provided during production of the course Manuals. recognition and thanks must go to chief technical advisor for T-TEL and Policy advisor to the national education reform secretariat, Prof. Mohammed Salifu the executive secretary of NCTE and Mr. Jerry Sarfo the coordinator for the colleges of education, who in diverse ways supported during the course Manual writing workshops.

In addition to all the staff who participated visibly in the development of these materials we would like to acknowledge all those people from the many colleges of education and universities in which we have worked who have, directly or indirectly, shared their views on the curriculum with us.

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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 ……

A.Course Information

Title Page

i. 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. In doing this to instil in new teachers the Nation's core values of honesty, integrity, creativity and responsible citizenship and to achieve inclusive, equitable, high quality education for all learners

ii. Course Details

Course name	LEGAL AND SECURITY ISSUES IN ICT						
Pre-requisite	TECHNOLOGY LEADERSHIP AND MANAGEMENT						
Course Level	400	Course Code		Credit Value	3	Semester	2

Table of contents

1. Goal for the Subject or Learning Area

This course provides understanding of the fundamentals of information security. This will be accomplished by defining key terms, explaining essential concepts, and providing the knowledge and understanding of information security. The course will also discuss access control devices commonly deployed by modern operating systems, and new technologies that can provide strong authentication to existing implementations. **(*National Teachers' Standard: 2c, 2e, 3a, 3e, 3h, 3i, 3k, 3p/ NTECF: Pillar 1, 2 & 3, crosscutting issues; Core skills, Assessment.***

2. Key contextual factors

There is a high mobile communication device ownership in the 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 can be categorised as low technology-rich learning environment particularly in the public schools.

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

a. There is an intra-national digital divide (Rich/Poor, Male/Female, Urban/Rural, SEN/Typical)

b. Generally, there is low internet connectivity especially in the rural communities.

c. Most schools lack computing facilities.

d. Some schools do not have electricity supply

e. Existing facilities do not favour people with disability

Student teachers will be prepared with technology integration strategies in the classroom as well as the theories thereof.

3. Course Description

This course examines the various definitions and categorizations of firewall technologies and the architectures under which firewalls may be deployed. The course also discusses security technologies by examining the concept of the intrusion, and the technologies necessary to prevent, detect, react, and recover from intrusions. Specific types of intrusion detection and prevention systems (IDPSs)—the host IDPS, network IDPS, and application IDPS. This course explores national laws that guide the field and use of ICT, and presents a detailed examination of the computer ethics that the users and those who implement information security must adhere to. **(*National Teachers' Standard: 1a, 1b, 3b, 3c, 3e, 3d, 3n/NTECF: Pillar crosscutting issues; Core skills, Professional values and attitudes)*.** This course will be taught through interactive discussions, seminars and presentation of the various concepts to student-teachers. The course will be assessed through assignments, quizzes and classroom exercises to evaluate student-teachers' understanding and knowledge of Information security concepts.

4. *Core and transferable skills and cross cutting issues, including equity and inclusion*

Digital literacy of student teachers will be enhanced by giving them opportunities to surf and present information across units using various digital tools

Critical thinking is developed in student teachers when they collect data, analyse and reflect on interventions.

Collaboration is fostered through assigning group projects and presentation of various topics across units and encouraging a healthy school-community relationship

Communicative skills of student teacher would be enhanced through the examination, interrogation and presentation of their misconceptions and philosophies

Personal development & Enquiry skills in action research would be fostered acquiring skills for collecting data, analysing and initiating interventions for individual children and small groups.

Respect for diversity and Individual differences would be engendered in student teachers by applying appropriate interventions, examining and reflecting their usefulness

Honesty and Accountability would be fostered by stating the regulations regarding fair use as well as, presentation of a project report on compliance with acceptable use policies and other guidelines.

5. Course Learning Outcomes	Indicators The following will be used to measure the achievement of the learning outcomes
CLO1 Understand the principles of Information security concepts. ***(NTS 2b, 2c, 3b, 3c, 3d, 3e, 3h, 3i, 3k, 3n, 3p NTECF: Pillars 1, 2 & 3, crosscutting issues; Core skills, Assessment, Professional values and attitudes)***	1.1 Explain Information security concepts.
CLO2: Assess/evaluate the security status of information systems. ***(NTS 2b, 2c, 3b, 3c, 3d, 3e, 3h, 3i, 3k, 3n, 3p NTECF: Pillars 1, 2 & 3, crosscutting issues; Core skills, Assessment, Professional values and attitudes)***	2.1 Assess the risks and identify vulnerabilities of information assets Recommend appropriate protection for information assets
CLO3: Demonstrate knowledge and apply different security control systems to protect information systems ***(NTS 2b, 2c, 3b, 3c, 3d, 3e, 3h, 3i, 3k, 3n, 3p NTECF: Pillars 1, 2 & 3, crosscutting issues; Core skills, Assessment, Professional values and attitudes)***	3.1 Implement security controls to reduce the risks to information assets.
CLO 4: Demonstrate compliance of statutory, regulatory and institutional ICT requirements. **(NTS 1a, 1b, 1c, *NTECF: Pillar 4, crosscutting issues, Professional values and attitudes)***	4.1 Explain the legal issues and implications associated with use of ICT

6. Course Content

Unit/ Week	Topic	Sub-topic (if any)	Teaching and learning activity to achieve the learning outcomes
1	Security fundamental I	1.1 Information Security Principles 1.1.1Confidentiality, 1.1.2 Integrity, 1.1.3 Availability	Use interactive multimedia presentations to introduce student-teachers to Information Security Principles (C.I.A). Seminars (Talk for Learning) & interactive discussions (Games) to further examine the concept, video analysis (e.g. From YouTube) to introduce Information Security Principles (C.I.A).
.2	Security fundamental II	2.1 Security Concepts 2.1 Vulnerabilities 2.3 Threats 2.4 Threat Actors 2.5 Exploits 2.6 Risk	Use interactive multimedia presentations to introduce student-teachers to Security Concepts, Vulnerabilities, Threats, Threat Actors, Exploits and Risk. Seminars (Talk for Learning) & interactive discussions (Games) to further examine the methodologies and methods, video analysis (e.g. From YouTube) to elaborate the advantages/disadvantages of Security Concepts, Vulnerabilities, Threats, Threat Actors, Exploits and Risk.
3	Access Control Fundamentals (introduction to Accountability process) I	3.1 Subject and Object Definition 3.2 Accountability process 3.3 Identification 3.4 Authentication 3.5 Authorization 3.6 Auditing	Use Project-/problem- Based (Individual/Group Work) to analyzeSubject and Object Definition, Accountability process, Identification, Authentication, Authorization, and Auditingand design solution(s) for an identified educational problem. Use inquiry-based learning (Questioning) seminars (Talk for Learning), interactive discussions (Games), interactive multimedia presentations, tutorial and practical sessions, video analysis e.g. YouTube to discuss, Subject and Object Definition, Accountability process, Identification, Authentication, Authorization, and Auditing.

4	Access Control Fundamentals (Authentication types) II	4.1 Authentication by Knowledge 4.2 Authentication by Ownership 4.3Authentication by Characteristic	Use Project-/problem- Based (Individual/Group Work) to analyzeAuthentication by Knowledge, Authentication by Ownership, and Authentication by Characteristic. Use inquiry-based learning (Questioning) seminars (Talk for Learning), interactive discussions (Games), interactive multimedia presentations, tutorial and practical sessions, video analysis e.g. YouTube to discuss Authentication by Knowledge, Authentication by Ownership, and Authentication by Characteristic.
5	Access Control Fundamentals (Authentication methods) III	5.1 mechanisms for authentication(Multifactor Authentication)	Use interactive multimedia presentations, tutorial and practical sessions, video analysis e.g. YouTube to introduce students to mechanisms for authentication (Multifactor Authentication). Use inquiry-based learning (Questioning), seminars (Talk for Learning), interactive discussions (Games) to support deeper understanding of mechanisms for authentication (Multifactor Authentication).
6	Access Control Fundamentals (Authorisation & auditing methods) IV	6.1 Authorization 6.2 Auditing	Use interactive multimedia presentations, tutorial and practical sessions, video analysis e.g. YouTube to introduce students to Authorization, and Auditing. Use inquiry-based learning (Questioning), seminars (Talk for Learning), interactive discussions (Games) to support deeper understanding of Authorization, and Auditing.
7	Types of Information security controls (Logical Controls) I	7.1 Logical controls • Traditional Firewalls • Packet-Filtering Techniques • Application Proxies • Network Address Translation • Port Address Translation	Use interactive multimedia presentations, tutorial and practical sessions, video analysis e.g. YouTube to introduce students to Logical controls (Traditional Firewalls, Packet-Filtering Techniques, Application Proxies, Network Address Translation, and Port Address Translation). Use inquiry-based learning (Questioning), seminars (Talk for Learning), interactive discussions (Games) to support deeper understanding of Logical controls (Traditional Firewalls, Packet-Filtering Techniques, Application Proxies, Network Address Translation, and Port Address Translation).
8	Types of Information security controls (Physical & Administrative controls) II	8.1 Physical controls 8.2 Administrative controls (ICT policies and administrative processes & procedures)	Use interactive multimedia presentations, tutorial and practical sessions, video analysis e.g. YouTube to introduce students to Physical controls, and Administrative controls (ICT policies and administrative processes & procedures).Use inquiry-based learning (Questioning), seminars (Talk for Learning), interactive discussions (Games) to support deeper understanding of Physical controls, and Administrative controls (ICT policies and administrative processes & procedures).
9	Legal issues (Introduction, Child & Data protection) I	9.1 Cyberspace Privacy Laws and Issues 9.2 Child Protection Laws 9.3 Data protection laws (data protection Act 843)	Use interactive multimedia presentations, tutorial and practical sessions, video analysis e.g. YouTube to introduce students to Cyberspace Privacy Laws and Issues, Child Protection Laws, and Data protection laws (data protection Act 843). Use inquiry-based learning (Questioning), seminars (Talk for Learning), interactive discussions (Games) to support deeper understanding of Cyberspace Privacy Laws and Issues, Child Protection Laws, and Data protection laws (Data protection Act 843).
10	Legal issues (Electronic Communications) II	10.1 Electronic communications laws (electronic communications act 775)	Use interactive multimedia presentations to introduce student-teachers to Electronic communications laws (electronic communications act 775). Seminars (Talk for Learning) & interactive discussions (Games) to further examine the models, video analysis (e.g. From YouTube) to examine Electronic communications laws (electronic communications act 775).

11	Legal issues (Contracts) III	11.1Law of Contract (Act 25, 1960)	Use interactive multimedia presentations to introduce student-teachers to Law of Contract (Act 25, 1960). Seminars (Talk for Learning) & interactive discussions (Games) to further examine the models, video analysis (e.g. From YouTube) to examine Law of Contract (Act 25, 1960).
12	Legal issues (Anti-spam & privacy) IV	12.1 Anti-Spam laws Analyze Privacy policies • Opt in vs Opt out • International impact on privacy policies • Legality and ethics of spyware and other malware • Privacy vs civil liberties RFID (Radio Frequency ID) issues	Use interactive multimedia presentations to introduce student-teacher to Anti-Spam laws (Analyze Privacy policies). Seminars (Talk for Learning) & interactive discussions (Games) to further examine the concepts, video analysis (e.g. From YouTube) to elaborate Anti-Spam laws (Analyze Privacy policies).

7. Teaching and Learning Strategies

- Individual and group presentations
- Concept cartoons and concept maps
- Cooperative learning
- Think-pair-share
- Talk for learning approaches- always, sometimes, never true, convince yourself, convince a friend; pyramid discussion etc

8. 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. ICT Security and ICT law documents developed from projects.
b. Observation of school visit.
c. reflective notes on application of ICT security and law
d. Presentations from Video Analysis, individual and group work on ICT security and Law concepts.
e. Tests/quizzes and class exercises to examine
f. Assignments and group work to evaluate their understanding technology leadership and 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: Identify, investigate and develop various management documents like ICT policies, security plans, review of ICT related law etc

Weighting: 30%

Assesses Learning Outcomes: CLO 3, CLO 4

Component 3: End of Semester Examination – 40% overall

Summary of Assessment Method:

A written assessment to assess student teacher's basics of information security and IT related legal issues knowledge and understanding the various concepts of technology leadership and management

Weighting: 40 %

Assesses Learning Outcomes: CLO1, CLO2

9. Required Reading and Reference List

Whitman, Michael E., and Herbert J. Mattord. *Principles of information security* (4th ed.). Cengage Learning, 2011.

Parliament of Ghana (2012). Data Protection Act, 2012 (Act 843), Retrieve from Ghana Data Protection Commission website: https://www.dataprotection.org.gh/data-protection-act

Parliament of Ghana (2008). Electronic communications act 2008 (775), Retrieve from website: https://www.moc.gov.gh/ , https://nca.org.gh/

Parliament of Ghana. Law of Contract (act 25, 1960), Retrieve from http://laws.ghanalegal.com/acts/id/18/contracts-act

10. **Additional Reading List**

Anderson, Ross J. *Security engineering: a guide to building dependable distributed systems*. John Wiley & Sons, 2010.

Selected articles and online resources (youtube.com, MOOCs: Khan Academy, TESSA, Udemy etc)

11. Teaching and Learning resources

- Smartphones
- Laptops
- Desktop computers
- Tablets
- TV and Radio
- Open Educational Resources (Including: YouTube, MOOCS-Udemy/coursera, khan academy, TESSA)
- The iBox (CENDLOS)
- Productivity tools
- Subject based application software
- Instructional Laboratories (with multimedia equipment and smartboards)
- Google Classroom

12. Course related professional development for tutors/ lecturers

- Development of Concept Maps/ Concept cartoons Charts/ technical/action research report writing.
- Appreciating the place of cross cutting issues in the CLOs and Teaching -Learning Activities/ Assessment component requirement for active learning/ model teaching to reflect the desired PCK student – teachers require to learn for teaching.

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	Security fundamentals I				**Lesson Duration**	**3 Hours**	
Lesson description	In this lesson, Student teachers will be introduced to security fundamentals I. It assumes student-teachers have prior knowledge on computer security. This first lesson introduces student teachers to the course learning outcomes and the 3 assessment components of the course.**(*National Teachers' Standard: 1a, 1b, 3b, 3c, 3e, 3d, 3n/NTECF: Pillar crosscutting issues; Core skills, Professional values and attitudes)*.**						
Previous student teacher knowledge, prior learning (assumed)	Student teachers have taken the Application Development in Education course.						
Possible barriers to learning in the lesson	Some student teachers might not have had knowledge and understanding of Information Security in Education and its impact on teaching and learning.						
Lesson Delivery – chosen to support students in achieving the outcomes	**Face-to-face [√]**	**Practical Activity [√]**	**Work-Based Leaning**	**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 –** Both teacher and student-led approaches such as discussions of varying kinds should be used. **E-learning opportunities -**Student teachers would watch videos on YouTube/videos about responsible use of technology systems. **Seminars –** Both individual and group presentation of projects should be encouraged. **Practical Activity**- student teachers will review work samples of other student teachers to explain progress or barriers to learning **Group work:** put student teachers in small groups to examine various issues both in a face to face class and also online. Create a social media group for each group (e.g. Facebook, WhatsApp, Telegram) to enable them 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 student 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 you want the students 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 will ; Explain Information security concepts. ***(NTS 2b, 2c, 3b, 3c, 3d, 3e, 3h, 3i, 3k, 3n, 3p NTECF: Pillars 1, 2 & 3, crosscutting issues; Core skills, Assessment, Professional values and attitudes)***						
• **Learning Outcome for the lesson, picked and developed from the course specification** • **Learning indicators for each learning outcome**	**Learning Outcomes**		**Learning Indicators**		Identify which cross cutting issues – core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?		
	CLO1: Understand the principles of Information security concepts ***(NTS 2b, 2c, 3b, 3c, 3d, 3e, 3h, 3i, 3k, 3n, 3p NTECF: Pillars 1, 2 & 3, crosscutting issues; Core skills, Assessment, Professional values and attitudes)***		1.1 Explain Information security concepts.		Acquire skills in addressing equity and gender issues, use ICT tools to equity and inclusion, develop critical thinking, problem solving, creativity, collaboration skills and reflective practice.		

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 mins	**Questioning:** Tutor uses questioning to introduce the Course Manual and review student teacher's experience with a computer software used in learning. (PDG Theme 2)	**Questioning:** Student teacher answers questions and explores their experience on how they have used software in the past to support their learning.
	Information Security Principles Confidentiality Integrity Availability	20 Mins	**e-learning & groupwork** Tutor shows student teachers short videos from YouTube explaining what Information security principles means. Class is then put into small diverse groups to discuss information security principles.	**e-learning & groupwork** Student teachers watch videos from YouTube explaining what Information security principles means. They then discuss in their groups information security principles with examples learning drawing from their own experiences and how software can support learning in their STS visit.
		120 Mins	**e-learning & Face-to-face** Tutor shows a video on these three key information security principles (Confidentiality, Integrity, and Availability). Tutor leads the Student teachers to discuss the information security principles (Confidentiality, Integrity, and Availability) considering what the pros and cons in information security principles (Confidentiality, Integrity, and Availability). Student teachers then discuss in their groups the tasks they will undertake to effectively ensure information security principles (Confidentiality, Integrity, and Availability).	**e-learning & Face-to-face** Student teacher watches a video on information security principles (Confidentiality, Integrity, and Availability). Tutor leads the Student teachers to discuss the information security principles (Confidentiality, Integrity, and Availability) considering what the pros and cons in the information security principles (Confidentiality, Integrity, and Availability). Student teachers then discuss in their groups the tasks they will undertake to effectively ensure information security principles (Confidentiality, Integrity, and Availability). Student teachers then develop a wiki on information security principles (Confidentiality, Integrity, and Availability) implications for teaching and learning."

	Lesson Closure	20 Mins	**Questioning:** Tutor uses questioning to summarise and recap the concepts covered for the lesson	**Questioning:** Student teacher responds to questions to summarise and recap the concepts covered for the lesson.
Lesson assessments – evaluation of learning: of, for and as learning within the lesson				
Instructional Resources	i. Smartphones ii. Laptops iii. Desktop computers iv. Tablets v. TV and Radio vi. Open Educational Resources (Including: YouTube, MOOCS-Udemy/coursera, khan academy, TESSA) vii. The iBox (CENDLOS) viii. Productivity tools ix. Subject based application software x. Instructional Laboratories (with multimedia equipment and smartboards)			
Required Text (core)	Whitman, Michael E., and Herbert J. Mattord. *Principles of information security* (4th ed.). Cengage Learning, 2011. Parliament of Ghana (2012). Data Protection Act, 2012 (Act 843), Retrieve from Ghana Data Protection Commission website: https://www.dataprotection.org.gh/data-protection-act Parliament of Ghana (2008). Electronic communications act 2008 (775), Retrieve from website: https://www.moc.gov.gh/ , https://nca.org.gh/ Parliament of Ghana. Law of Contract (act 25, 1960), Retrieve from http://laws.ghanalegal.com/acts/id/18/contracts-act			
Additional Reading List	Anderson, Ross J. *Security engineering: a guide to building dependable distributed systems*. John Wiley & Sons, 2010. Selected articles and online resources (youtube.com, MOOCs: Khan Academy, TESSA, Udemy etc)			
CPD needs	Need for seminar on information security principles , confidentiality , integrity, and availability Writing reflective notes Participating in a community of practice/conferences and accessing online magazines (E-zines) & journals to obtain up to date content on information security principles , Confidentiality, Integrity, and Availability Team teaching and lesson observation to improve instructional strategies & practices. Supporting student teachers in collaborating in designing and developing a wiki.			

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	Security fundamental II				**Lesson Duration**	**3 Hours**	
Lesson description	In this lesson, Student teachers will examine the various security concepts in Information Technology.						
Previous student teacher knowledge, prior learning (assumed)	Student teachers have been Introduced to information security principles (Confidentiality, integrity, and Availability)						
Possible barriers to learning in the lesson	Some student teachers might not have had knowledge and understanding of Security Concepts in Education and its impact on teaching and learning.						
Lesson Delivery – chosen to support students in achieving the outcomes	**Face-to-face [√]**	**Practical Activity [√]**	**Work-Based Leaning**	**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 –** Both teacher and student-led approaches such as discussions of varying kinds should be used. **E-learning opportunities -**Student teachers would watch videos on YouTube/videos about responsible use of technology systems. **Seminars –** Both individual and group presentation of projects should be encouraged. **Practical Activity**- student teachers will review work samples of other student teachers to explain progress or barriers to learning **Group work:** put student teachers in small groups to examine various issues both in a face to face class and also online. Create a social media group for each group (e.g. Facebook, WhatsApp, Telegram) to enable them 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 student 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 you want the students 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 will : Assess the risks and identify vulnerabilities of information assets and Recommend appropriate protection for information assets ***(NTS 2b, 2c, 3b, 3c, 3d, 3e, 3h, 3i, 3k, 3n, 3p NTECF: Pillars 1, 2 & 3, crosscutting issues; Core skills, Assessment, Professional values and attitudes)***						
● **Learning Outcome for the lesson, picked and developed from the course specification** ● **Learning indicators for each learning outcome**	**Learning Outcomes**		**Learning Indicators**		Identify which cross cutting issues – core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?		
	CLO2: Assess/evaluate the security status of information systems. ***(NTS 2b, 2c, 3b, 3c, 3d, 3e, 3h, 3i, 3k, 3n, 3p NTECF: Pillars 1, 2 & 3, crosscutting issues; Core skills, Assessment, Professional values and attitudes)***		Assess the risks and identify vulnerabilities of information assets Recommend appropriate protection for information assets		These strategies will respond to inclusivity and equity (ie ICT as a tool for expanding learning to diverse learners eg. People with visual impairment, dyslexia, dysgraphia). Identify the instances when personal, cultural, and institutionalized discrimination are creating and/ or sustaining disadvantages for some student-teachers		

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**
	Recap of previous week	20 Mins	**Face-to-Face:** Discussion of wikis developed from the previous lesson. Tutor leads brainstorming session to identify the information security principlesdiscussed in the previous week.	**Face-to-Face:** Student teachers present the wikis developed from the previous lesson. They take part in the brain storming session to identify information security principles discussed in the previous week.
	Security Concepts 1. Vulnerabilities 2. Threats 3. Threat Actors 4. Exploits 5. Risk	40 Mins	**e-learning & Face-to-face** Tutor shows a video on Vulnerabilities. Student teachers then discuss in their groups Vulnerabilities in ICT and under which circumstances recommendations can be made.	**e-learning & Face-to-face** Student teacher watches a video on Vulnerabilities. Student teachers then discuss in their groups Vulnerabilitiesin ICT drawing from their experiences in the school. They also discuss under which circumstances recommendations can be made.
		40 Mins	**e-learning & Face-to-face** Tutor shows a video on what Threats means in ICT.Student teachers then discuss in their groups Threats and under which circumstances recommendations can be made.	**e-learning & Face-to-face** Student teacher watches a video on Threats means in ICT.Student teachers then discuss in their groups Threatsand under which circumstances recommendations can be made.
		60 Mins	**e-learning & Face-to-face** Tutor shows a video on what Threat Actors, Exploits, and Risk are. Student teachers then discuss in their groups Threat Actors, Exploits, and Risk and under which circumstances they will affect information security.	**e-learning & Face-to-face** Student teacher watches a video on what Threat Actors, Exploits, and Risk are. Student teachers then discuss in their groups Threat Actors, Exploits, and Risk and under which circumstances they will affect information security.
	Lesson Closure	20 Mins	**Questioning:** Tutor uses questioning to summarise and recap the concepts covered for the day and tasks students to write reflective notes on security concepts.	**Questioning:** Student teacher responds to questions to summarise and recap the concepts covered for the day write reflective notes on security concepts.

Lesson assessments – evaluation of learning: of, for and as learning within the lesson	
Instructional Resources	i. Smartphones ii. Laptops iii. Desktop computers iv. Tablets v. TV and Radio vi. Open Educational Resources (Including: YouTube, MOOCS-Udemy/coursera, khan academy, TESSA) vii. The iBox (CENDLOS) viii. Productivity tools ix. Subject based application software x. Instructional Laboratories (with multimedia equipment and smartboards) xii. Google Classroom
Required Text (core)	Whitman, Michael E., and Herbert J. Mattord. *Principles of information security* (4th ed.). Cengage Learning, 2011. Parliament of Ghana (2012). Data Protection Act, 2012 (Act 843), Retrieve from Ghana Data Protection Commission website: https://www.dataprotection.org.gh/data-protection-act Parliament of Ghana (2008). Electronic communications act 2008 (775), Retrieve from website: https://www.moc.gov.gh/ , https://nca.org.gh/ Parliament of Ghana. Law of Contract (act 25, 1960), Retrieve from http://laws.ghanalegal.com/acts/id/18/contracts-act
Additional Reading List	Anderson, Ross J. *Security engineering: a guide to building dependable distributed systems*. John Wiley & Sons, 2010. Selected articles and online resources (youtube.com, MOOCs: Khan Academy, TESSA, Udemy etc)
CPD needs	Need for seminar on security concepts, vulnerabilities etc Writing reflective notes Participating in a community of practice/conferences and accessing online magazines (E-zines) & journals to obtain up to date content on security concepts , vulnerabilities etc Team teaching and lesson observation to improve instructional strategies & practices. Supporting student teachers in collaborating in designing and developing a wiki.

LESSON 3

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	Access Control Fundamentals (introduction to Accountability process) I					**Lesson Duration**	**3 Hours**
Lesson description	In this lesson, student teachers will examine Access Control Fundamentals.**(*National Teachers' Standard: 1a, 1b, 3b, 3c, 3e, 3d, 3n/NTECF: Pillar crosscutting issues; Core skills, Professional values and attitudes)*.**						
Previous student teacher knowledge, prior learning (assumed)	Student –teachers have been introduced to Security fundamental II (Threat Actors, Exploits, and Risk)						
Possible barriers to learning in the lesson	Some student teachers might not have had knowledge and understanding of Access control fundamentals inICT and its impact on teaching and learning.						
Lesson Delivery – chosen to support students in achieving the outcomes	**Face-to-Face [√]**	**Practical work [√]**	**Work Based**	**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:** lecturette, discussions and other talk for learning approaches should be employed **Practical Activity:** Individual and group activities involving surfing the internet for current technological trends shaping education. **E-learning opportunities:** information and other related material would be gleaned from the internet using their phones and other digital devices. **Group work:** put student teachers in small groups to examine various issues both in a face to face class and also online. Create a social media group for each group (e.g. Facebook, WhatsApp, Telegram) to enable them 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 student 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 you want the students 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 will:** Demonstrate knowledge and apply different security control systems to protect information systems. ***(NTS 2b, 2c, 3b, 3c, 3d, 3e, 3h, 3i, 3k, 3n, 3p NTECF: Pillars 1, 2 & 3, crosscutting issues; Core skills, Assessment, Professional values and attitudes)***						
● **Learning Outcomes for the lesson, picked and developed from the course specification** ● **Learning indicators for each learning outcome**	**Learning Outcomes**			**Learning Indicators**		**Identify which cross cutting issues – core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?**	
	CLO3: Demonstrate knowledge and apply different security control systems to protect information systems.***(NTS 2b, 2c, 3b, 3c, 3d, 3e, 3h, 3i, 3k, 3n, 3p NTECF: Pillars 1, 2 & 3, crosscutting issues; Core skills, Assessment, Professional values and attitudes)***			Implement security controls to reduce the risks to information assets.		These strategies will respond to inclusivity and equity (ie ICT as a tool for expanding learning to diverse learners eg. People with visual	

			impairment, dyslexia, dysgraphia) . Identify the instances when personal, cultural, and institutionalized discrimination are creating and/ or sustaining disadvantages for some student-teachers

Topic Title:	**Sub-topic**	**Time and stage**	**Teaching and learning activities to achieve outcomes depending on the delivery mode selected. Teacher-led collaborative group work or independent.**	
			Teaching Activities:	**Student Activity**
	Recap of previous week	20 mins	**Face-to-Face:** Discussion of wikis developed from the previous lesson. Tutor leads brain storming session to identify security concepts in ICT discussed in the previous week.	**Face-to-Face:** Student teachers present the wikis developed from the previous lesson. They take part in the brain storming session to identify securityconcepts discussed in the previous week.
	Subject and Object Definition	**20 mins**	**E learning and Face to face:** Tutor shows short videos on Subject and Object Definition. Then refineSubject and Object Definition	**E learning and Face to face:** Student teacher watches videos and images etc, analyses them and engage in the discussion to refineSubject and Object Definition.
	1. Accountability process 2. Identification	**45 mins**	**Face-to-face & E Learning:** Tutor shows student teachers short videos on Accountability process and Identificationusing Creative Approaches (such as, games, storytelling, role paly, songs and modelling). **Seminar:** Tutor lead students to discuss Accountability process and Identification in small groups and gives them case studies and tasks them to perform a feasibility of a scenario	**Face-to-Face & e-learning** Students watch and analyse videos then surf the internet with their mobile phones for Meaning and examples ofAccountability process and Identification. **Seminar:** Student teachers discuss Accountability process and Identification in small groups and consider case studies given to them by tutor and perform a feasibility of the scenario reporting their findings through small group presentations
	1.Authentication 2. Authorization	**45 mins**	**E-learning:** Tutor shows a video tutorial on Authentication and Authorization. **Seminar:** tutor then leads the groups to identify and discuss Authentication and Authorization.	**E-learning: Student teacher watches** video on Authentication and Authorization **Seminar:** Student teacher engages in a discussion on Authentication and Authorization

	Auditing	**30 min**	**Practical activity** Tutor guides student teachers to explore the concept Auditing in Access control. Teacher shares a video tutorial on Auditing in Access control with students either to the whole class or to them via their mobile devices. The Tutor leads the class to identify examples of Auditing in Access control.	**Practical activity** Student teachers watches the video tutorial and explores the concept Auditing in Access control. Student teachers engages in discussion to identify Auditing in Access control and further use examples in group presentations They then make reflective notes on Auditing in Access control.
	Lesson Closure	20 Mins	**Questioning:** Tutor uses questioning to summarise and recap the concepts covered for the lesson.	**Questioning:** Student teacher responds to questions to summarise and recap the concepts covered for the lesson.
Lesson assessments – evaluation of learning: of, for and as learning within the lesson				
Instructional Resources	i. Smartphones ii. Laptops iii. Desktop computers iv. Tablets v. TV and Radio vi. Open Educational Resources (Including: YouTube, MOOCS-Udemy/coursera, khan academy, TESSA) vii. The iBox (CENDLOS) viii. Productivity tools ix. Subject based application software x. Instructional Laboratories (with multimedia equipment and smartboards) xi. Google Classroom			
Required Text (core)	Whitman, Michael E., and Herbert J. Mattord. *Principles of information security* (4th ed.). Cengage Learning, 2011. Parliament of Ghana (2012). Data Protection Act, 2012 (Act 843), Retrieve from Ghana Data Protection Commission website: https://www.dataprotection.org.gh/data-protection-act Parliament of Ghana (2008). Electronic communications act 2008 (775), Retrieve from website: https://www.moc.gov.gh/ , https://nca.org.gh/ Parliament of Ghana. Law of Contract (act 25, 1960), Retrieve from http://laws.ghanalegal.com/acts/id/18/contracts-act			
Additional Reading List	Anderson, Ross J. *Security engineering: a guide to building dependable distributed systems*. John Wiley & Sons, 2010. Selected articles and online resources (youtube.com, MOOCs: Khan Academy, TESSA, Udemy etc)			
CPD needs	Need for seminar on Access control fundamentals Writing reflective notes Participating in a community of practice/conferences and accessing online magazines (E-zines) & journals to obtain up to date content on Access control fundamentals Team teaching and lesson observation to improve instructional strategies & practices. Supporting student teachers in collaborating in designing and developing a wiki.			

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	Access Control Fundamentals (Authentication types) II					**Lesson Duration**	**3 Hours**
Lesson description	In this lesson, Student teachers will explore Authentication types under Access control fundamentals. **(*National Teachers' Standard: 1a, 1b, 3b, 3c, 3e, 3d, 3n/NTECF: Pillar crosscutting issues; Core skills, Professional values and attitudes)*.**						
Previous student teacher knowledge, prior learning (assumed)	Student teachers have been introduced to Access Control Fundamentals (introduction to Accountability process						
Possible barriers to learning in the lesson	Some student teachers might not have had knowledge and understanding of Authentication types under Access control fundamentals and its impact on teaching and learning.						
Lesson Delivery – chosen to support students in achieving the outcomes	**Face-to-face [√]**	**Practical Activity [√]**	**Work-Based Leaning**	**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 –** Both teacher and student-led approaches such as discussions of varying kinds should be used. **E-learning opportunities -**Student teachers would watch videos on YouTube/videos about compatibility issues between types of technology. **Seminars –** Both individual and group presentation of projects should be encouraged. **Practical Activity**- student teachers will review work samples of other student teachers to explain progress or barriers to learning **Group work:** put student teachers in small groups to examine various issues both in a face to face class and also online. Create a social media group for each group (e.g. Facebook, WhatsApp, Telegram) to enable them 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 student 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 you want the students 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 will: Implement security controls to reduce the risks to information assets. ***(NTS 2b, 2c, 3b, 3c, 3d, 3e, 3h, 3i, 3k, 3n, 3p NTECF: Pillars 1, 2 & 3, crosscutting issues; Core skills, Assessment, Professional values and attitudes)***						
● **Learning Outcome for the lesson, picked and developed from the course specification** ● **Learning indicators for each learning outcome**	**Learning Outcomes**		**Learning Indicators**			Identify which cross cutting issues – core and transferable skills, inclusivity, equity and addressing diversity.	
	CLO3: Demonstrate knowledge and apply different security control systems to protect information systems.***(NTS 2b, 2c, 3b, 3c, 3d, 3e, 3h, 3i, 3k, 3n, 3p NTECF: Pillars 1, 2 & 3,***		Implement security controls to reduce the risks to information assets.			These strategies will respond to inclusivity and equity (ie ICT as a tool for expanding learning to diverse learners eg. People with visual impairment, dyslexia, dysgraphia). Identify the instances when personal, cultural, and institutionalized	

	crosscutting issues; Core skills, Assessment, Professional values and attitudes)			discrimination are creating and/ or sustaining disadvantages for some student-teachers
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**
	Recap of previous lessons	15 mins	**Face to face:** Tutor guides student teacher to discuss their reflections on the concept authentication and authorization with examples.	**Face to face:** Student teacher presents and discusses their own and others reflections on authentication and authorization with examples.
	Authentication by Knowledge	30 min	**e-learning opportunities:** Tutor shows a video on Authentication by Knowledge. **Group Work:** Tutor breaks class into small diverse groups to analyse the video identifying Authentication by Knowledge .	**e-learning opportunities:** Student teachers watch video on Authentication by Knowledge **Group Work:** Student teachers participates in group discussions to analyse the video identifying Authentication by Knowledge
	Authentication by Ownership	60 mins	**E learning, Questioning and practical:** Tutor shows a video on Authentication by Ownership and then uses questioning to bring to the fore Authentication by Ownership entails.	**Questioning:** Student teachers watch video and answer questions to bring out whatAuthentication by Ownership entails. Student teachers put together points to guide them in the search for Advantages of authentication by ownership.
	Authentication by Characteristic	60 mins	**Group discussion & Seminar:** Tutor breaks class into their small diverse groups to discuss Authentication by Characteristic. Tutor guides student teachers to apply the concepts of Authentication by Characteristic to their projects	**Group discussion & Seminar:** Student teachers discuss in their groups Authentication by Characteristic. Groups make presentations on their findings. Student teachers then apply the concepts Authentication by Characteristic to their projects.
	Closure	15 mins	**Closure:** Tutor guide the student teacher to recap the discussions for the day (PDG Theme 3). Tutor gives an assignment for student teachers on authentication by ownership and Authentication by Characteristic and write notes in their reflective journals	**Closure:** student teacher contributes in discussions to recap the sub-topics learnt for the day. (PDG Theme 3). Student teacher work on authentication by ownership and Authentication by Characteristic as an assignment and write notes in their reflective journals

Lesson assessments – evaluation of learning: of, for and as learning within the lesson	Student teachers work on authentication by ownership and Authentication by Characteristic as an assignment and write notes in their reflective journals.
Instructional Resources	i. Smartphones ii. Laptops iii. Desktop computers iv. Tablets v. TV and Radio vi. Open Educational Resources (Including: YouTube, MOOCS-Udemy/coursera, khan academy, TESSA) vii. The iBox (CENDLOS) viii. Productivity tools ix. Subject based application software x. Instructional Laboratories (with multimedia equipment and smartboards) xi. Google Classroom
Required Text (core)	Whitman, Michael E., and Herbert J. Mattord. *Principles of information security* (4th ed.). Cengage Learning, 2011. Parliament of Ghana (2012). Data Protection Act, 2012 (Act 843), Retrieve from Ghana Data Protection Commission website: https://www.dataprotection.org.gh/data-protection-act Parliament of Ghana (2008). Electronic communications act 2008 (775), Retrieve from website: https://www.moc.gov.gh/ , https://nca.org.gh/ Parliament of Ghana. Law of Contract (act 25, 1960), Retrieve from http://laws.ghanalegal.com/acts/id/18/contracts-act
Additional Reading List	Anderson, Ross J. *Security engineering: a guide to building dependable distributed systems*. John Wiley & Sons, 2010. Selected articles and online resources (youtube.com, MOOCs: Khan Academy, TESSA, Udemy etc)
CPD needs	Need for seminar on authentication by ownership and characteristic Writing reflective notes Participating in a community of practice/conferences and accessing online magazines (E-zines) & journals to obtain up to date content. Team teaching and lesson observation to improve instructional strategies & practices. Supporting student teachers in collaborating in designing and developing a wiki.

LESSON 5

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	Access Control Fundamentals (Authentication methods) III			**Lesson Duration**	**3 Hours**		
Lesson description	In this lesson, Student teachers will be introduced to mechanisms for authentication (Multifactor Authentication).**(*National Teachers' Standard: 1a, 1b, 3b, 3c, 3e, 3d, 3n/NTECF: Pillar crosscutting issues; Core skills, Professional values and attitudes)*.**						
Previous student teacher knowledge, prior learning (assumed)	Student Teachers have been introduced to Access Control Fundamentals (Authentication types) II						
Possible barriers to learning in the lesson	Some student teachers might not have had knowledge and understanding of Access control fundamentals II.						
Lesson Delivery – chosen to support students in achieving the outcomes	**Face-to-face [√]**	**Practical Activity [√]**	**Work-Based Leaning**	**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 –** Both teacher and student-led approaches such as discussions of varying kinds should be used. **E-learning opportunities -**Student teachers would watch videos on YouTube/videos about responsible use of technology systems. **Seminars –** Both individual and group presentation of projects should be encouraged. **Practical Activity**- student teachers will review work samples of other student teachers to explain progress or barriers to learning **Group work:** put student teachers in small groups to examine various issues both in a face to face class and also online. Create a social media group for each group (e.g. Facebook, WhatsApp, Telegram) to enable them 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 student 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 you want the students 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 will: Implement security controls to reduce the risks to information assets.***(NTS 2b, 2c, 3b, 3c, 3d, 3e, 3h, 3i, 3k, 3n, 3p NTECF: Pillars 1, 2 & 3, crosscutting issues; Core skills, Assessment, Professional values and attitudes)***						
● **Learning Outcome for the lesson, picked and developed from the course specification** ● **Learning indicators for each learning outcome**	**Learning Outcomes**		**Learning Indicators**		Identify which cross cutting issues – core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?		
	CLO3: Demonstrate knowledge and apply different security control systems to protect information systems.***(NTS 2b, 2c, 3b, 3c, 3d, 3e, 3h, 3i, 3k, 3n, 3p NTECF: Pillars 1, 2 & 3, crosscutting issues; Core skills,***		Implement security controls to reduce the risks to information assets.		These strategies will respond to inclusivity and equity (ie ICT as a tool for expanding learning to diverse learners eg. People with visual impairment, dyslexia, dysgraphia). Identify the instances when personal, cultural, and institutionalized		

	Assessment, Professional values and attitudes)			discrimination are creating and/ or sustaining disadvantages for some student-teachers
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 and review of RPK	15 Mins	Tutor uses questioning to recap the concepts authentication by knowledge, authentication by ownership and authentication by characteristic.	Student teacher answers questions to recap the concepts authentication by knowledge, authentication by ownership and authentication by characteristic.
	mechanisms for authentication	45 Mins	**E-learning & face to face:** Tutor shows a video to explain the mechanisms for authentication . Tutor engages in a discussion on mechanisms for authentication	**E-learning & face to face:** Student teacher watches a video which explainmechanisms for authentication
		105 Mins	**E-learning & face to face:** Tutor shows a video to explain mechanisms for authentication. Tutor then leads class in a discussion on mechanisms for authentication.	**E-learning & face to face:** Student teacher watches a video which explains mechanisms for authentication. Student teacher engages in a discussion on mechanisms for authentication.
	Closure	15 Mins	Tutor moderates group presentation on mechanisms for authentication to recap the lesson	Student teachers do a group presentation on mechanisms for authentication to recap the lesson
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	Student teachers do a group presentation on mechanisms for authentication to recap the lesson			
Instructional Resources	i. Smartphones ii. Laptops iii. Desktop computers iv. Tablets v. TV and Radio vi. Open Educational Resources (Including: YouTube, MOOCS-Udemy/coursera, khan academy, TESSA) vii. The iBox (CENDLOS) viii. Productivity tools ix. Subject based application software x. Instructional Laboratories (with multimedia equipment and smartboards) xi. Google Classroom			
Required Text (core)	Whitman, Michael E., and Herbert J. Mattord. *Principles of information security* (4th ed.). Cengage Learning, 2011. Parliament of Ghana (2012). Data Protection Act, 2012 (Act 843), Retrieve from Ghana Data Protection Commission website: https://www.dataprotection.org.gh/data-protection-act			

	Parliament of Ghana (2008). Electronic communications act 2008 (775), Retrieve from website: https://www.moc.gov.gh/ , https://nca.org.gh/ Parliament of Ghana. Law of Contract (act 25, 1960), Retrieve from http://laws.ghanalegal.com/acts/id/18/contracts-act
Additional Reading List	Anderson, Ross J. *Security engineering: a guide to building dependable distributed systems*. John Wiley & Sons, 2010. Selected articles and online resources (youtube.com, MOOCs: Khan Academy, TESSA, Udemy etc)
CPD needs	Need for seminar on mechanisms for authentication Writing reflective notes Participating in a community of practice/conferences and accessing online magazines (E-zines) & journals to obtain up to date content on mechanisms for authentication. Team teaching and lesson observation to improve instructional strategies & practices. Supporting student teachers in collaborating in designing and developing a wiki.

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	Access Control Fundamentals (Authorization and Auditing methods) IV				**Lesson Duration**	**3 Hours**	
Lesson description	In this lesson, Student teachers will be introduced to authorization methods and auditing methods.**(*National Teachers' Standard: 1a, 1b, 3b, 3c, 3e, 3d, 3n/NTECF: Pillar crosscutting issues; Core skills, Professional values and attitudes)*.**						
Previous student teacher knowledge, prior learning (assumed)	Student teachers have been introduced to Access Control Fundamentals in the previous lesson						
Possible barriers to learning in the lesson	Some student teachers might not have had knowledge and understanding of Web and Mobile Development in Education and its impact on teaching and learning.						
Lesson Delivery – chosen to support students 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 –** Both teacher and student-led approaches such as discussions of varying kinds should be used. **E-learning opportunities -**Student teachers would watch videos on YouTube/videos about responsible use of technology systems. **Seminars –** Both individual and group presentation of projects should be encouraged. **Practical Activity**- student teachers will review work samples of other student teachers to explain progress or barriers to learning **Group work:** put student teachers in small groups to examine various issues both in a face to face class and also online. Create a social media group for each group (e.g. Facebook, WhatsApp, Telegram) to enable them 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 student 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 you want the students 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 will: Implement security controls to reduce the risks to information assets.***(NTS 2b, 2c, 3b, 3c, 3d, 3e, 3h, 3i, 3k, 3n, 3p NTECF: Pillars 1, 2 & 3, crosscutting issues; Core skills, Assessment, Professional values and attitudes)***						
● **Learning Outcome for the lesson, picked and developed from the course specification** ● **Learning indicators for each learning outcome**	**Learning Outcomes**			**Learning Indicators**		**Identify which cross cutting issues – core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?**	
	CLO3: Demonstrate knowledge and apply different security control systems to protect information systems.***(NTS 2b, 2c, 3b, 3c, 3d, 3e, 3h, 3i, 3k, 3n, 3p NTECF: Pillars 1, 2 & 3, crosscutting issues; Core skills, Assessment, Professional values and attitudes)***			Implement security controls to reduce the risks to information assets.		Activities will instil in student virtues such as honesty and critical thinking as they accurately evaluate and report	

				on fair use of tools of technology adopted to address diverse learning needs. They will learn to avoid biases in favour of or against specific gender, social class. Religion and ethnicity.
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**
	Recap of Previous lesson Understanding mechanism for authentication	**30 Mins**	**Face-to-face** Uses questions to recap student teachers understanding on mechanism for authentication	**Face-to-face** Student teachers answer questions to recap their understanding on mechanism for authentication
	Authorization methods Auditing methods	**50 min**	**Interactive lecturette:** Tutor uses an interactive lecturette to explain Authorization methods . Using videos Tutor will explain Authorization methods Tutor leads a discussion on Authorization methods	**Independent study & Seminar** Student teachers participate in the interactive lecturette and watch videos to build an understanding of Authorization methods . Student teachers engage in a discussion on Authorization methods
		90 min	**Interactive lecturette with video:** Tutor uses an interactive lecturette to explain Auditing methods. Using videos Tutor will explain Auditing methods. Tutor guides student teachers to write and make a group presentation Auditing methods.	**Interactive lecturette with video:** Student teachers participate in the interactive lecturette and watch videos on Auditing methods . Student teachers write and make a group presentation on Auditing methods.
	Lesson Closure	**10 mins**	Tutor reviews authorization and auditing methods with student teachers to recap concepts learnt.	Student teacher reviews with tutor authorization and auditing methods to recap concepts learnt.
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	Student teacher reviews with tutor authorization and auditing methods to recap concepts learnt.			
Instructional Resources	i. Smartphones ii. Laptops iii. Desktop computers iv. Tablets v. TV and Radio vi. Open Educational Resources (Including: YouTube, MOOCS-Udemy/coursera, khan academy, TESSA)			

	vii. The iBox (CENDLOS) viii. Productivity tools ix. Subject based application software x. Instructional Laboratories (with multimedia equipment and smartboards) xi. Google Classroom
Required Text (core)	Whitman, Michael E., and Herbert J. Mattord. *Principles of information security* (4th ed.). Cengage Learning, 2011. Parliament of Ghana (2012). Data Protection Act, 2012 (Act 843), Retrieve from Ghana Data Protection Commission website: https://www.dataprotection.org.gh/data-protection-act Parliament of Ghana (2008). Electronic communications act 2008 (775), Retrieve from website: https://www.moc.gov.gh/ , https://nca.org.gh/ Parliament of Ghana. Law of Contract (act 25, 1960), Retrieve from http://laws.ghanalegal.com/acts/id/18/contracts-act
Additional Reading List	Anderson, Ross J. *Security engineering: a guide to building dependable distributed systems*. John Wiley & Sons, 2010. Selected articles and online resources (youtube.com, MOOCs: Khan Academy, TESSA, Udemy etc)
CPD needs	Need for seminar on authorization and auditing Writing reflective notes Participating in a community of practice/conferences and accessing online magazines (E-zines) & journals to obtain up to date content on authorization and auditing Team teaching and lesson observation to improve instructional strategies & practices. Supporting student teachers in collaborating in designing and developing a wiki.

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	Types of Information security controls (Logical Controls) I				**Lesson Duration**		**3 Hours**
Lesson description	In this lesson, student teachers will be introduced to logical controls under types of information security controls.**(*National Teachers' Standard: 1a, 1b, 3b, 3c, 3e, 3d, 3n/NTECF: Pillar crosscutting issues; Core skills, Professional values and attitudes)*.**						
Previous student teacher knowledge, prior learning (assumed)	Student teachers have taken a lesson in Access Control Fundamentals (Authorization & Auditing methods)						
Possible barriers to learning in the lesson	Some student teachers might not have had knowledge and understanding of information security.						
Lesson Delivery – chosen to support students in achieving the outcomes	**Face-to-face [√]**	**Practical Activity [√]**	**Work-Based Leaning**	**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 –** Both teacher and student-led approaches such as discussions of varying kinds should be used. **E-learning opportunities -**Student teachers would watch videos on YouTube/videos about responsible use of technology systems. **Seminars –** Both individual and group presentation of projects should be encouraged. **Practical Activity**- student teachers will review work samples of other student teachers to explain progress or barriers to learning **Group work:** put student teachers in small groups to examine various issues both in a face to face class and also online. Create a social media group for each group (e.g. Facebook, WhatsApp, Telegram) to enable them 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 student 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 you want the students 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 will: Implement security controls to reduce the risks to information assets.***(NTS 2b, 2c, 3b, 3c, 3d, 3e, 3h, 3i, 3k, 3n, 3p NTECF: Pillars 1, 2 & 3, crosscutting issues; Core skills, Assessment, Professional values and attitudes)***						
● **Learning Outcome for the lesson, picked and developed from the course specification** ● **Learning indicators for each learning outcome**	**Learning Outcomes**		**Learning Indicators**		Identify which cross cutting issues – core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?		
	CLO3: Demonstrate knowledge and apply different security control systems to protect information systems. ***(NTS 2b, 2c, 3b, 3c, 3d, 3e, 3h, 3i, 3k, 3n, 3p NTECF: Pillars 1, 2 & 3, crosscutting issues; Core skills, Assessment, Professional values and attitudes)***		Implement security controls to reduce the risks to information assets.		Develop skills in Integration of ICT, collaboration and communication, knowledge on equity, gender and Inclusion as well as reflection and critical thinking		

<table>
<tr><td>●</td><td colspan="2">CLO4. Build a professional record to reflect student teacher's accomplishments, skills, experiences, learning and attributes NTS: 1a, 1d, 2c, 2e/NTECF: Pillar 1& 3</td><td>4.1 Build a portfolio</td><td></td></tr>
<tr><td rowspan="4">Topic Title:</td><td>Sub-topic</td><td>Stage/time</td><td colspan="2">Teaching and learning activities to achieve outcomes depending on the delivery mode selected. Teacher-led collaborative group work or independent.</td></tr>
<tr><td></td><td></td><td>Teacher Activity</td><td>Student Activity</td></tr>
<tr><td>Recap of previous lesson</td><td>30 mins</td><td>Face-to-Face: Discussion on authorization and auditing. Tutor leads brain storming session on authorization and auditing to recap previous lesson.</td><td>Face-to-Face: Student teacher discusses authorization and auditing to recap previous lesson with tutor.</td></tr>
<tr><td>Logical controls
Traditional Firewalls
Packet-Filtering Techniques
Application Proxies
Network Address Translation
Port Address Translation</td><td>140 min</td><td>Interactive lecturette with video:
Tutor uses an interactive lecturette to explain Logical controls. Tutor leads a discussion on Logical controls.

Tutor then discusses the following examples of logical controls with student teachers ;
Traditional Firewalls
Packet-Filtering Techniques
Application Proxies
Network Address Translation
Port Address Translation</td><td>Interactive lecturette with video:
Student teachers participate in the interactive lecturette and watch videos to build an understanding of Logical controls.
Student teachers then discuss the following examples of logical controls with tutor;
Traditional Firewalls
Packet-Filtering Techniques
Application Proxies
Network Address Translation
Port Address Translation</td></tr>
<tr><td></td><td>Closure</td><td>10 mins</td><td>Tutor reviews Logical controls with student teachers to recap concepts learnt.</td><td>Student teacher reviews with tutor Logical controlsto recap concepts learnt.</td></tr>
<tr><td>Lesson assessments – evaluation of learning: of, for and as learning within the lesson</td><td colspan="4">Student teachers write short notes with examples of the following under logical controls;
Traditional Firewalls
Packet-Filtering Techniques
Application Proxies
Network Address Translation
Port Address Translation</td></tr>
<tr><td>Instructional Resources</td><td colspan="4">i. Smartphones
ii. Laptops
iii. Desktop computers
iv. Tablets
v. TV and Radio
vi. Open Educational Resources (Including: YouTube, MOOCS-Udemy/coursera, khan academy,
TESSA)</td></tr>
</table>

	vii. The iBox (CENDLOS) viii. Productivity tools ix. Subject based application software x. Instructional Laboratories (with multimedia equipment and smartboards) xi. Google Classroom
Required Text (core)	Whitman, Michael E., and Herbert J. Mattord. *Principles of information security* (4th ed.). Cengage Learning, 2011. Parliament of Ghana (2012). Data Protection Act, 2012 (Act 843), Retrieve from Ghana Data Protection Commission website: https://www.dataprotection.org.gh/data-protection-act Parliament of Ghana (2008). Electronic communications act 2008 (775), Retrieve from website: https://www.moc.gov.gh/ , https://nca.org.gh/ Parliament of Ghana. Law of Contract (act 25, 1960), Retrieve from http://laws.ghanalegal.com/acts/id/18/contracts-act
Additional Reading List	Anderson, Ross J. *Security engineering: a guide to building dependable distributed systems*. John Wiley & Sons, 2010. Selected articles and online resources (youtube.com, MOOCs: Khan Academy, TESSA, Udemy etc)
CPD needs	Need for seminar on logical controls (Traditional firewalls, Packet-Filtering Techniques Writing reflective notes Participating in a community of practice/conferences and accessing online magazines (E-zines) & journals to obtain up to date content on logical controls, and packet-filtering techniques Team teaching and lesson observation to improve instructional strategies & practices. Supporting student teachers in collaborating in designing and developing a wiki.

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	Information security controls (Physical & Administrative Controls) II				**Lesson Duration**		**3 Hours**
Lesson description	In this lesson, student teachers will be introduced to physical and administrative controls.**(*National Teachers' Standard: 1a, 1b, 3b, 3c, 3e, 3d, 3n/NTECF: Pillar crosscutting issues; Core skills, Professional values and attitudes)*.**						
Previous student teacher knowledge, prior learning (assumed)	Students Teachers have been introduced to Types of Information security controls (Logical Controls) I						
Possible barriers to learning in the lesson	Some student teachers might not have had knowledge and understanding of information security.						
Lesson Delivery – chosen to support students in achieving the outcomes	**Face-to-face [√]**	**Practical Activity [√]**	**Work-Based Leaning**	**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 –** Both teacher and student-led approaches such as discussions of varying kinds should be used. **E-learning opportunities -**Student teachers would watch videos on YouTube/videos about responsible use of technology systems. **Practical Activity**- student teachers will review work samples of other student teachers to explain progress or barriers to learning **Group work:** put student teachers in small groups to examine various issues both in a face to face class and also online. Create a social media group for each group (e.g. Facebook, WhatsApp, Telegram) to enable them 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 student 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 you want the students 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 will: Implement security controls to reduce the risks to information assets.***(NTS 2b, 2c, 3b, 3c, 3d, 3e, 3h, 3i, 3k, 3n, 3p NTECF: Pillars 1, 2 & 3, crosscutting issues; Core skills, Assessment, Professional values and attitudes)***		
● **Learning Outcome for the lesson, picked and developed from the course specification** ● **Learning indicators for each learning outcome**	**Learning Outcomes**	**Learning Indicators**	Identify which cross cutting issues – core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?
	CLO3: Demonstrate knowledge and apply different security control systems to protect information systems. ***(NTS 2b, 2c, 3b, 3c, 3d, 3e,***	Implement security controls to reduce the risks to information	Develop skills in Integration of ICT, collaboration and

	3h, 3i, 3k, 3n, 3p NTECF: Pillars 1, 2 & 3, crosscutting issues; Core skills, Assessment, Professional values and attitudes)		assets.	communication, knowledge on equity, gender and Inclusion as well as reflection and critical thinking
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**
	Recap of previous lesson	**30 mins**	**Questioning:** Tutor uses questioning to recap student teacher's knowledge and understanding on logical controls	**Questioning:** Student teacher answers questions to recap student teacher's knowledge and understanding on logical controls
	Physical controls Administrative controls (ICT policies and administrative processes & procedures)	**140 min**	**Face-to- face & e-learning** Guides student teachers to watch short videos from YouTube, on Physical controls and administrative controls. **E-learning & Practical Activity**. After the short videos on Physical controls and administrative controls. . Tutor then Guides student teachers to write and present in groups examples of on Physical controls and administrative controls.	**Face-to-face & Practical Activity** Student teachers share their views on Physical controls and administrative controls after watching a short video. **Independent Study & Practical Activity** Based on the videos watched, student teachers discuss in groups and discuss on Physical controls and administrative controls using group presentations.
	Closure	**10 mins**	Tutor reviews Physical controls and administrative controls with student teachers to recap concepts learnt.	Student teacher reviews with tutor Physical controls and administrative controls with student teachers to recap concepts learnt.
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	student teachers discuss in groups and discuss on Physical controls and administrative controls using group presentations			
Instructional Resources	i. Smartphones ii. Laptops iii. Desktop computers iv. Tablets v. TV and Radio vi. Open Educational Resources (Including: YouTube, MOOCS-Udemy/coursera, khan academy, TESSA) vii. The iBox (CENDLOS) viii. Productivity tools ix. Subject based application software x. Instructional Laboratories (with multimedia equipment and smartboards) xi. Google Classroom			
Required Text (core)	Whitman, Michael E., and Herbert J. Mattord. *Principles of information security* (4th ed.). Cengage Learning, 2011. Parliament of Ghana (2012). Data Protection Act, 2012 (Act 843), Retrieve from Ghana Data Protection Commission website: https://www.dataprotection.org.gh/data-protection-act Parliament of Ghana (2008). Electronic communications act 2008 (775), Retrieve from website:			

	https://www.moc.gov.gh/ , https://nca.org.gh/ Parliament of Ghana. Law of Contract (act 25, 1960), Retrieve from http://laws.ghanalegal.com/acts/id/18/contracts-act
Additional Reading List	Anderson, Ross J. *Security engineering: a guide to building dependable distributed systems*. John Wiley & Sons, 2010. Selected articles and online resources (youtube.com, MOOCs: Khan Academy, TESSA, Udemy etc)
CPD needs	Need for seminar on physical controls and administrative controls Writing reflective notes Participating in a community of practice/conferences and accessing online magazines (E-zines) & journals to obtain up to date content on physical controls and administrative controls Team teaching and lesson observation to improve instructional strategies & practices. Supporting student teachers in collaborating in designing and developing a wiki.

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	Legal issues (Introduction, Child & Data protection) I			**Lesson Duration**		**3 Hours**	
Lesson description	In this lesson, Student teachers will be introduced to legal issues (Child and Data protection)***(National Teachers' Standard: 1a, 1b, 3b, 3c, 3e, 3d, 3n/NTECF: Pillar crosscutting issues; Core skills, Professional values and attitudes)*****.**						
Previous student teacher knowledge, prior learning (assumed)	Student teachers have been introduced to Types of security controls (Physical & Administrative controls) II						
Possible barriers to learning in the lesson	Some student teachers might not have had knowledge and understanding of Legal Issues.						
Lesson Delivery – chosen to support students in achieving the outcomes	**Face-to-face [√]**	**Practical Activity [√]**	**Work-Based Leaning**	**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 –** Both teacher and student-led approaches such as discussions of varying kinds should be used. **E-learning opportunities -**Student teachers would watch videos on YouTube/videos about responsible use of technology systems. **Seminars –** Both individual and group presentation of projects should be encouraged. **Practical Activity**- student teachers will review work samples of other student teachers to explain progress or barriers to learning **Group work:** put student teachers in small groups to examine various issues both in a face to face class and also online. Create a social media group for each group (e.g. Facebook, WhatsApp, Telegram) to enable them 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 student 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 you want the students 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 will: Explain the legal issues and implications associated with use of ICT ***(NTS 2b, 2c, 3b, 3c, 3d, 3e, 3h, 3i, 3k, 3n, 3p NTECF: Pillars 1, 2 & 3, crosscutting issues; Core skills, Assessment, Professional values and attitudes)***		
• **Learning Outcome for the lesson, picked and developed from the course specification** • **Learning indicators for each learning outcome**	**Learning Outcomes**	**Learning Indicators**	Identify which cross cutting issues – core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?
	CLO4: Demonstrate compliance of statutory, regulatory and institutional ICT requirements. ***(NTS 2b, 2c, 3b, 3c, 3d, 3e, 3h, 3i, 3k, 3n, 3p NTECF: Pillars 1, 2 & 3, crosscutting issues; Core skills, Assessment, Professional values and attitudes)***	Explain the legal issues and implications associated with use of ICT	Develop skills in Integration of ICT, collaboration and communication, knowledge on equity, gender and Inclusion as well as reflection and critical thinking.

	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**
	Recap of previous lesson	**20 mins**	**Questioning:** Tutor uses questioning to recap student teacher's knowledge and understanding on physical controls and administrative controls. Use a concept map to link the key points.	**Questioning:** Student teacher answers questions to recap student teacher's knowledge and understanding on physical controls and administrative controls. Use a concept map to link the key points.
	Cyberspace Privacy Laws and Issues Child Protection Laws	**75 mins**	**Face-to- face & e-learning** Guides student teachers to watch show short videos from YouTube, on Cyberspace Privacy Laws and Issues, and Child Protection Laws as it impacts on ICT.	**Face-to-face & Practical Activity** Student teachers share their views on Cyberspace Privacy Laws and Issues, and Child Protection Laws as it impacts on ICT. And make group presentations on Cyberspace Privacy Laws and Issues, and Child Protection Laws for whole class discussions.
	Data protection laws (data protection Act 843)	**75min**	**PracticalActivity**. Guides student teachers to discuss Data protection laws (data protection Act 843). And make group presentations	**Independent Study & Seminar** Student teachers share their views on Data protection laws (data protection Act 843). Student teachers do group presentations for whole class discussions.
	Lesson Closure	**10 mins**	Tutor reviews Data protection laws (data protection Act 843with student teachers to recap concepts learnt.	Student teacher reviews Data protection laws (data protection Act 843 with tutor to recap concepts learnt.
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	Student teachers share their views on Data protection laws (data protection Act 843). Student teachers do group presentations for whole class discussions.			
Instructional Resources	i. Smartphones ii. Laptops iii. Desktop computers iv. Tablets v. TV and Radio vi. Open Educational Resources (Including: YouTube, MOOCS-Udemy/coursera, khan academy, TESSA) vii. The iBox (CENDLOS) viii. Productivity tools ix. Subject based application software x. Instructional Laboratories (with multimedia equipment and smartboards) xi. Google Classroom			
Required Text (core)	Whitman, Michael E., and Herbert J. Mattord. *Principles of information security* (4th ed.). Cengage Learning, 2011.			

	Parliament of Ghana (2012). Data Protection Act, 2012 (Act 843), Retrieve from Ghana Data Protection Commission website: https://www.dataprotection.org.gh/data-protection-act Parliament of Ghana (2008). Electronic communications act 2008 (775), Retrieve from website: https://www.moc.gov.gh/ , https://nca.org.gh/ Parliament of Ghana. Law of Contract (act 25, 1960), Retrieve from http://laws.ghanalegal.com/acts/id/18/contracts-act
Additional Reading List	Anderson, Ross J. *Security engineering: a guide to building dependable distributed systems*. John Wiley & Sons, 2010. Selected articles and online resources (youtube.com, MOOCs: Khan Academy, TESSA, Udemy etc)
CPD needs	Need for seminar on Cyberspace privacy laws and issues Writing reflective notes Participating in a community of practice/conferences and accessing online magazines (E-zines) & journals to obtain up to date content on Cyberspace privacy laws and issues Team teaching and lesson observation to improve instructional strategies & practices. Supporting student teachers in collaborating in designing and developing a wiki.

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	Legal issues (Electronic Communications) II				**Lesson Duration**	**3 Hours**	
Lesson description	In this lesson, student teachers will be introduced to Electronic Issues under Legal issues.**(*National Teachers' Standard: 1a, 1b, 3b, 3c, 3e, 3d, 3n/NTECF: Pillar crosscutting issues; Core skills, Professional values and attitudes)*.**						
Previous student teacher knowledge, prior learning (assumed)	Student Teachers have been introduced to Legal issues (Introduction, Child & Data protection) I						
Possible barriers to learning in the lesson	Some student teachers might not have had knowledge and understanding of Legal Issues in ICT.						
Lesson Delivery – chosen to support students 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 –** Both teacher and student-led approaches such as discussions of varying kinds should be used. **E-learning opportunities -**Student teachers would watch videos on YouTube/videos about responsible use of technology systems. **Seminars –** Both individual and group presentation of projects should be encouraged. **Practical Activity**- student teachers will review work samples of other student teachers to explain progress or barriers to learning **Group work:** put student teachers in small groups to examine various issues both in a face to face class and also online. Create a social media group for each group (e.g. Facebook, WhatsApp, Telegram) to enable them 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 student 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 you want the students 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 will: Explain the legal issues and implications associated with use of ICT. ***(NTS 2b, 2c, 3b, 3c, 3d, 3e, 3h, 3i, 3k, 3n, 3p NTECF: Pillars 1, 2 & 3, crosscutting issues; Core skills, Assessment, Professional values and attitudes)***						
● **Learning Outcome for the lesson, picked and developed from the course specification** ● **Learning indicators for each learning outcome**	**Learning Outcomes**			**Learning Indicators**		Identify which cross cutting issues – core and transferable skills, inclusivity, equity and addressing diversity.	
	CLO4: Demonstrate compliance of statutory, regulatory and institutional ICT requirements. ***(NTS 2b, 2c, 3b, 3c, 3d, 3e, 3h, 3i, 3k, 3n, 3p NTECF: Pillars 1, 2 & 3, crosscutting issues; Core skills, Assessment, Professional values and attitudes)***			Explain the legal issues and implications associated with use of ICT		These strategies will respond to inclusivity and equity (ie ICT as a tool for expanding learning to diverse learners eg. People with visual impairment,	

				dyslexia, dysgraphia). Identify the instances when personal, cultural, and institutionalized discrimination are creating and/ or sustaining disadvantages for some student-teachers
	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**
	Recap of previous lesson	**15 mins**	**Questioning:** Tutor uses questioning to recap student teacher's knowledge and understanding of data protection lawsusing concepts maps to link the key points.	**Questioning:** Student teacher answers questions to recap student teacher's knowledge and understanding of data protection laws using concepts maps to link the key points.
	Electronic communications laws (electronic communications act 775)	75 mins	**e-learning, discussion & Practical session:** Tutor shows short videos introducing student teachers to Electronic Communications Laws. Tutor then guides student teachers to work on the elements of the Electronic Communications Laws in small groups	**e-learning and discussion:** Student teacher watches videos on Electronic Communications Laws. Student teachersworks in small groups and make a presentation for whole class discussions.
		75 Mins	**Questioning:** Tutor leads student teachers to discuss Electronic Communications Laws. PowerPoint presentations could be used	**Questioning:** Student teacher discusses Electronic Communications Laws and make group presentations for whole class discussions.
	Lesson Closure	**15 mins**	Tutor uses questioning to recap the concepts learnt in the lesson	Student teacher answers questions to recap the concepts learnt in the lesson.
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	Student teacher discusses Electronic Communications Laws and make group presentations for whole class discussions.			
Instructional Resources	i. Smartphones ii. Laptops iii. Desktop computers iv. Tablets v. TV and Radio vi. Open Educational Resources (Including: YouTube, MOOCS-Udemy/coursera, khan academy, TESSA) vii. The iBox (CENDLOS) viii. Productivity tools ix. Subject based application software x. Instructional Laboratories (with multimedia equipment and smartboards) xi. Google Classroom			
Required Text (core)	Whitman, Michael E., and Herbert J. Mattord. *Principles of information security* (4th ed.). Cengage Learning, 2011. Parliament of Ghana (2012). Data Protection Act, 2012 (Act 843), Retrieve from Ghana Data			

	Protection Commission website: https://www.dataprotection.org.gh/data-protection-act Parliament of Ghana (2008). Electronic communications act 2008 (775), Retrieve from website: https://www.moc.gov.gh/ , https://nca.org.gh/ Parliament of Ghana. Law of Contract (act 25, 1960), Retrieve from http://laws.ghanalegal.com/acts/id/18/contracts-act
Additional Reading List	Anderson, Ross J. *Security engineering: a guide to building dependable distributed systems*. John Wiley & Sons, 2010. Selected articles and online resources (youtube.com, MOOCs: Khan Academy, TESSA, Udemy etc)
CPD needs	Need for seminar on Electronic communications laws (Electronic Communications Act 775) Writing reflective notes Participating in a community of practice/conferences and accessing online magazines (E-zines) & journals to obtain up to date content on Electronic Communication Team teaching and lesson observation to improve instructional strategies & practices. Supporting student teachers in collaborating in designing and developing a wiki.

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	Legal issues (Contracts) III				**Lesson Duration**	**3 Hours**	
Lesson description	In this lesson, Student teachers will be introduced to contracts under Legal Issues.**(*National Teachers' Standard: 1a, 1b, 3b, 3c, 3e, 3d, 3n/NTECF: Pillar crosscutting issues; Core skills, Professional values and attitudes)*.**						
Previous student teacher knowledge, prior learning (assumed)	Student teachers have been introduced to Legal issues (Electronic Communications) II						
Possible barriers to learning in the lesson	Some student teachers might not have had knowledge and understanding of legal issues and its impact on ICT.						
Lesson Delivery – chosen to support students 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 –** Both teacher and student-led approaches such as discussions of varying kinds should be used. **E-learning opportunities -**Student teachers would watch videos on YouTube/videos about responsible use of technology systems. **Seminars –** Both individual and group presentation of projects should be encouraged. **Group work:** put student teachers in small groups to examine various issues both in a face to face class and also online. Create a social media group for each group (e.g. Facebook, WhatsApp, Telegram) to enable them 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 student 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 you want the students 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 will: Explain the legal issues and implications associated with use of ICT ***(NTS 2b, 2c, 3b, 3c, 3d, 3e, 3h, 3i, 3k, 3n, 3p NTECF: Pillars 1, 2 & 3, crosscutting issues; Core skills, Assessment, Professional values and attitudes)***						
● **Learning Outcome for the lesson, picked and developed from the course specification** ● **Learning indicators for each learning outcome**	**Learning Outcomes**		**Learning Indicators**		Identify which cross cutting issues – core and transferable skills, inclusivity, equity and addressing diversity.		
	CLO4: Demonstrate compliance of statutory, regulatory and institutional ICT requirements. ***(NTS 2b, 2c, 3b, 3c, 3d, 3e, 3h, 3i, 3k, 3n, 3p NTECF: Pillars 1, 2 & 3, crosscutting issues; Core skills, Assessment, Professional values and attitudes)***		Explain the legal issues and implications associated with use of ICT		These strategies will respond to inclusivity and equity (ie ICT as a tool for expanding learning to diverse learners eg. People with visual impairment, dyslexia, dysgraphia). Identify the instances when personal, cultural, and institutionalized discrimination are creating and/ or sustaining disadvantages for some student-teachers.		

	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**
	Recap lesson on Electronic Communication Laws as RPK	20	**Face-to-face:** Tutor recaps on Electronic Communication Laws .(PDG Theme 2)	**e-learning & Seminar** Student teachers discusses on Electronic Communication Laws to recap the precious lesson.
	Law of Contract (act 25, 1960)	140 Mins	**e-learning** Shows short videos from YouTube on Law of Contract (act 25, 1960) **Practical session:** Tutor leads student teachers to work on some examples of Law of Contract (act 25, 1960) in small group and make a presentation.	**e-learning & Seminar** Student teachers watch videos from YouTube on Law of Contract (act 25, 1960); make notes from the videos for small group's discussion. **Practical session:** Student teacher work on some examples of Law of Contract (act 25, 1960) in small group and make a presentation.
	Lesson Closure	20 mins	Tutor reviews Law of Contract (act 25, 1960), with student teachers to recap concepts learnt.	Student teacher reviews Law of Contract (act 25, 1960), with tutor to recap concepts learnt.
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	Student teacher reviews Law of Contract (act 25, 1960), with tutor with its implications to ICT, in small groups.			
Instructional Resources	i. Smartphones ii. Laptops iii. Desktop computers iv. Tablets v. TV and Radio vi. Open Educational Resources (Including: YouTube, MOOCS-Udemy/coursera, khan academy, TESSA) vii. The iBox (CENDLOS) viii. Productivity tools ix. Subject based application software x. Instructional Laboratories (with multimedia equipment and smartboards) xi. Google Classroom			
Required Text (core)	Whitman, Michael E., and Herbert J. Mattord. *Principles of information security* (4th ed.). Cengage Learning, 2011. Parliament of Ghana (2012). Data Protection Act, 2012 (Act 843), Retrieve from Ghana Data Protection Commission website: https://www.dataprotection.org.gh/data-protection-act Parliament of Ghana (2008). Electronic communications act 2008 (775), Retrieve from website: https://www.moc.gov.gh/ , https://nca.org.gh/ Parliament of Ghana. Law of Contract (act 25, 1960), Retrieve from http://laws.ghanalegal.com/acts/id/18/contracts-act			
Additional Reading List	Anderson, Ross J. *Security engineering: a guide to building dependable distributed systems*. John Wiley & Sons, 2010. Selected articles and online resources (youtube.com, MOOCs: Khan Academy, TESSA, Udemy etc)			

CPD needs	Need for seminar on Law of Contract (Act 25, 1960) Writing reflective notes Participating in a community of practice/conferences and accessing online magazines (E-zines) & journals to obtain up to date content on Law of Contract (Act 25, 1960) Team teaching and lesson observation to improve instructional strategies & practices. Supporting student teachers in collaborating in designing and developing a wiki.

LESSON 12

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	Legal issues (Anti-spam & privacy) IV				**Lesson Duration**	**3 Hours**	
Lesson description	In this lesson, Student teachers will be introduced to Anti-Spam and privacy under Legal issues.(***National Teachers' Standard: 1a, 1b, 3b, 3c, 3e, 3d, 3n/NTECF: Pillar crosscutting issues; Core skills, Professional values and attitudes)*.**						
Previous student teacher knowledge, prior learning (assumed)	Student teachers have been introduced to Legal issues (Contracts) III						
Possible barriers to learning in the lesson	Some student teachers might not have had knowledge and understanding of Anti-Spam and privacy under Legal Issues and its impact on ICT.						
Lesson Delivery – chosen to support students in achieving the outcomes	**Face-to-face [√]**	**Practical Activity [√]**	**Work-Based Leaning**	**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 –** Both teacher and student-led approaches such as discussions of varying kinds should be used. **E-learning opportunities -**Student teachers would watch videos on YouTube/videos about responsible use of technology systems. **Seminars –** Both individual and group presentation of projects should be encouraged. **Practical Activity**- student teachers will review work samples of other student teachers to explain progress or barriers to learning **Group work:** put student teachers in small groups to examine various issues both in a face to face class and also online. Create a social media group for each group (e.g. Facebook, WhatsApp, Telegram) to enable them 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 student 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 you want the students 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 will: Explain the legal issues and implications associated with use of ICT ***(NTS 2b, 2c, 3b, 3c, 3d, 3e, 3h, 3i, 3k, 3n, 3p NTECF: Pillars 1, 2 & 3, crosscutting issues; Core skills, Assessment, Professional values and attitudes)***						
● **Learning Outcome for the lesson, picked and developed from the course specification** ● **Learning indicators for each learning outcome**	**Learning Outcomes**		**Learning Indicators**		Identify which cross cutting issues – core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed?		
	CLO4: Demonstrate compliance of statutory, regulatory and institutional ICT requirements.***(NTS 2b, 2c, 3b, 3c, 3d, 3e, 3h, 3i, 3k, 3n, 3p NTECF: Pillars 1, 2 & 3, crosscutting issues; Core skills, Assessment, Professional values and attitudes)***		Explain the legal issues and implications associated with use of ICT		These strategies will respond to inclusivity and equity (ie ICT as a tool for expanding learning to diverse learners eg. People with visual impairment, dyslexia, dysgraphia). Identify the instances when personal, cultural, and institutionalized discrimination are creating and/ or sustaining disadvantages for some student-teachers		

	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**
	Recap lesson on Law of contract.	15min	**Face-to-face:** Tutor/lecturer recaps previous lesson on Law of contract. (PDG Theme 2)	**e-learning & Seminar** Student teachers discuss the previous lesson on Law of contract.
	Anti-Spam Laws	75 Mins	**e-learning** Shows short videos explaining Anti-Spam Laws Tutor then discusses these concepts with students	**e-learning & Seminar** Student teachers watch videos from YouTube on Anti-Spam Laws; make notes from the videos for small group's discussion.
	Privacy Vs. Civil Liberties	80 Mins	**Practical session:** Tutor leads student teachers to discuss Privacy Vs. Civil Liberties. Tutor breaks student teachers into groups.	**Practical session:** Student teacher discusses in their groups Privacy Vs. Civil Liberties.Work in small groups and make presentations for whole class discussions
	Lesson Closure	10 mins	Tutor reviews Privacy Vs. Civil Liberties with student teachers to recap concepts learnt in the course.	Student teacher reviews with tutor Privacy Vs. Civil Liberties, to recap concepts learnt in the course.
Lesson assessments – evaluation of learning: of, for and as learning within the lesson	Student teachers write on the following in their notes; Anti-Spam laws Analyze Privacy policies • Opt in vs Opt out • International impact on privacy policies • Legality and ethics of spyware and other malware • Privacy vs civil liberties RFID (Radio Frequency ID) issues			
Instructional Resources	i. Smartphones ii. Laptops iii. Desktop computers iv. Tablets v. TV and Radio vi. Open Educational Resources (Including: YouTube, MOOCS-Udemy/coursera, khan academy, TESSA) vii. The iBox (CENDLOS) viii. Productivity tools ix. Subject based application software x. Instructional Laboratories (with multimedia equipment and smartboards) xi. Google Classroom			
Required Text (core)	Whitman, Michael E., and Herbert J. Mattord. *Principles of information security* (4th ed.). Cengage Learning, 2011. Parliament of Ghana (2012). Data Protection Act, 2012 (Act 843), Retrieve from Ghana Data Protection Commission website: https://www.dataprotection.org.gh/data-protection-act Parliament of Ghana (2008). Electronic communications act 2008 (775), Retrieve from website: https://www.moc.gov.gh/ , https://nca.org.gh/ Parliament of Ghana. Law of Contract (act 25, 1960), Retrieve from http://laws.ghanalegal.com/acts/id/18/contracts-act			
Additional Reading List	Anderson, Ross J. *Security engineering: a guide to building dependable distributed systems*. John Wiley & Sons, 2010. Selected articles and online resources (youtube.com, MOOCs: Khan Academy, TESSA, Udemy etc)			

CPD needs	Need for seminar on Analysis of Privacy policies • Opt in vs Opt out • International impact on privacy policies • Legality and ethics of spyware and other malware • Privacy vs civil liberties RFID (Radio Frequency ID) issues Writing reflective notes Participating in a community of practice/conferences and accessing online magazines (E-zines) & journals to obtain up to date content on Privacy policies Interacting with View Controllers. Team teaching and lesson observation to improve instructional strategies & practices. Supporting student teachers in collaborating in designing and developing a wiki.
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% • 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**

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