

Preparing Tutors for the Delivery of the National Teachers' Standards-Based Bachelor of Education Curriculum

PROFESSIONAL DEVELOPMENT GUIDE FOR TUTORS





THEME 9: PREPARING TUTORS FOR THE DELIVERY OF THE NATIONAL TEACHERS' STANDARDS-BASED BACHELOR OF EDUCATION CURRICULUM.



The Government of Ghana

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FOREWORD

The vision of the Ministry of Education is to promote the socio-economic development of Ghana and adopt the United Nations Sustainable Development Goal 4 (SDG 4), which is to 'ensure inclusive and equitable quality education and promote life-long learning opportunities for all'.

Teacher education activities in Ghana therefore aim to prepare teachers who can equip all Ghanaians with relevant productive and adaptive 21st Century skills through the education system in order to make SDG 4 attainable. By implication, these activities are meant to produce teachers who have adequate professional knowledge and skills, who are imbued with professional values and attitudes, and who are adept in demonstrating high standards of professional practice that will enable them to help address the learning needs of all learners including those with special educational needs.

The new 4-year B.Ed. curriculum is designed not only to produce such teachers but also to help train teachers who have a passion for teaching and leadership, are reflective practitioners, and who engage with members of the wider community, always acting as prospective change agents.

This theme aims to prepare tutors to deliver the new curriculum in a way that will produce the future teachers and leaders described above. The theme looks at individual teaching and learning philosophies of tutors and how they can be aligned to the philosophy of the new curriculum, the structure and content of the new B.Ed. programme as well as the spirit of the National Teachers' Standards which form the foundations upon which the new programme is built.

The units in the theme are well thought through and capture a variety of important information to help tutors to guide student teachers not only to get the best out of basic school learners but also to provide them with opportunities to chart their future professional pathways. On the whole, the theme is replete with good activities which will enrich tutors' understanding of the relevant concepts and skills introduced by the National Teachers' Standards.

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INTRODUCTION

THEME 9: PREPARING TUTORS FOR THE DELIVERY OF THE NATIONAL TEACHERS' STANDARDS-BASED BACHELOR OF EDUCATION CURRICULUM

Overview

The unit provides an overview of Theme 9: Preparing Tutors for the Delivery of the National Teachers Standards (NTS) Based Curriculum. The unit looks at the philosophy, structure and content of the new 4-year Bachelor of Education (B.Ed.) curriculum.

We begin this session with an overview of Theme 9 as follows:

Overview (10 Minutes)

The purpose of Theme 9, 'The new 4 - Year B.Ed. Teacher Education Curriculum Delivery for Year 1', is to enable you to become familiar with the basic principles underlying the new 4 -year B.Ed. curriculum, its structure and content as well as issues of inclusivity and equity to prepare you for the successful delivery of the curriculum.

Learning Outcomes of Theme 9

After going through this handbook, you should be able to:

- a. Demonstrate understanding of the philosophy, structure and content of the new 4 - Year B.Ed. Teacher Education Curriculum.
- b. Demonstrate awareness of inclusion and equity standards in the curriculum as required by NTS and the National Teacher Education Curriculum Framework (NTECF).
- c. Demonstrate understanding of the principles that guide the learning outcomes at the various levels of the new curriculum.
- d. Align performance indicators, teaching and assessment in year 1.
- e. Integrate subject knowledge and pedagogical knowledge in year 1.
- f. Produce course manuals for the courses you teach.
- g. Demonstrate understanding of the essential features of Supported Teaching in School (STS) in year 1.
- h. Demonstrate understanding of the benefits and challenges of assuring the quality delivery of the new curriculum.

Note: Each unit also has its own learning outcomes and indicators.



The learning outcomes above align with the following 8 units which constitute Theme 9:

- Unit 1: Philosophy, structure and content of the new 4-year B.Ed. curriculum.
- Unit 2: Equity and inclusion in the new 4-year B.Ed. curriculum.
- Unit 3: Learning outcomes in the new 4-year B.Ed. curriculum.
- Unit 4: Aligning performance indicators, teaching and assessment.
- Unit 5: Integrating subject knowledge and pedagogical knowledge in year 1.
- Unit 6: Preparing course manuals.
- Unit 7: Supported teaching in schools in year 1.
- Unit 8: Quality assuring curriculum delivery.

UNIT 1: PHILOSOPHY, STRUCTURE AND CONTENT OF THE NEW 4 - YEAR BACHELOR OF EDUCATION CURRICULUM

Learning Outcomes By the end of the unit, every tutor should be able to:	Learning Indicators
1. Align their personal teaching and learning philosophies with that of the new 4-year B.Ed. curriculum.	1.1 Every tutor has a personal teaching and learning philosophy. 1.2 Tutors' teaching and learning philosophies contain key points like spirit of enquiry, innovation, creativity and inclusive strategy in the new 4-year B.Ed. curriculum.
2. Demonstrate familiarity with the foundations of the new 4-year B.Ed. curriculum.	2.1 Give examples of features in the foundations of the curriculum. 2.2 Explain the features in the foundations of the curriculum.
3. Demonstrate understanding of the structure and content of the new 4-year B.Ed. curriculum.	3.1 Describe the relationships between the pillars of the new 4-year B.Ed. curriculum. 3.2 Explain how the courses taught in each year are dependent on those taught in the year before to show the progressive nature of the curriculum.

Revision Activity on Theme 6 (10 minutes)

Individually reflect on Theme 6 (NTS and NTECF) then as a group, write down one question you would wish the class to answer. Submit your question to the PDC. The PDC will in turn distribute all questions to the various groups for discussion. Responses from the groups will be for a general class discussion.

INTRODUCTION (10 minutes)

The vision of the Ministry of Education (MoE), regarding preparing and equipping all Ghanaians with relevant education and productive and adaptive skills, is to promote the socio-economic development of Ghana (ESP 2016-2030) and adopt the UN Sustainable Development Goal (SDG) 4, which is to 'ensure inclusive and equitable quality education and promote life-long learning opportunities for all' (UNESCO, 2017).

Ghana's Teacher Education Philosophy is 'producing teachers imbued with professional skills, attitudes and values, and depth and breadth of content knowledge as well as the spirit of enquiry, innovation and creativity that will enable them to adapt to changing conditions, use inclusive strategies and engage in life-long learning.' (NTECF, p.14).

This underpins the new 4-year B.Ed. The B.Ed. curriculum is designed to produce teachers who have passion for teaching and leadership, are reflective practitioners, and who 'engage with members not only in the school community but also in the wider community, and act as potential agents of change' (p. 14).

This philosophy will be realised if every teacher has a personal teaching and learning philosophy, knows the philosophy of the new 4-year B.Ed. curriculum (described above) and ensures the two are aligned. It is also important to find out about the structure and content of the new curriculum as these reflect the philosophy and can help to explain it further. This unit therefore looks at individual teaching and learning philosophies of tutors as compared with the philosophy of the new curriculum, the structure and content of the new programme as well as the foundations upon which the programme is built.

Activity 1: Comparing Personal Teaching and learning Philosophies with the Philosophy of the new Curriculum (20 minutes)

You may recall that you wrote your personal teaching and learning philosophies during portfolio development in Theme 7.

- In the next 5 minutes, write your personal teaching and learning philosophy on the cards given using speech blubs. When you finish post it anywhere on a wall in the room.
- Go around and read noting the major points or themes.
- Next, read the Ghana's Teacher Education philosophy in the introduction.
 - i. Are the points on the flip chart covered in the notes on the philosophy in the introduction?
 - ii. What are the implications if the points on the flip chart are not aligned with the philosophy in the introduction?

Activity 2: Foundations of the new 4 – Year B.Ed. Curriculum: (20 minutes)

Read Annex 1.1

In your group, write examples of features which inform the new 4-year B.Ed programme on flip charts for presentation



Activity 3: Structure and content of the new 4-year B.Ed. Curriculum. (20 minutes)

- Read Figures 1 and 2 in Annexes 1.2 and 1.3.
- Describe the relationship between the pillars of the new 4-year B.Ed. Curriculum.
- Explain how the courses taught in each year are dependent on those taught in the year before to show the progressive nature of the curriculum.

REFLECTION (5 MINUTES)

1. Mention any two important things you have learnt after going through this unit.
2. Review your personal teaching and learning philosophy in line with that of the new 4-year B.Ed. Curriculum.



INTER-UNIT ACTIVITY

1. Before the next PD Session read Unit 2 carefully, taking note of equity and inclusion issues.



MATERIALS FOR UNIT 2:

1. Write down the challenges you face this/next week while implementing the new year one curriculum for discussion at the next PD session.
2. Bring along your reviewed personal teaching and learning philosophy.



UNIT 1 - ANNEXES

ANNEXE 1.1: THE FOUNDATIONS OF THE B.ED. CURRICULUM

There is a number of distinctive features which inform the new 4-year B.Ed. programme which provide the foundations of the curriculum.

A value-driven curriculum: the writing of the NTECF and of this curriculum was driven by the nation's core values of honesty, integrity, creativity and responsible citizenship, and with the intent of achieving SDG4: inclusive, equitable quality education and lifelong learning for all, and by the vision for a good teacher as set out in the NTS.

A concurrent curriculum: Student teachers' subject content knowledge, pedagogy and assessment approaches and practical teaching skills are developed alongside each other.

An integrated curriculum: Preparing student teachers to: meet the requirements of the NTECF; be assessed against the NTS and to be able to teach the Basic School Curriculum. Cross-cutting issues connect the different areas of study, cutting across subject-matter lines and emphasizing unifying concepts. The integration focuses attention on making connections for student teachers, allowing them to engage in relevant, meaningful activities directed at developing the skills, knowledge and understanding of an effective teacher.

A developmental curriculum: Student teachers will progress through four levels: beginning, developing, embedding and extending teaching. Each level has its own set of expectations. Student teachers' progress, learning and skills through each subject or learning area will be mapped out across the four years.

Interactive pedagogy: Student teachers will be prepared to base the pedagogy they use on the social constructivist view, which sees teacher education as the co-construction of knowledge. They will be able to use differentiated instruction and assessment strategies.

The four pillars of the curriculum: these set out the essential knowledge, skills and understanding necessary for effective teaching, as defined by the NTECF (Figure 1).

- **Subject and curriculum knowledge:** secure, subject-specific content and pedagogic knowledge are the key to being able to teach the school curriculum including: subject knowledge for teaching; progress in learning in subjects; misconceptions, potential contextual barriers to learning and curriculum studies. All school's curriculum subjects are addressed and made specific to each specialism.
- **Literacy Studies (Ghanaian Languages and English),** including Early Grade Literacy in L1 and L2. As language is the key to enabling children to access the curriculum, this learning area is a pillar in its own right.
- **Pedagogic Knowledge, including:** general pedagogic knowledge, assessment strategies, introduction to and development of cross cutting issues, education studies, preparation for supported teaching in school, classroom enquiry and research, Inclusion and equity, SEN and ICT.
- **Supported teaching in school:** student teachers will spend 30% of their training in the field. For the KG-P3 and P4-6 specialisms, this training period will be spent in schools with the support of mentors. For TVET this part of the training will be divided between TVET schools and industry with the support of mentors. The mentors will assess student teachers on the development of competencies and skills set out in the National Teachers' Standards.

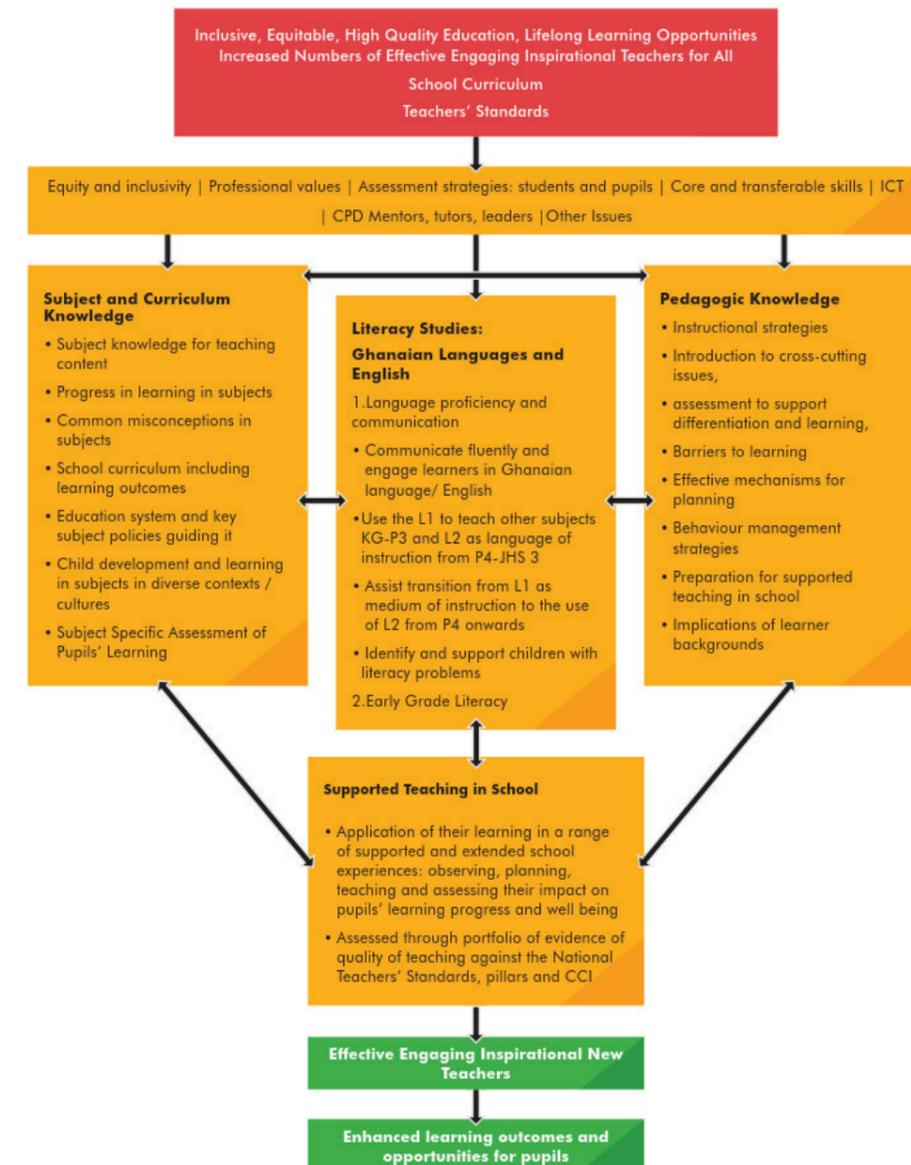
Specialism options: The new B.Ed. 4 Year curriculum is made up of three distinct programmes: Early Grade Education (Kindergarten to Primary Three), Upper Primary Education (Primary Four to Six) and Junior High School Education. Following a foundation first year, student teachers will elect to follow one of three programmes. This will ensure depth of knowledge of what is to be taught and enable them to connect with the developmental level of the learners they teach.

Each of the programmes is written to adhere to the ITE curriculum structure set out in the NTECF (Figure 1), which provide the framework for the content of and each course.

ANNEXE 1.2: THE NTECF

The NTECF consists of the four pillars of teacher education (see Figure 1 overleaf). These represent the knowledge, skills and understanding necessary for effective teaching: Subject and Curriculum Knowledge; Literacy Studies: Ghanaian Languages and English; Pedagogic Knowledge and Supported Teaching in School. The red and yellow bars across the top, represent the values, attitudes and issues, which both underpin and cut across the four pillars.

Figure 1: The National Teacher Education Curriculum Framework



ANNEXE 1.3:

Figure 2: Model of Progress in Student Teacher Learning Across the Four Years

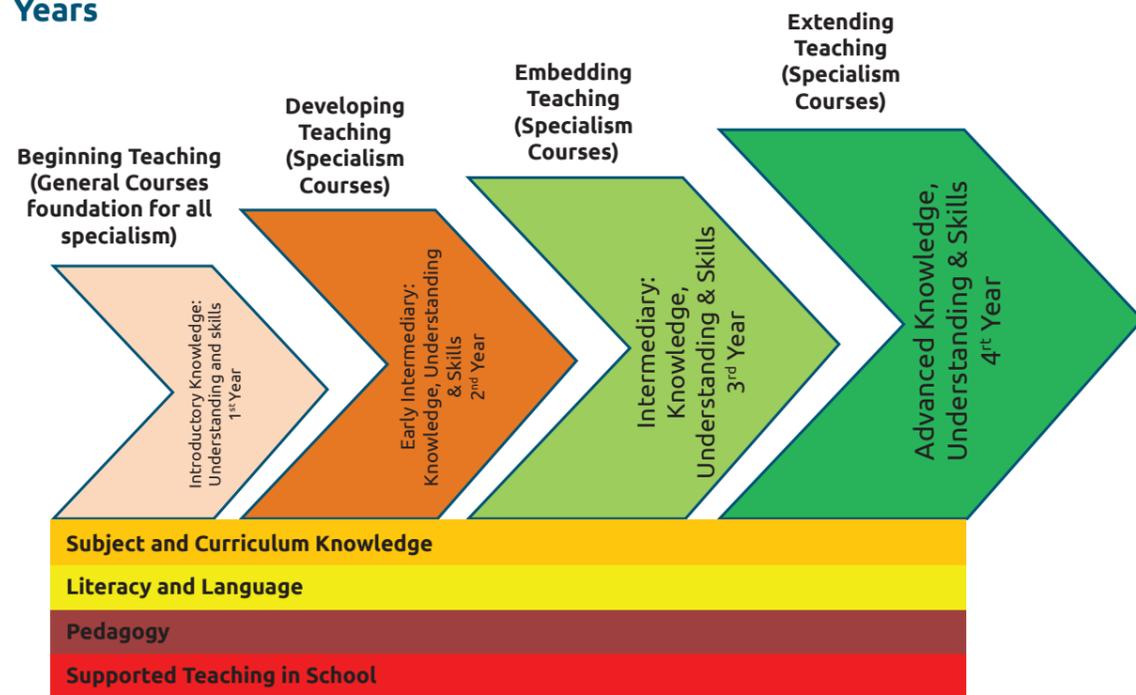


Figure 2, above, shows the model of progress for student teachers across the four years. Each year of the curriculum builds on the outcomes of the previous year. This is achieved through: college-based training, school-based experience and training, course work, practical work, work-based learning and independent study.

- **Year one:** beginning teaching, provides support for the transition from school to college and recognises that many student teachers will have come from school level education and from a wide range of backgrounds and experience. It introduces the key principles and practises of the subjects and learning areas and supported teaching in school within the wider curriculum thereby ensuring that student teachers can locate their specialisms.
- **Year two:** developing teaching, student teachers elect for one of the three specialism programmes but key features from year one continue to be developed as relevant to each specialism. The second year prepares student teachers to identify and assess weaknesses and barriers to learning for learners and carry out small-scale action research under the guidance of mentors.
- **Year three:** embedding teaching, year three, student teachers will continue to build skills, knowledge and understanding in their chosen specialism. They will co-plan and co-teach groups of learners and whole classes; carry out small-scale classroom enquiries and provide evidence of working towards meeting the NTS. Year three includes preparation for year four.
- **Year four (Semester 1):** final supported teaching in school (internship) and for significant classroom-based enquiry and action research projects.
- **Year four (Semester 2):** students will return to college to complete some courses. By the end of the fourth year, extending teaching, student teachers will: plan, teach and assess their learners independently and with increasing consistency; exhibit the ethical codes of conduct, values and attitudes expected of a teacher; carry out extensive action research projects and provide evidence of meeting the National Teachers' Standards in full.

ANNEXE 1.4: OUTLINE FOR THE COURSE CONTENT OF THE NEW CURRICULUM

Course Title				
Course Code		Course Level	Credit value	
Course Delivery	Face-to-face	Independent Study	Work-Based Learning	Practicum
Course Description				
NTS, NTECF, BSC GLE to be addressed				
Course Learning Outcomes	On successful completion of the course, trainees will be able to:			
Course Content	Units:	Topics:	Sub-topics:	Suggested Teaching Learning Strategies
Course Learning and Teaching	Scheduled Learning and Teaching Activities			
	Guided Independent Study			
	Placement Learning			
Course Assessment	Component 1: COURSEWORK Summary of Assessment Method: Weighting: % Assesses Learning Outcomes:			
	Component 2: COURSEWORK Summary of Assessment Method: Weighting: % Assesses Learning Outcomes:			
	Component 3: COURSEWORK Summary of Assessment Method: Weighting: % Assesses Learning Outcomes:			
Reading List				

UNIT 2 - EQUITY AND INCLUSION IN THE NEW 4-YEAR B.ED. CURRICULUM

Learning Outcomes By the end of this unit every tutor should be able to:	Learning Indicators
1. Demonstrate understanding of equality, equity and inclusion as used in the new 4-year B.Ed. curriculum.	1.1 Explain inclusion and equity as used in the new 4-year B.Ed. curriculum. 1.2 Distinguish between equality and equity 1.3 Distinguish between exclusion, segregation, integration and inclusion.
2. Demonstrate knowledge of inclusion and equity standards a student teacher is required to meet at the end of the first year of the 4-year B.Ed. programme.	2.1 Identify and explain the equity standards a student teacher is required to meet at the end of the first year of the 4-year B.Ed. programme. 2.2 Identify and explain the inclusion standards a student teacher is required to meet at the end of the first year of the 4-year B.Ed. programme.

Revision Activity (10 minutes)

- In pairs, answer the questions below and then share your responses with the larger group:
 - How similar is the philosophy of the new 4-year B.Ed. curriculum to your revised teaching and learning philosophy?
 - How different are the structure and content areas of the new 4-year B.Ed. curriculum from the structure and content areas of the DBE?
- What challenges did you face while implementing the new Year 1 curriculum since the last PD session?

INTRODUCTION

This unit will enable every tutor to consolidate their knowledge and understanding of inclusion and equity in the National Teacher Education Curriculum Framework (NTECF) as well as the standards which student teachers are expected to meet as outlined in the National Teachers' Standards (NTS) (refer to Annex 2.2).

The following are the key milestones in the standards for the four levels of the programme:

Year one: student teachers should be aware of themselves and learners as unique individuals.

Year two: student teachers should be aware of teachers' values and attitudes impacting on learners' learning outcomes, and how diversity impacts on learning.

Year three: student teachers as team members, are required to co-plan and co-teach, and develop together lessons for all learners including those who have learning difficulties.

Year four: student teachers are required to independently plan for and teach all learners irrespective of their individual characteristics.

Activity 1: Inclusion and equity as explained in the new 4-year B.Ed. curriculum (20 minutes)

- In pairs,
 - ◇ Share ideas on what you remember about inclusion and equity in relation to school, teaching and assessment as explained in Theme 6: National Teachers' Standards and Teacher Education Curriculum Framework for Ghana.
 - ◇ Distinguish between equality and equity.
 - ◇ Share your findings with the larger group for a brief discussion.
 - ◇ Refer to Annex 2.1 for more information to consolidate your points.
 - ◇ Share with the large group, and discuss, the points where you had difficulties understanding a concept or disagreed, looking for a consensus
- Match the following terms, '*inclusion, integration, segregation and exclusion*', with their corresponding diagrams in Figure 2.1.

Figure 2.1: Forms of Diversity

Terms: <i>inclusion, integration, segregation and exclusion</i>	Diagrams	Reason(s)
	<p>•A</p> 	
	<p>B</p> 	
	<p>•C</p> 	
	<p>•D</p> 	

Activity 2: Inclusion and equity standards Year 1 student teachers are required to meet (30 minutes)

- Tick your preference for each statement in the boxes provided in Table 2.1.
- Pair up and compare your responses.
- Where you and your partner selected different options for the same statement, give reasons for the difference.

Table 2.1: Statements on Specific Year 1 Inclusivity and Equity Standards

S/N	Statement The Year 1 student teacher should ...	Agree	Disagree
1	begin to identify the characteristics of an inclusive teacher		
2	develop awareness of self, as individual and future teacher.		
3	begin to identify diversity characteristics as expressed in the learners		
4	know that all learners' voices should be heard and valued		
5	begin to identify the characteristics that make each learner (in child study) unique		
6	know the different human developmental characteristics of learners in KG-P3, P4-P6 and JHS		
7	identify own beliefs and biases about diversity, inclusion and equity		
8	start portfolio on child study		
9	seek the definition of inclusion ... as part of his/her personal teaching and learning philosophy		
10	identify learners who have difficulty overcoming barriers to learning		

Activity 3: Ensuring equity and inclusion in the delivery of lessons in Year 1 (25 minutes)

In your departmental groups:

- Write down as many equity and inclusivity issues as you can think of for consideration in Year 1 lessons.
- Explain to the larger group how you would use 3 of the issues you have written down in lesson delivery and assessment in Year 1.



REFLECTION (5 MINUTES)

Reflect on the key points in the unit by answering the following questions:

1. What can you do to deepen your knowledge and skills in ensuring that student teachers meet the standards on equity and inclusion.
2. Explain how you would apply at least 2 inclusivity and equity ideas in your lesson delivery and assessment in any class you teach in the college.



INTER-UNIT ACTIVITY

1. Read Unit 3 and answer the following questions for that session:
 - ◊ What is an inclusive course learning outcome?
 - ◊ State 3 purposes of inclusive course learning outcomes.
2. Write down any challenges you face this week/next week while implementing the new Year 1 curriculum for discussion at the next PD session.



MATERIALS FOR UNIT 3:

1. Samples of course learning outcomes you have written while assessing student teachers in a particular semester.



UNIT 2 - ANNEXES

ANNEXE 2.1: EQUITY AND INCLUSIVITY

(Refer to: Equity and Inclusivity on pages 66 & 67 of Theme 6, handbook for PD Coordinators).

(Refer to pages 41-43 of The National Teacher Education Framework).

ANNEXE 2.2: INCLUSION AND EQUITY

Student Progress Through the B.Ed. Curriculum (i.e. standards that student teachers are to attain by the end of each year).

(Refer to pages 40-44 of The Initial Teacher Education Curriculum Writing Guide).

(Refer to: *Inclusion and Equity, Student Progress Through the B.Ed. Curriculum* on pages 40 - 42 of The Initial Teacher Education Curriculum Writing Guide).

REFERENCES

MoE (2018). *The initial teacher education curriculum writing guide*, Accra: Ministry of Education.

MoE (2017). *The National Teacher Education Curriculum Framework: The essential elements of initial teacher education*, Accra: Ministry of Education.

MoE (2016). *T-TEL professional development programme – Theme 6: National Teachers' Standards and Teacher Education Curriculum Framework for Ghana (handbook for professional development coordinators)*, Accra: Ministry of Education.

NTC (2017). *National Teachers' Standards for Ghana: Guidelines*,

Accra: National Teaching Council

UNIT 3: COURSE LEARNING OUTCOMES IN THE NEW 4-YEAR B.ED. CURRICULUM

Learning Outcomes By the end of the unit, every tutor should be able to:	Learning Indicators
1. Demonstrate understanding of learning outcomes and the purpose(s) for writing them.	1.1 Explain what a learning outcome is 1.2 List three purposes for writing learning outcomes.
2. Demonstrate understanding of the principles that guide the writing of course learning outcomes.	2.1. Identify and explain the principles that guide the writing of course learning outcomes. 2.2. Change a learning objective into a leaning outcome.
3. Show how course learning outcomes are used to teach and assess the learning of student teachers bearing in mind equity and inclusivity.	3.1 Explain how course learning outcomes can be used to teach a particular subject taking into account issues on equity and inclusivity. 3.2 Explain how course learning outcomes can be used to assess the learning of student teachers in a particular subject taking into account issues on equity and inclusivity.
4. Recognise envisaged challenges associated with developing and using course learning outcomes and suggest appropriate ways of addressing them.	4.1 Outline some of the envisaged challenges associated with developing and using course learning outcomes. 4.2 List appropriate ways of addressing the envisaged challenges.

Revision Activity (10 minutes)

- Reflect on the following questions:
 - ◇ What do the terms inclusion and equity mean as used in the new 4-year B.Ed. curriculum?
 - ◇ Identify two inclusion and equity standards a student teacher is required to meet at the end of the first year of the new 4-year B.Ed. programme.
 - ◇ How do you ensure equity and inclusion in the delivery of your lessons?
- In pairs, share your answers.
- What challenges did you face while implementing the new Year 1 curriculum since the last PD session?

INTRODUCTION

Unit 3 aims to equip every tutor with the required knowledge and skills for writing learning outcomes of courses and how to use them to teach and assess the student teacher.

The new 4-year B.Ed. curriculum states explicitly that course learning outcomes 'set out what the trainee should know and be able to do on successful completion of the course. They should specify the results or intended impact of the learning rather than the learning process itself'. In other words, they describe the measurable skills, abilities, knowledge or values that student teachers should be able to demonstrate as a result of completing the course. They are student-centred rather than teacher-centred, in that they describe what the students will do, not what the teachers will teach.

Every tutor is expected to write appropriate learning outcomes for all courses taught, hence the need to learn how to write and use them.

Activity 1: Course learning outcomes and their purposes (15 minutes)

- In your departmental groups, share ideas on what you think course learning outcomes are and the purpose(s) for writing and using them.
- Share your ideas with the larger group by using the 'radio reporter' activity.
- Refer to Annex 3.1 for additional information.



Activity 2: Principles guiding the writing of course learning outcomes (25 minutes)

- In your departmental groups, use a concept cartoon to write down:
 - ◊ Principles to be considered in writing course learning outcomes.
- Post both responses on the walls for a gallery walk.
- Whole group discussion of any issues raised during the gallery walk.
- Refer to Annex 3.2 for a sample of a concept cartoon and to 3.1 for ideas on principles guiding the writing of course learning outcomes.
- Still in your departmental groups:
 - ◊ Write 2 learning objectives;
 - ◊ Change them into learning outcomes;
 - ◊ Present your work in tabular form on a flip chart for a larger group discussion.



Activity 3: Using course learning outcomes to teach and assess student teachers (20 minutes)

In your departmental groups:

- Exchange and read each other's sample of course learning outcomes.
- Share ideas on whether they follow the principles for writing them.
- Discuss how you use course learning outcomes to teach and assess student teachers, taking into consideration issues on equity and inclusivity.
- Share with the larger group.



Refer to Annex 3.3 for a sample of course learning outcomes which you can study to improve your work.

Activity 4: Some challenges associated with writing and using course learning outcomes (15 minutes)

- Write 2 challenges associated with writing and using course learning outcomes into your learning journals.
- Provide suggested solutions to the challenges you have identified.
- Share ideas in pairs.
- A few pairs should share their ideas with the larger group for discussion.

REFLECTION (5 MINUTES)

Reflect on the key issues in the unit by answering the following question:

1. What principles will you consider when preparing course learning outcomes?



INTER-UNIT ACTIVITY

1. Read Unit 4 and answer the following questions on it before the next session:
 - ◊ What is a learning indicator?
 - ◊ How do learning indicators influence teaching and learning?
 - ◊ How are learning indicators related to assessment?
2. Also, bring along a list of subject specific learning indicators in teaching and learning.
3. Write down any challenges you face this week/next week while implementing the new Year 1 curriculum for discussion at the next PD session.



MATERIALS FOR UNIT 4:

N/A



UNIT 3 - ANNEXES

ANNEXE 3.1: PRINCIPLES GUIDING THE WRITING OF COURSE LEARNING OUTCOMES

<p>Course Learning Outcomes:</p>	<p>These set out what the Trainee should know and be able to do on successful completion of the Course. They should specify the results or intended impact of the learning rather than the learning process itself.</p> <p>Consider the following points when writing learning outcomes:</p> <ul style="list-style-type: none"> • SPECIFIC - clear about expectations, what you want the Trainee to achieve. • MEANINGFUL - they should be written in a language that is accessible to their readership. • APPROPRIATE - they should be appropriate to both the learner's abilities / experience and the identified level and content of the Course. • REALISTIC - in terms of achievement, time and resources required to undertake the Course – remembering the Trainees have other demands. • MEASURABLE - allow some measure(s) of achievement to be made by both the Trainee and the assessor. <p>In terms of developing effective Course learning outcomes (and indeed the assessment used to measure these outcomes), it might be useful to ask yourself the following THREE sets of questions at the outset of developing a Course;</p> <ol style="list-style-type: none"> 1. (In terms of knowledge) - What knowledge will the Trainee have at the end of this Course? How will they use it in their teaching? 2. (In terms of transferable skills) - What skills will they develop that can be transferred beyond the Course and to their future? What skills that are specific to being a teacher will they develop? 3. (In terms of Cross Cutting Issues) What values and attitudes will the Trainee develop from this Course? Consider areas related to equity, inclusivity, diversity, gender, ICT, ethical issues and professional values.
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ANNEXE 3.2: SAMPLE CONCEPT CARTOON

One of the principles is ...
1.

Another is ...
1.



ANNEXE 3.3: USING LEARNING OUTCOMES TO TEACH AND ASSESS STUDENT-TEACHERS

YEAR 1 SEMESTER 2 COURSES FOR PRIMARY: PEDAGOGY I

Course Learning Outcomes:	On successful completion of the course, student teachers will be able to:	Indicators
	CLO 1. Demonstrate knowledge and understanding of the concepts of human growth, development and maturation and the causes of abnormality (NTECF, NTS 3f, 3g).	1.1 Explain the difference between human growth, development and maturation. 1.2 Discuss the educational implications of the principles of human growth and development. 1.3 Discuss the causes of abnormality.
	CLO 2. Demonstrate knowledge and understanding of the course of human growth and development and how to determine the sex of a developing foetus.	2.1 Describe the pre-natal, perinatal and the post-natal phases of human development. 2.2 Explain how the sex of a developing foetus is determined. 2.3 Discuss the educational implications of the course of human growth and development.
	CLO 3. Demonstrate basic knowledge and understanding of the domains of development (NTS 3g, 3f).	3.1 Explain cognitive development of learners from age early grade to early adolescence 3.2 Describe socio-emotional cognitive development of learners from age early grade to early adolescence 3.3 Discuss physical development of learners from age early grade to early adolescence
	CLO 4. Demonstrate knowledge and understanding of threats to human growth and development and their educational implications (NTS 2f, p.17, 3c, 3g, p. 14).	3.1 Explain clearly the various biological threats to human growth and development and the educational implications. 3.2 Examine the various environmental threats to human growth and development and their educational implications.
	CLO 5. Demonstrate understanding and application of learning styles and various strategies for learning	4.1. Identify the various learning styles and clearly explain how it relates to them. 4.2. Examine the various learning strategies for each learning style.
	CLO 6. Demonstrate effective ways of motivating learners in inclusive and multi-grade learning environments (NTECF, NTS 3d, p.14).	5.1. Use appropriate techniques such as positive reinforcement and shaping to modify behaviour of diverse learners in inclusive classrooms. 5.2. Apply democratic principles in teaching and learning sessions to highlight the values of fairness and justice to enhance collaborative learning.

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UNIT 4 - ALIGNING LEARNING INDICATORS, TEACHING AND ASSESSMENT

Learning Outcomes By the end of this unit every tutor should be able to:	Learning Indicators
1. Demonstrate understanding of the term <i>learning indicator</i> .	1.1 Explain the term learning indicator. 1.2 Match learning outcomes to their corresponding learning indicators. 1.3 Write learning indicators for given learning outcomes.
2. Demonstrate understanding of how learning indicators influence teaching & learning.	2.1 Show relationships between learning indicators, and teaching & learning. 2.2 Distinguish between learning outcomes and learning indicators. 2.3 Relate learning indicators to assessment methods.
3. Demonstrate understanding of how teaching influences assessment and vice-versa.	3.1 Give an example to support the claim that what is taught and learned influences what is assessed. 3.2 Give an example to support the claim that what is assessed influences what is taught and learned.

Revision Activity (5 minutes)

INTRODUCTION

Learning Indicators (LI) assist an educational institution to define and measure progress towards institutional goals and objectives. Once an institution has analysed its mission and defined its goals, it needs to measure progress towards those goals. Learning Indicators provide a measurement tool, an indication that it is 'on track' – most often, that it is working towards and attaining a beneficial outcome or improvement.

In a teaching and learning setting, a learning indicator essentially breaks down a learning outcome, enabling the observer to measure whether it has been met. It indicates what concrete action students should be able to take or perform as result of participating in the learning process. Once the learning outcomes have been identified, the knowledge and skills necessary for the mastery of these outcomes should be listed. This will allow the desired behaviour of the students to be identified and will help to eliminate ambiguity concerning the demonstration of competencies. See Annex 4.1 for a depiction of the relationship between learning outcome, learning indicator, teaching approaches and assessment. Learning indicators are made up of at least two main elements: illustrative verb; and content. The expected behaviour must be specified by name, preceded by an observable illustrative verb such as arrange, classify, demonstrate, interpret, develop, design, or apply. Learning indicators facilitate the curriculum delivery strategies, and assessment procedures (Rogers, 2010).

Activity 1: Understanding Learning Indicators (20 minutes)

- Be in groups of 5.
- Study the statements in column B (learning indicators as seen in Table 4.1) to the groups.
- Match the learning outcomes in column A with their corresponding learning indicators listed below.
- Present your work explaining the basis for the matching for general discussion.



Column B: Learning Indicators

- Produce a model of some excretory organs.
- Produce lesson plan with well-defined intended outcomes.
- Develop a concept cartoons showing some excretory organs and what they excrete, e.g. skin – salt.
- Develop concept maps matching common infections to their preventions/management.
- Prepare a worksheet of effects of pollution on the environment.
- Provide checklist to identify appropriate planning skills and assessment styles that will present the expected learning behaviour.
- Prepare lesson notes and plans that show a variety of teaching and learning strategies appropriate to learners to their developmental stages.
- Review sketches/photographs of science teachers at work.
- Identify the various learning styles and clearly explain how it relates to them.
- Examine the various learning strategies for each learning style.
- Explain cognitive development of learners from age early grade to early adolescence.
- Describe socio-emotional cognitive development of learners from age early grade to early adolescence.
- Explain clearly the various biological threats to human growth and development and the educational implications.
- Examine the various environmental threats to human growth and development and their educational implications.

Table 4.1: Matching learning outcomes with learning indicators

No	Column A: Learning Outcomes	Column B: Learning Indicators
1	Demonstrate understanding and application of learning styles and various strategies for learning.	
2	Demonstrate the ability to match some common diseases and infections of humans and their preventions/management and identify causes of, and types of pollution.	
3	Demonstrate basic knowledge and understanding of the domains of development.	
4	Demonstrate understanding on how children develop and learn in diverse contexts and applies this in their teaching.	
5	Demonstrate knowledge and understanding of threats to human growth and development and their educational implications.	
6	Plan and deliver varied lessons in a differentiated and inclusive manner that will produce the intended learning outcomes.	
7	Describe the structure and function of some excretory organs.	
8	Demonstrate basic and higher level of thinking skills in planning to teach, assessment and reporting.	

Activity 2: How learning indicators influence teaching and learning (25 minutes)

- Tick your preference for each of the statements in Table 4.2.
- When you have completed this, compare your responses with those of your partner, and give reasons for your decisions.
- Provide your answers for whole class discussion.

Table 4.2: Evaluating statements on learning indicators

No	Statement Indicate the extent to which you agree with the following:	Agree	Strongly agree	Disagree
1	Learning outcomes influence learning indicators.			
2	Learning indicators measure student learning outcomes.			
3	Learning indicators are always involved in making judgment about learning outcomes.			
4	The content of a lesson is determined by learning indicators.			
5	The quality of a tutor's lesson delivery can be assessed using learning indicators.			
6	The selection of teaching and learning materials for lessons is influenced by learning indicators.			
7	Teaching and learning policies are geared towards meeting learning indicators.			
8	Learning environment impacts on learning indicators.			
9	The selection of appropriate teaching and learning strategies is based on learning indicators.			
10	Learning indicators are goal, value and context laden.			
11	Developing the essential skills, knowledge and understanding required of a good teacher as set out in the NTS depends on learning indicators.			
12	Learning indicators guide tutors to set meaningful tasks that encourage inclusivity, equity and learner collaboration, and lead to purposeful learning.			

Activity 3: Demonstrating understanding of how teaching influences assessment and vice-versa (35 minutes)

Stand up and arrange yourselves into two groups.
Select two speakers to represent your group (lead and support).
Pick your statement from the following and discuss it. Be prepared to argue the case for this statement.

- What is taught and learned influences what is assessed.
- What is assessed influences what is taught and learned.

Take your turn to present your points in defence of your group's statement.



REFLECTION (5 MINUTES)

Lead tutors to discuss the question below:

1. What could be the impact of learning indicators on the quality of your lesson preparation and delivery?



INTER-UNIT ACTIVITY

Inter-unit Activity

Reflect on the following questions in preparation for next session

1. How do learning indicators influence teaching and learning?
2. How are learning indicators related to assessment?



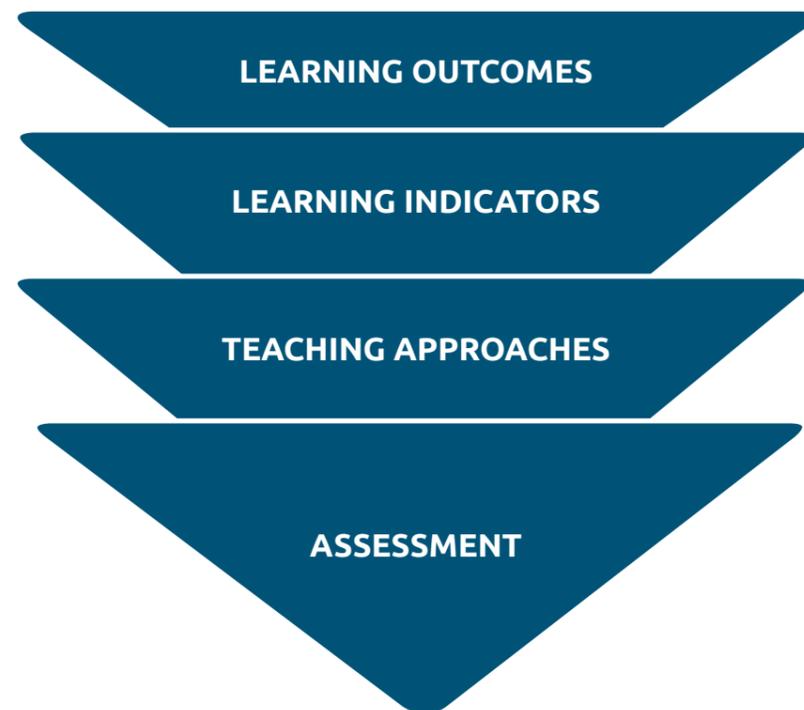
MATERIALS FOR UNIT 5:

1. Bring your course outline/curriculum for your subject areas for the next session.



UNIT 4 - ANNEXES

ANNEXE 4.1: RELATIONSHIP BETWEEN LEARNING OUTCOMES, LEARNING INDICATORS, TEACHING APPROACHES AND ASSESSMENT



REFERENCES

Adapted from: https://www.sc.edu/about/offices.../coursedevelopment/learning_outcomes/index.php

Rogers, G. (2010). What is a performance indicator anyway? Retrieved August 1, 2018 from <http://programassessment.blogspot.com/2010/05/what-is-performance-indicator-anyway.html>

UNIT 5 - INTEGRATING SUBJECT KNOWLEDGE AND PEDAGOGICAL KNOWLEDGE IN YEAR 1

Learning Outcomes By the end of this unit every tutor should be able to:	Learning Indicators
1. Demonstrate understanding of the integration of subject knowledge and pedagogical knowledge in teacher preparation.	1.1 Provide examples of integration of subject knowledge and pedagogical knowledge in lesson plans. 1.2 Give reasons for the use of pedagogical content knowledge in teaching and learning.
2. Show how subject knowledge and pedagogical knowledge are integrated in teaching.	2.1 Produce a lesson plan to show the three levels (i.e. planning, teaching and assessment) of integration of subject knowledge and pedagogical knowledge. 2.2 Describe how to use a teaching strategy to demonstrate the application of PCK in a specific subject. 2.3 Show how to use an assessment method to demonstrate integration of content knowledge and pedagogical knowledge.
3. Demonstrate understanding of factors that influence the integration of subject knowledge and pedagogical knowledge.	3.1 Select the factors that influence the integration of content knowledge and pedagogical knowledge from a given list. 3.2 Compare and discuss the selected factors giving reasons for their influence on the integration of subject knowledge and pedagogical knowledge.

Revision Activity (10 minutes)

Aligning learning (or performance) indicators with teaching and learning as well as assessment should be an ideal way by which every tutor ensures that the learning outcomes for lessons delivered are achieved.

In pairs, share your views on the following questions:

- How do learning indicators influence teaching and learning?
- How are learning indicators related to assessment?

INTRODUCTION (5 MINUTES)

Subject knowledge or content knowledge is the body of knowledge and information that teachers teach and that students are expected to learn in a given subject or content such as English (NTS, 2016). By contrast, pedagogical knowledge refers to specialised knowledge and skills of teachers for creating an effective teaching and learning environment for all learners (Guerriero, 2017).

The integration of subject knowledge and pedagogical knowledge in teaching and learning provides the teacher with pedagogical content knowledge (PCK). Pedagogical content knowledge is a type of knowledge that teachers acquire through the processes of reflection and teaching. It is based on the manner in which they relate their pedagogical knowledge (what they know about how they teach) to their subject matter knowledge (what they know about what they teach). Indeed, it is the integration or the synthesis of teachers' pedagogical knowledge and their subject matter knowledge that comprises pedagogical content knowledge (Shulman, 1986).

A pictorial representation of PCK is shown at Annex 5.1. This diagram indicates that PCK involves three kinds of knowledge which are knowledge about CONTENT, knowledge about TEACHING and knowledge about LEARNING (Killen, 2007). The knowledge about LEARNING includes knowledge of the curriculum, knowledge of learners' learning styles, and knowledge of learner misconceptions.

Activity 1: Relevance of subject knowledge and pedagogical knowledge in teacher preparation (15 minutes)

In your subject groups, answer the following questions:

- What is subject knowledge?
- What is pedagogical knowledge?
- Why is there the need for integration of subject knowledge and pedagogical knowledge?
- What is the relevance of subject knowledge and pedagogical knowledge in teacher preparation in terms of:
 - student teachers' learning?
 - student teachers' self-esteem and self-image?

Provide examples of integration of subject knowledge and pedagogical knowledge in lesson plans.

Give reasons for the use of pedagogical content knowledge in teaching and learning and put your answers on flip charts for whole class discussion.



Activity 2: Integrating subject knowledge and pedagogical knowledge in subject teaching (45 minutes)

In your subject groups, apply your pedagogical content knowledge to carry out the following activities:

- Categorise the items in *Subject and Curriculum Knowledge Pillar* into **content** and **pedagogy**:

Table 5.1: Subject and Curriculum Knowledge Pillar (NTECF, 2017)

	Content	Pedagogy
Subject knowledge for teaching content		
Progress in learning in subjects		
Common misconceptions		
Child development and learning in subjects in diverse contexts / cultures		
How to structure and represent academic content, age and subject (PCK)		
Specific teaching strategies to address students' learning needs in particular classroom circumstances (PCK)		
Subject Specific Assessment of pupils' learning (PCK)		

- Select a topic.
 - State the subject matter (*content knowledge*).
 - State the strategies (*pedagogical knowledge*) required to teach the topic selected.
 - Develop a lesson plan showing how the strategies are applied to the subject matter to enable clear understanding of what is to be learnt (Note: state the class; 2 learning outcomes and their corresponding indicators; and state how *content* integrates *strategies* in teacher – learner activities).
 - Examine the strategies applied to the content and justify why they are the best to be used to teach the lesson.
 - Identify strategies that are not appropriate for the lesson and indicate why they are not appropriate.
 - Describe how to use an assessment method (e.g. quiz, essay, role play) to demonstrate integration of content knowledge and pedagogical knowledge, indicating how decisions were arrived at.
 - What other knowledge do you need to consider to ensure learning outcomes are achieved through PCK?

Write your work on flip charts for presentation to the whole class.

Activity 3: Challenges of integrating subject knowledge and pedagogical knowledge. (10 minutes)

You have been provided with a number of statement of factors influencing the integration of subject knowledge and pedagogical knowledge in Table 5.2.

- Tick your preference in the boxes provided for each statement.
- Compare and discuss your responses with those of another person.
- Where you and your colleague have selected different responses, give reasons for your responses and share with the whole class.

Table 5.2: Statements of factors that influence the integration of content knowledge and pedagogical knowledge

No	Statements of factors that influence the integration of subject knowledge and pedagogical knowledge: Indicate whether you agree or disagree	Agree	Disagree
1	The success of integration depends largely on learner behaviours.		
2	The learning environment is a factor to consider during integration.		
3	Effective integration requires student teachers' readiness to learn more than the <i>content</i> .		
4	Tutors' wide and in-depth subject knowledge plays significant role in the integration.		
5	Enthusiastic tutors are more likely to achieve integration.		
6	Tutors with good methodology background and knowledge of the learners' cultural context are adequately prepared for integration.		
7	Tutors with only knowledge of class management and knowledge of teaching methods cannot integrate successfully.		
8	Knowledge of content alone can guarantee successful integration		
9	PCK refers to teachers' knowledge about how to combine pedagogy and content effectively.		
10	Pedagogical knowledge combines tutors' knowledge of the theories of learning and principles of teaching.		

REFLECTION (5 MINUTES)

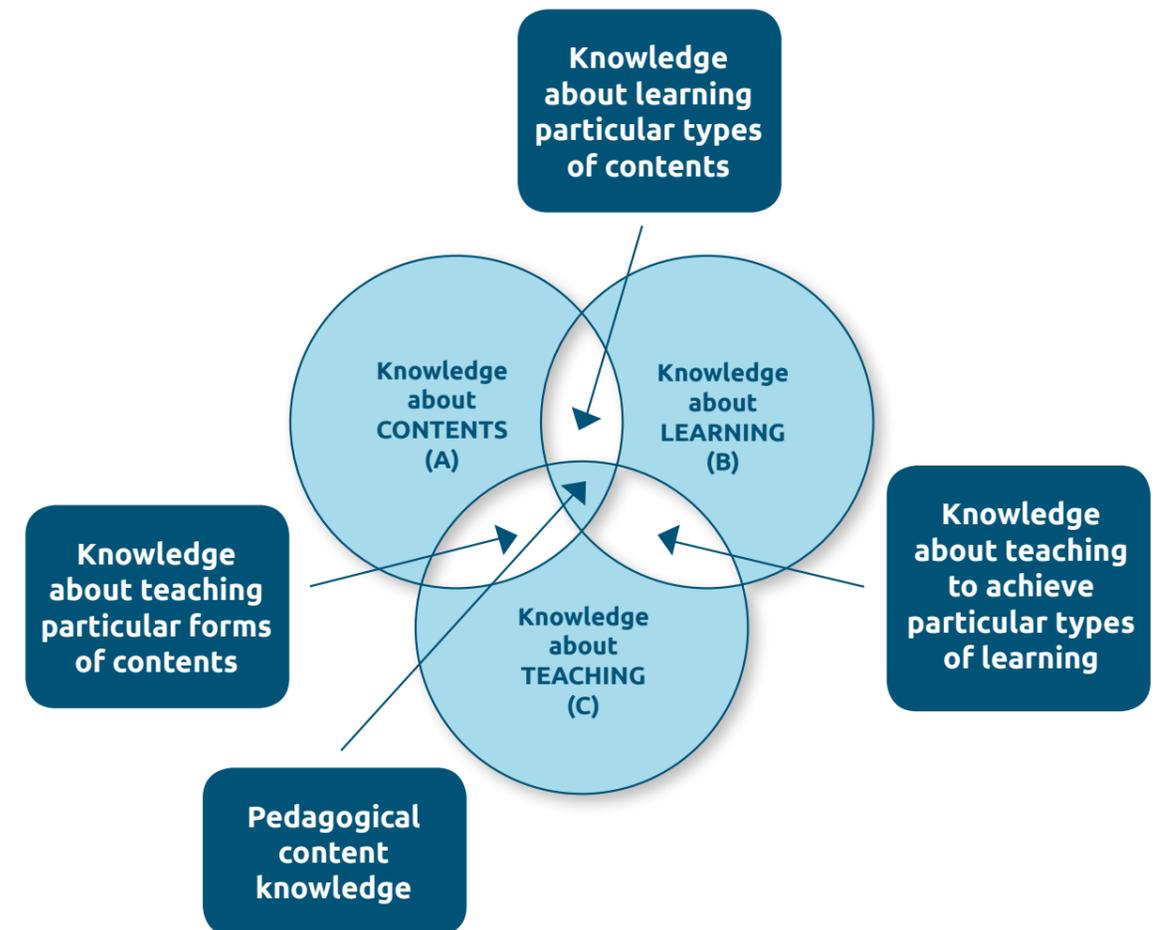
1. Did you achieve the learning outcomes and their indicators of this unit?
2. How might your understanding of integration of subject knowledge and pedagogical knowledge influence your delivery of lessons?
3. Have you identified any immediate challenges in the integration that you need to address through continuing professional development?

**INTER-UNIT ACTIVITY**

1. Read Unit 6: Preparing Course Manual.
2. Write down any challenge you faced this week or next week while implementing the new Year 1 curriculum for discussion.

**MATERIALS FOR UNIT 6:**

1. Course outlines.

**UNIT 5 - ANNEXES****ANNEXE 5.1: INTEGRATION OF CONTENT, LEARNING AND TEACHING****Figure 5.1: Illustration of Pedagogical Content Knowledge (PCK), adapted from Killen (2007, p44)****ANNEXE 5.2: NOTES FROM THE NTECF****INTRODUCTION**

Subject and curriculum knowledge represent the combination of subject matter or content knowledge and curriculum knowledge into an understanding of how key concepts of the basic academic disciplines (i.e. subject matter) are represented, and organised, and how they are applied in the school curriculum, textbooks and in the design and selection of teaching resources. The kind of teacher and teacher education envisioned in the Curriculum Framework calls on all to perceive teacher education as a holistic enterprise involving actions of different kinds and from multiple fronts aimed at the development of the total teacher – a teacher who has developed the appropriate professional values

and attitudes, professional knowledge, and professional practice and is therefore knowledgeable and understanding of educational curriculum and frameworks, having a repertoire of skills for teaching, learning and assessment and managing the learning environment, with positive attitudes, habits, and values and the capacity to reflect.

Expectations of subject and curriculum knowledge

According to the National Teachers' Standards, the pre-service teacher education programmes should prepare a teacher who:

1. demonstrates familiarity with the education system and key policies guiding it;
2. has comprehensive knowledge of the official school curriculum including learning outcomes;
3. has secure content knowledge, pedagogical knowledge and pedagogical content knowledge;
4. knows the curriculum for the years appropriate to multi-grade classes;
5. has a good knowledge of how to teach beginning reading and numeracy, and can use at least one Ghanaian language as medium of instruction;
6. understands how children develop and learn in diverse contexts and applies this in their teaching; and
7. takes account of, and respects, learners' cultural, linguistic socio-economic and educational backgrounds in their planning and teaching.

The modules or courses for teaching, learning and assessment in ITE institutions should be linked to the above-stated standards in an integrated manner for their attainment. It is important that courses are also structured to integrate elements of the four key curricular areas or broad curricular pillars of teacher education – Subject and Curriculum Knowledge; Pedagogic Knowledge; Literacy in Ghanaian and English Languages; and Supported School Placement. The curricular pillars are not only interconnected but also underpinned by cross-cutting issues (as shown in Figure 1 above), feeding each other towards the total development of the student teacher. This section gives concrete suggestions as to how the curriculum for ITE can be redesigned to focus on development of a knowledgeable and understanding teacher.

Subject and curriculum knowledge

Two key components of the Subject and Curriculum Knowledge pillar of the ITE curriculum are Subject Content Knowledge and Subject Curriculum Knowledge (Figure 1). A major expectation of students in ITE is that they have a secure knowledge of content as well as the curriculum they are going to implement. Some of this knowledge is attained in the students' general education prior to their enrolment into the ITE programme and then built upon in the disciplinary studies courses. For effective curriculum implementation, it is important that the teacher attains a subject knowledge that goes beyond what is contained within the curriculum at the level he/she is specialising. He/she should be able to identify and address gaps in his/her own subject knowledge through self-study. In addition, he/she should be able to articulate high standards of literacy as well as demonstrate good content knowledge in the core subjects and his/her discipline. What is essential is that trainee teachers have the subject knowledge required to support children to successful learning outcomes through the School Curriculum.

It is therefore mandatory for ITE programmes to include the study of subjects that provide sufficient disciplinary learning to complement the pedagogical training. The nature of the subject studies however depends on the teacher's level of specialism. The sections that follow provide guidelines on what should go into courses for developing trainees' understanding of educational foundations, subject content and curriculum knowledge.

In brief, this pillar will address:

- Subject knowledge for teaching content;
- Progress in learning in subjects;
- Common misconceptions in subjects;
- The school curriculum, including learning outcomes;
- The education system and key subject policies guiding it;
- Child development and learning in subjects in diverse contexts / cultures.

Subject content knowledge

Initial Teacher Education (ITE) students are expected to demonstrate a knowledge of subject content that goes beyond the level of the curriculum they will be implementing in their specialisms. The subject content knowledge should encompass the subject's key concepts, substance and structure. A strong content knowledge needs to link to relevant pedagogical knowledge through training. Initial teacher education institutions in Ghana offer the concurrent programme and therefore should ensure their disciplinary studies provide sufficient subject content knowledge for teaching at the basic school level. Therefore, their content knowledge courses should focus on developing a deeper understanding and consolidation of relevant content.

Curriculum provision

Disciplinary studies should comprise the Core Subjects – Literacy (English [L2] & Ghanaian Language [L1] and language proficiency for instruction) (essentially addressed through the Literacy Studies pillar), Mathematics, Science, and ICT. It should also comprise the courses addressing the subjects of the school curriculum. The depth of subject study will vary across different subjects with greater emphasis on: English, mathematics, science and ICT. Helping subjects like Arts, Music, Arts & Craft, Culture, Physical Education, Health and Well-being will be addressed. In addition, institutions specialising at the junior and senior high phases should offer elective courses in Pre-Technical skills; Pre-Vocational skills; and in subjects in the students' specialisms. Any institutions offering the consecutive programme must discover whether the underpinning subjects in the prior degree provide sufficient subject content knowledge, and, ensure additional modules or courses are taken either prior to admission or concurrently. That is, it is necessary to allow graduates in the consecutive ITE programmes to complete relevant modules missing from their undergraduate degrees.

GENERAL PEDAGOGICAL KNOWLEDGE

Rationale

General Pedagogical Knowledge refers to the principles and strategies of classroom management and organisation, teaching methods, assessment, learning processes and learner characteristics that are cross-curricular. The rationale for pedagogical study is to help trainees understand how to teach and assess the subjects that schools offer and their pedagogical approaches in the context of the school and the learner. Pedagogical study makes teachers see the linkages among learner, context, subject discipline and the pedagogical approach. Courses in General Pedagogical Knowledge (PK) are focused on the learner and his/her context. Teachers' PK is the 'how' of teaching and it includes knowledge of different theories about learning, learning styles, learners' context, planning and management, and evaluation. General Pedagogical Knowledge is acquired through education coursework and developed and embedded through supported teaching in school (personal experiences). The links between subject and curriculum knowledge and Pedagogical Knowledge need to be made explicit to trainees.

Curricular provision

Theoretical Aspect

Courses in Pedagogy: these involve courses in pedagogy which include: knowledge as construction through experiences; nature of disciplines; critical understanding of school curriculum, and pedagogy as the integration of knowledge about the learner, the discipline and the context. This would include separate but interrelated courses on: knowledge of classroom management; knowledge of learning processes; knowledge of teaching methods; knowledge of classroom assessment; structure; adaptivity; knowledge of individual student characteristics and behaviour management. A pedagogy course should include the following: i) skills in and knowledge of class management and ii) skills in and knowledge of managing students' learning. The issues of trainee teachers' engagement with learners' assessment needs to be integrated with courses in pedagogical studies. It should include a rigorous critical reading of perspectives that regard learner assessment. The training should broaden the scope of assessment beyond achievement testing to cover a child's overall development, action research and reflective practice strategies for supported teaching in school.

Practical Aspect

Practical courses should be designed on:

- themes of classroom management;
- teaching/learning materials development and;
- supported Teaching in Schools.

Trainee teachers learn to integrate ideas, experiences and professional skills through hands-on experience of developing curriculum and learning materials, designing appropriate activities for children of different age groups and formulating questions to facilitate learning. Also, trainee teachers need to learn to prompt pupils to ask questions and to learn to collate these to further the processes of learning. For instance, for in a language pedagogy course, trainee teachers would need to:

- engage with projects involving listening to and developing children's reading;
- observe and analyse reading difficulties;
- observe and identify mismatches between school language and home language;
- analyse textbooks and other materials used in different subjects in terms of presentation, style and language used.

Practical activities should include:

- hands-on learning;
- planning lessons to accommodate learners' interests and adopting creative ways for teaching the basic school curriculum, drawing upon low or no cost teaching and learning resources;
- collection and presentation of specimens of natural resources and indigenous knowledge available in the area using reports, journals, magazines, newspapers, documents, atlas, map drawing and reading in the classroom.

After this exercise, student teachers can be engaged in other activities such as:

- reflective discussion;
- learning how-to-do observations, recording and analysing them.

Supported teaching is one of the ways to ensure that trainee teachers will have the opportunity to be engaged in school contexts to interact with learners. This will create the opportunity for trainees to learn how to design projects that are level specific.

PEDAGOGICAL CONTENT KNOWLEDGE

Rationale

Pedagogical Content Knowledge is included in subject and curriculum knowledge. The study of subject specific pedagogy, also referred to as Pedagogical Content Knowledge, will equip trainee teachers to understand school subjects and the pedagogical approaches in the context of the school and the learner. It will help the teacher to establish the links between, and among, learner, context, subject discipline and the pedagogical approach. Teachers' Pedagogical Content Knowledge (PCK) is a key concept in teaching. PCK is the type of knowledge that is unique to teachers and relates to the manner in which teachers relate what they know about teaching (general pedagogical knowledge) to what they know about what they teach (subject matter knowledge). It refers to teachers' knowledge about how to combine pedagogy and content effectively. Teachers' knowledge about the pedagogy of subjects, such as language, sciences, mathematics and social studies, equips them with the skills needed to manage the teaching and learning process in a manner that they will be able to draw upon epistemological insights while teaching any of the key disciplines.

PCK is a form of practical knowledge that entails, among other things: (a) knowledge of how to structure and represent academic content for direct teaching to students; (b) knowledge of the common conceptions, misconceptions, and difficulties that students encounter when learning particular content; and (c) knowledge of the specific teaching strategies that can be used to address students' learning needs in particular classroom circumstances.

The transformation of subject matter for teaching occurs as the teacher critically reflects on and interprets the subject matter; finds multiple ways to represent the information as analogies, metaphors, examples, problems, demonstrations, and classroom activities; adapts the material to students' abilities, gender, prior knowledge, and preconceptions (those pre-instructional informal, or non-traditional ideas students bring to the learning setting); and finally tailors the material to those specific students to whom the information will be taught.

In addition to PCK, technology in pedagogy is important. Technological Pedagogical Content Knowledge (TPCK also called TPACK) entails the existence, components and capabilities of various technologies that can be and are used in the teaching and learning process. Trainee teachers need to integrate technology into their teaching. This knowledge will build trainee teachers capacity about how teaching and learning might change depending on the type of technology they employ. Teachers' TPCK will help them understand: the range of tools that exist for doing specific tasks during the teaching learning process; choose tools based on their fitness; find strategies for using the tools; discover knowledge about pedagogical strategies and the ability to apply the strategies for the use of information technologies.

Curricular provision

Theoretical Aspect

Courses in Pedagogy, Content and Technology: knowledge as construction through experiences, nature of disciplines, critical understanding of school curriculum; and pedagogy as the integration of knowledge about the learner, the discipline and the context. This would include building trainee teachers' capacity in PCK and TPCK/TPAC in the different subject areas such as literacy, mathematics, and integrated science and citizenship education/social studies at early grade, upper primary, and junior high school/senior high school levels of education. In particular, trainee teachers TPCK requires an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content. Subject specialist trainee teachers will need

to engage with deeper epistemological questions of the disciplines they specialise in. Specific tasks related to, how learners engage with school subject-content misconceptions need to be addressed through a rigorous study of disciplinary knowledge, besides a specific focus on content area literacy and tasks of writing observations and analysis for enhancing conceptual understanding. Pedagogy courses will need to be designed to address specific levels of education – early grade (KG to P3), upper primary and secondary.

Practical Aspects

Practical aspects of the PCK should be designed in a manner to facilitate the transfer of knowledge from PK into specific subjects. Also, practical aspects should include the best ways to use technology to teach with the understanding of technological pedagogical content knowledge as well as technological material development/usage in teaching content. Practical activities could be based on the integration of technological content knowledge, general pedagogical knowledge and pedagogical content knowledge in the classroom. These could be followed by reflective discussion, learning how to make observations, record them and analyse them. Such an approach would help forge links between the learner and his/her context, disciplinary content and the technological pedagogical content knowledge used. A key component of this entails trainees observing their tutors teach specific subjects in the placement schools, engaging in hands-on learning activities or watching video clips to appreciate how the theory is can be applied in practice.

FURTHER NOTES

Importance of subject knowledge and pedagogical knowledge in teacher preparation

Teachers need wide and deep knowledge if they are to respond well, even though the response may often be to ask further questions and to point to ways of finding out or exploring further. Moreover, teachers need subject knowledge that is linked closely to pedagogical knowledge. For example, an awareness of common misconceptions and ways of looking at them, the importance of forging links and connections between different subject (mathematical) ideas and the flexibility that comes from seeing alternative ways of looking at the same idea or problem are all essential for effective teaching.

A teacher's ability to prepare effective lessons and to respond perceptively and flexibly to the multitude of difficulties that pupils encounter with a subject such as mathematics is dependent on their own depth of understanding of the topics involved and their own powers of mathematical thinking, as well as their more general pedagogical skills and understandings. Subject knowledge which embraces depth of understanding, an ability to think appropriately in a subject area and subject related pedagogical knowledge, as well as content knowledge at an appropriate level, is vitally important to all who teach any subject.

Subject knowledge is a major element of what is transferred, along with teaching skills. Subject knowledge has a very important role to play because high-quality teaching rests on teachers understanding the subjects they are teaching, knowing the structure and sequencing of concepts, developing factual knowledge essential to each subject and guiding their pupils into the different ways of knowing that subjects provide.

- **Definition of strategies**

Teaching strategies refer to the structure, system, methods, techniques, procedures and processes that a teacher uses during instruction. These are strategies the teacher employs to assist student learning.

<https://www.nwmissouri.edu/education/peu/pdf/studentteach/mopta/Task3Definition.pdf>
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UNIT 6 - PREPARING YEAR ONE COURSE MANUALS

Learning Outcomes By the end of this unit every tutor should be able to:	Learning Indicators
1. Show familiarity with the essential features of a course manual.	1.1 Write the essential features of a course manual. 1.2 Compare the listed features with a given list of features. 1.3 Distinguish between essential features and non-essential features of a course manual.
2. Demonstrate knowledge of the relevance of a course manual.	2.1 List the benefits of the use of a course manual in lesson delivery. 2.2 List possible dangers associated with not using a course manual.
3. Analyse the similarities and differences between a course manual and a course outline.	3.1 List the similarities between a course manual and a course outline. 3.2 List the differences between a course manual and a course outline. 3.3 Justify the need for both a course manual and a course outline.
4. Begin to prepare a course manual in their subject areas and address any challenges associated with preparing a course manual and how to overcome them.	4.1 Produce a miniature course manual in their subject areas. 4.2 Outline the challenges in preparing a course manual and how to overcome them.

Revision Activity (10 minutes)

- How might your understanding of integration of subject knowledge and pedagogical knowledge influence your delivery of lessons?
- What challenges did you face while implementing the new year one curriculum since the last PD session?

INTRODUCTION (5 MINUTES)

For every lesson delivery to be effective, there is the need for thorough preparation, which leads to effective teaching and learning. Such thorough preparation can be evidenced by an appropriate course manual.

This unit discusses the preparation of course manuals generally, with emphasis on course manuals for Year 1 of the new 4-year B.Ed. curriculum. It touches on the essential features of a course manual, its relevance, how different it is from a syllabus and the challenges associated with its preparation.

Activity 1: Essential features of a course manual (15 minutes)

What are the essential features of a course manual? Present your responses on flip chart paper for discussion.

Activity 2: Relevance of a Course Manual (10 minutes)

In your groups,

1. Identify the benefits of using a course manual in lesson delivery.
2. List possible dangers associated with not using a course manual in lesson delivery.
3. Present your reports on flip charts for discussion by the larger group.

**Activity 3: Similarities and differences between a course manual and a course outline (10 minutes)**

In your groups,

1. Study Annexes 6.1A, B and C, and list similarities and differences between a course manual and a course outline.
2. Justify the need for a course manual.
3. Present your work on flip charts for discussion.

**Activity 4: Course manual preparation, challenges and solutions (45 minutes)**

In your Subject groups,

1. Use the relevant year 1 course materials in the new 4-year B.Ed. curriculum and any other relevant material to begin to prepare course manuals.
2. Refer to the essential features provided in Annex 6.1A. as a guide.
3. Display your work on the walls for gallery walk.
4. Compare Annex 6.1B to what you have prepared in your subject area.
5. Are there any similarities and/or differences?
6. Discuss the challenges you encountered and provide possible solutions.

**REFLECTION (5 MINUTES)**

1. Have we achieved our learning outcomes?
2. What will be the likely impact of a course manual on your teaching?

**INTER-UNIT ACTIVITY**

1. Write down challenges you face this/next week while implementing the new year one curriculum for discussion at the the next PD session.
2. Read Unit 7 thoroughly before the next PD Session.

**MATERIALS FOR UNIT 7:**

1. STS Year I Student Handbook.



UNIT 6 - ANNEXES

ANNEXE 6.1A: ESSENTIAL FEATURES OF A COURSE MANUAL

COURSE INFORMATION	
Code:	
Title:	
Credits:	
Prerequisite knowledge/skills:	
COURSE TUTOR INFORMATION	
Name:	
Department/Unit	
Telephone:	
Email:	
COURSE DESCRIPTION	
COURSE learning/Outcomes and indicators	
At the end of the course students will be able to:.....	
COURSE CONTENT (INTERGRATED)	
UNITS OR TOPICS WITH SUGGESTED TEACHING LEARNING STRATEGIES	
Unit /Topic	Teaching and Learning strategies
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
Note: Include Supported Teaching in Schools (STS) for year 1, beginning writing portfolio and beginning writing philosophy.	

ASSESSMENT

A combination of formative and summative assessment including group tasks, quizzes, assignments, portfolio, SRJ and examination will be used.

Assessment weighting

End-of-semester examination: %

Continuous assessment (types) %

Supported teaching %

Portfolio %

You will be graded as follows:

COURSE POLICY

Attendance:

Code of conduct:

Cheating/plagiarism:

Assignment submission:

Referencing:

REFERENCES

Week beginning	Week	Advance preparation for student teachers	Content/Topic	Learning outcome(s)	TLMs	PCK Activities	Assignment on lesson	Remarks
	1							
	2							
	3							
	4		Example: STS – school visit for observation			Example: Familiarization with school culture, beginning child study		
	5							
	6		Example: STS – school visit for observation			Example: Familiarization with basic school curriculum, beginning collecting artefact		
	7							
	8							
	9							
	10							
	11							
	12							
	13		Example: Revision					

ANNEXE 6.1B: SAMPLE COURSE MANUAL FOR LEARNING, TEACHING AND APPLYING NUMBER AND ALGEBRA

COURSE INFORMATION

Code: MAE 111

Title: Learning, Teaching and Applying Number and Algebra

Credits: 3 HOURS

Prerequisite knowledge/skills: Credit in Senior High School Core Mathematics

COURSE TUTOR INFORMATION

Name: ABC

Department/Unit: Mathematics/ICT

Telephone: 0200000000

Email: def@ghi.edu.gh

COURSE DESCRIPTION

There is the need to do auditing of subject knowledge to establish and address student teachers' learning needs, perceptions and misconceptions in Number and Algebra. Knowledge, skills and understanding of fundamental concepts of Number and Algebra, as well as, the ability to identify one's own individual characteristics (culture, ethnicity, religion, family constellation, socio-economic background, dis/ability, etc.), can lead to a student teacher's ability to apply these two areas of mathematics in patterning, generalisation and algebraic reasoning in reminding the student teachers of the role of deductive reasoning in developing mathematical ideas. Algebra is about generalized mathematical thinking arising from seeing patterns and relationships. Strong foundations in Number and Algebra can help student teachers to develop confidence in demonstrating their mathematical abilities. For that reason, this course is designed to help student teachers to develop demonstrable confidence to explain or justify their thinking, based on their observations, the patterns they have observed, or what they know about numbers and algebraic relationships. As they do so, they develop confidence in teaching related topics in Number and Algebra to their pupils at the respective grade levels.

Topics in Number and Algebra include recognizing and developing patterns, using numbers and number operations, properties of numbers, concept of sets, number bases and modulo arithmetic, and algebraic expressions. In addition, student teachers will explore operations on algebraic expressions; apply mathematical properties to algebraic equations and functions. Using many examples of different local and global contexts, student teachers will solve mathematical problems using equations, graphs and tables to investigate linear and quadratic relationships. ICT tools and other manipulative materials will be used to introduce student teachers to the concepts listed above and to extend their conceptual understanding of the areas under study.

The course will focus on mathematical content on one hand and the strategies and learning experiences in doing mathematics on the other hand. These will be combined to form an integrated instructional approach that addresses the course learning outcomes. Differentiated approach to teaching will be used to ensure that student teachers will be supported in the area of Number and Algebra. The instructional strategies will pay attention to all learners, especially girls and students with Special Education Needs. The course will be assessed using a variety of assessments methods including coursework (assignments, quizzes, project works and presentation) and end of semester examination to provide a comprehensive outlook of student teachers' competencies and skills. References are made to the following (NTS, 2b, 2f, 3j; NTECF p.30).

COURSE LEARNING OUTCOMES AND INDICATORS

Course Learning Outcomes (CLOs) with indicators	Outcomes	Indicators
	On successful completion of the course, student-teachers will be able to: 1. Demonstrate deep understanding of working with key mathematical concepts in the Number and Algebra content domains in the basic school mathematics curriculum (professional values, knowledge & practice) (NTS 2b).	1.1 Outline and address their perception and misconceptions about concepts in Number and Algebra. 1.1 Select and use the most appropriate mathematical method(s) or heuristics in carrying out tasks/exercises/problems in number and algebra within the basic education mathematics curriculum. 1.2 Make connections between mathematical concepts in the Number and Algebra content domains and applying them in teaching and solving real-life problems. 1.3 Identify and resolve mathematics related learning difficulties within the number and algebra content domains.
	2. Use manipulatives and other TLMs including ICT in a variety of ways in learning mathematics concepts (practical skills, digital literacy, problem solving) (NTS 3j).	2.1 Use manipulatives and other TLMs in developing number and algebraic concepts. 2.2 Use ICT as a tool in developing number and algebraic concepts in the basic school classroom. 2.3 Use drawing tools to conduct number and algebraic investigations emphasising visualization, pattern recognitions, conjecturing, etc. 2.4 Solve mathematics problems using manipulatives and/or technology related strategies in a variety of ways. 2.5 Use adaptive TLMs to support pupils with SEN
	3. Demonstrate value as well as respect for equity and inclusion in the mathematics classroom (knowledge) (NTS 2f).	3.1 Discuss personal perception about individuals with special needs in learning number and algebra. 3.2 Examine student teachers own misconceptions about number and algebra. 3.3 Appreciate the contributions of colleagues in the mathematics classroom. 3.4 Support colleagues in the mathematics classroom. 3.5 Cooperate with colleagues in carrying out mathematics tasks. 3.6 Engage in reflective thinking about how mathematics was taught in student-teacher's basic and high school days.
	4. Demonstrate awareness of core skills, individual characteristics and socio-cultural issues in teaching and learning mathematics in the content domains (knowledge) (NTS 2f).	4.1 Address Socio-cultural issues emerging from the teaching and learning of mathematics. 4.2 Reflect and show how student teachers' mathematics history influences their views of mathematics and its learning.

COURSE CONTENT (INTEGRATION OF SUBJECT MATTER AND PEDAGOGY) - UNITS OR TOPICS WITH SUGGESTED TEACHING LEARNING STRATEGIES

Unit	Topics	Sub-topics/theme (if any):	Teaching and learning activities to achieve learning outcomes
1	Numbers and Numeration systems: <i>Learning, teaching and applying.</i>	Development of Real number, up to Irrational. Misconceptions and barriers in teaching and learning number	Discussion of student teachers' perception and misconceptions about concepts in Number and Algebra. Investigations and Mathematical problem-solving strategies involving numbers will be used. Using various collaborative activities including think pair, share, group work and role play that will lead to the development of the numeration system. Using various collaborative activities to address misconception and barriers in teaching and learning number.
2	Operations and Properties on Integers (number sense): <i>Learning, teaching and applying.</i>	Operations of Integers Properties: Closure, commutative, associative, distributive, identity, inverse properties.	Use of manipulative as well as the number line for the operations. Using Investigations to explore properties. Use of Mathematical problem-solving strategies. E.g. Word problems, study and discuss concepts in a given task.
3	Operations and properties of rational and irrational numbers: <i>Learning, teaching and applying.</i>	Naming of fractions. Operations on common fractions, decimals number, percentages and irrational numbers. Properties of rational (including density property) and irrational numbers. Place values decimal places, approximations; significant figures including rounding off numbers and standard form.	Explore misconceptions of fractions, through discussions. Use fractional models and visual aids (TLMs) and developing multiple representations for a single mathematical concept. Use the concept of square roots to establish the notion of irrational numbers. Explore number of fractions between any two given fractions through activity method. Make connections among common fractions, decimals and percentages, with degree of accuracy, using manipulatives and visual aids (TLMs). Approximate given numbers to a specified value using number lines and other TLMs.

4	Concept of Sets: <i>Learning, teaching and applying.</i>	Sets of numbers, e.g. even and odd numbers, multiples, factors, prime numbers, squares, cubes, perfect numbers. Venn diagrams (two and three set problems), word problem.	Transition from set of numbers to real life groupings. Use real life situations involving groupings with certain characteristics.
5	Algebraic expressions, equations and inequalities: <i>Learning, teaching and applying.</i>	Simplification, expansion and factorization, Solving linear equations and inequalities.	Explore the meaning of variables using drill and practice. Transitioning from number to algebra. (Eg. $2 + 3$; $2 + x$) Use models and appropriate diction to deal with misconceptions of algebraic expressions (e.g. using algebra tiles to demonstrate identities). Apply the distributive property to expansion. Use inverse of numbers and operation principles. Use methods of elimination, substitution and graphical approach.
6	Every day and commercial arithmetic: <i>Learning, teaching and applying.</i>	Ratio, rates, proportion, scales, percentages (taxation, discount, commissions, VAT, etc.)	Investigations and Mathematical problem-solving strategies. Using applications to real life situation. Mathematical discourse: Learning by talking.
7	Number bases and Modular arithmetic: <i>Learning, teaching and applying.</i>	Expressing numbers of different bases; binary (base two), base five, base eight, and base ten. Cyclic variable, concept of modular arithmetic, addition and subtraction of modular arithmetic, multiplication in modular arithmetic.	Use of polygonal shapes to explore to number bases and modular arithmetic, Application to real life situations through presentations. Using models to represent place value concept with respect to different bases. Using place value model and chat to explore different number bases.
8	Relations and Functions and algebraic graphs: <i>Learning, teaching and applying.</i>	Types of Mapping/Relation, functions; domain, co-domain, range, inverse, composition and graphs.	Using mathematical explorations, transitioning from number patterns to algebraic ideas.

COMPONENT 1: Examination**Summary of Assessment Method:**

Student teachers should be summatively assessed by an examination linked to the themes listed below:

- Knowledge, understanding and applications of the key mathematical concepts in number and algebra within the basic school mathematics curriculum.
- Use manipulatives and other TLMs including ICT in a variety of ways to establish number and algebraic concepts in the classroom.
- How their mathematics history influences their views of mathematics and its learning.
- Relevant professional values and attitudes for teaching mathematics at early grade level.

Weighting: 40%

Assesses Learning Outcome(s): CLO 1, 3, 4; (NTS 2b, 2f).

COMPONENT 2: Coursework 1**Summary of Assessment Method:**

Individual Assignments with Presentations – student teachers may be asked to:

- Write on how mathematics problem can be solved using ICT tools as strategies in a variety of ways.
- Select the most appropriate mathematical method(s) or heuristics (i.e. using mental strategies, models, paper and pencil, etc.) in carrying out tasks / exercises / problems in number and algebra in the school mathematics curriculum.
- Reflect on how mathematics was taught in their basic school days and compare with current practice in basic schools.
- Reflect on the core skills (e.g. communication and collaboration, critical thinking and problem solving, digital literacy) teachers need to develop to make them good teachers.
- Do peer assessment on awareness of core skills needed to enhance own strengths and address limitations regarding the teaching of Number and Algebra.

Weighting: 40%

Assesses Learning Outcome(s): CLO 1- 4 (NTS 2b, 3j)

COMPONENT 3: Coursework 2**Summary of Assessment Method:**

Self-Assessment (as part of their portfolio): Students teachers should be given an assessment tool or questionnaire at the onset and the end of the course to

- Do self-assessment and compare their attitude towards learners, mathematics teaching and readiness to support learners who have misconceptions or struggle with the subject.
- Do self-assessment and compare their value as well as respect for equity and inclusivity in the mathematics classroom.
- Reflect critically on their own learning experiences and use them to plan for their own continuous personal development.
- Identify and reflect on mathematics related learning difficulties within the number and algebra content domain.

Weighting: 20%

Assesses Learning Outcome(s): CLO 3, 4 (NTS 1a, 2f)

COURSE POLICY

Attendance:

Code of Conduct:

Cheating/plagiarism:

Assignment Submission

Referencing: Use (APA format)

TLMs

Maths posters;
Manipulatives and visual aids
Computers
Graph sheets
Set of Mathematical instruments
Paper grids

Gordor, B. K., Naandam, S. M., & Nkansah, B. K. (2012). Core Mathematics for Senior High Schools. Accra: Sam-Woode Ltd

Backhouse, J. K., Houldsworth, S. P. T. & Horril, P. J. F. (2005). Pure Mathematics 1. (Seventh edition) London Longman.

Hesse, C. A. (2012). Core Mathematics for Senior High Schools. Accra: Publisher: Akrong Publications Ltd.

Martin, J. et. al. (1994). Mathematics for Teacher Training in Ghana: Tutor Notes, Accra Unimax Publishers.

Martin, J. et. al. (1994). Mathematics for Teacher Training in Ghana: Students Activities Accra Unimax Publishers.

Ministry of Education (2015). Core Mathematics Modules for SEIP. Accra: Ministry of Education

Ministry of Education. (2010). Teaching syllabus for Core mathematics (Senior High School). Accra: Ministry of Education, Science and Sports.

ANNEXE 6.1C: EXAMPLE OF A COURSE OUTLINE

UNIVERSITY OF CAPE COAST
COLLEGE OF EDUCATION STUDIES
SCHOOL OF EDUCATIONAL DEVELOPMENT AND OUTREACH
INSTITUTE OF EDUCATION

COURSE CODE/TITLE: EMA 111: DEVELOPING ALGEBRAIC THINKING

LEVEL: 100

CREDIT: 3 HOURS

COURSE DESCRIPTION:

This course is designed to expose students to the various elements of algebraic thinking necessary for the prospective teacher to be able to promote meaningful teaching and learning of algebra in schools. The course will generally expose students to the three main components of algebraic thinking namely; generalization, equality and unknown quantities. Students will also be introduced to the moves/strategies for teaching each of the following algebraic concepts for conceptual understanding: Algebra of sets, relation, mapping and functions, equivalence relation, properties of integers linear and exponential series, intuitive treatment of convergence and divergence of series: - the comparison of ratio and root test; partial fractions and mathematical induction.

COURSE OUTLINE

Unit	Topical outline	Duration
1	The three main components of algebraic thinking: Generalization, equality and unknown quantities.	
2	Teaching algebra of sets, relation, mapping and functions, equivalence relation and properties of integers.	
3	Linear and exponential series: Arithmetic Progression (AP) and Geometric progression and their applications to real life situations.	
4	Intuitive treatment of convergence and divergence of serie.	
5	Comparison of ratio and root test.	
6	Introduction to Partial fractions: Partial fractions with liner factors, partial fractions with repeated factors, partial fractions with quadratic factors Quiz	
7	Mathematical induction: Proof by induction.	

MODE OF ASSESSMENT

1. Continuous Assessment – 40%
2. Final Examination – 60%

LIST OF SUGGESTED READING MATERIALS:

1. Backhouse, J.K., & Houldsworth, S. P. T. (1985). Pure mathematics I. London: Pearson.
2. Larson, R. E., Kanold D. T., & Stiff L. (1993). Intermediate algebra. Canada: D. C. Heath and Company
3. Ofosu, J. B. (2001). A comprehensive SSS course in elective Mathematics. Accra, Afram Publication.
4. Stroud K. A. & Dexter J.B. (2007). Engineering Mathematics. 6th edition. Palgrave



UNIT 7 - SUPPORTED TEACHING IN SCHOOL YEAR 1

Learning Outcomes By the end of this unit every tutor should be able to:	Learning Indicators
1. Demonstrate familiarity with the features of Supported Teaching in School (STS).	1.1 Make oral presentations of the key features of STS in Year 1. 1.2 Compare the key features of STS in Year 1 with those of Teaching Practice in DBE Year 1.
2. Analyse the expectations of student teachers in Year 1 STS (i.e. what student teachers are expected to know and be able to do).	2.1 List and interpret the expectations of student teachers in Year 1 STS. 2.2 Make a poster showing connections between the expectations.
3. Demonstrate familiarity with the key stakeholder groups in STS and their roles.	3.1 Identify key stakeholders in each stakeholder group. 3.2 Describe the assigned roles of stakeholders in the implementation of the STS.
4. Propose solutions to key challenges of the Beginning Teaching stage of STS.	4.1 Discuss key challenges of the Beginning Teaching stage of STS from a given list 4.2 Write a report on solutions to the identified challenges.

Revision Activity (5 minutes)

Individually, answer the questions below and share your responses in pairs:

- What are the essential features of a course manual?
- What challenges did you face while preparing your course manual?
- What challenges have you faced while implementing the new Year 1 curriculum since the last PD session?

INTRODUCTION (5 MINUTES)

Supported Teaching in School (STS) aims to provide extended, guided and assessed teaching through each year of the training programme for student teachers to enable them to apply their knowledge to improve teaching. These periods of school-based training and teaching address all the requirements of the National Teachers' Standards (NTS) in order to develop effective, engaging, inspirational and life-long learning teachers who are to contribute to improve the learning outcomes of their learners.

Like all other areas of the new curriculum, STS comprises four stages namely: Beginning Teaching, Developing Teaching, Embedding Teaching and Extending Teaching. STS Year 1 is known as Beginning Teaching stage and serves as the foundation for student teachers' school practice.

In this unit, you will discuss how student teachers could be assisted to meet the standards related to STS in the NTS and also meet the Beginning Teaching stage expectations. You will also discuss the roles of various stakeholders in STS as well as the expected challenges of Beginning Teaching stage and their possible solutions (MoE, 2017).

Activity 1: Features of Beginning Teaching stage (15 minutes)

In your groups,

1. Discuss the features of the Beginning Teaching stage.
2. Identify the similarities and differences between STS of the new 4-year B.Ed. curriculum and the Teaching Practice arrangements of the Diploma in Basic Education (DBE) programme in terms of:
 - i. duration and structure.
 - ii. frequency of school visits.
 - iii. college-based orientation.
 - iv. school-based induction.
 - v. course content for Year 1

Present your findings on flip charts for whole class discussion.



Activity 2: Expectations of Beginning Teaching stage (25 minutes)

In your groups,

Discuss what is expected of student teachers during Beginning Teaching stage with regard to the following:

- a. Classroom and wider school observations.
- b. Personal teaching and learning philosophy preparation.
- c. Child study.
- d. Beginning to build their teaching portfolio.
- e. Key features of the Basic School Curriculum and related materials.

(Refer to Annex 7.2 and STS Year 1 Student Teacher handbook for further information).

Present your findings on flip charts for gallery walk and whole class discussion.



Activity 3: Key stakeholders and their roles in STS (20 minutes)

In your groups,

1. Identify the stakeholders in the stakeholder group assigned to you and the roles they play in STS:
 - a. College level stakeholders.
 - b. School level stakeholders.
 - c. Community level stakeholders.
 - d. District Education Directorate level stakeholders.
 - e. Regional Education Directorate level stakeholders.
 - f. Ministry of Education (MoE) Level stakeholders.

(Refer to National Policy on Supported Teaching in School for further information).

Present your findings on flip charts for gallery walk and whole class discussion.



Activity 4: Suggested solutions to challenges associated with the Beginning Teaching stage of STS (15 minutes)

In your groups,

Identify solutions to the challenges associated with the Beginning Teaching stage of STS which are outlined below:

- a. Student teachers' placement and Language policy issues.
- b. Lack of student teachers' knowledge on cultural practices in some communities.
- c. Ineffective mentors who leave their classes for student teachers.
- d. Inadequate resources in partner schools.
- e. Limited resources for tutors to visit partner schools.

(Provide solutions only to the challenge assigned to your group).

Present your findings (report on solutions to the identified challenges) for whole class discussion.



REFLECTION (5 MINUTES)

1. Did you achieve the learning outcomes and indicators of this unit?
2. How might the introduction of STS programme impact on the way you prepare your student teachers for school practice?
3. How would you strengthen the Beginning Teaching stage to support student teachers' school practice in Year 2 (Developing Teaching stage)?

**INTER-UNIT ACTIVITY**

1. Read Unit 8: Quality Assuring Curriculum Delivery.
2. Re-read Unit 2 on Equity and Inclusivity.
3. Consider how quality assurance can enhance curriculum delivery.
4. Write down any challenge you faced this week or which you expect to face next week while implementing the new Year 1 curriculum.

**MATERIALS FOR UNIT 8:**

1. Quality Assurance appraisal tools.

**UNIT 7 - ANNEXES****ANNEXE 7.1: STS – DURATION, STRUCTURE AND COURSE CONTENT**

Year	Duration and Structure
<p>1 (Beginning Teaching Stage)</p>	<p>Twelve (12) weeks visit to school 1 (One day visit per week in school to observe).</p> <ul style="list-style-type: none"> • Semester 1 – 6 weeks school visit • Semester 2 – 6 weeks school visit • College vacation – 4 weeks in school teaching small groups (Self-selected school) • Begin to gather artefacts for professional teaching portfolio.
<p>2 (Developing Teaching Stage)</p>	<p>Twelve (12) weeks visit to school 2 (One day visit per week in school to observe).</p> <ul style="list-style-type: none"> • Semester 1 – 6 weeks school visit for whole class observation • Semester 2 – 6 weeks school visit for small group observation • College vacation - 4 weeks in school teaching small groups (Self-selected school)
<p>3 (Embedding Teaching Stage)</p>	<p>Twelve (12) weeks in school 3</p> <ul style="list-style-type: none"> • Semester 1 - 6 weeks for school visit, one day per week for observation and direct task by mentor • Semester 2 - 6 continuous weeks visit in school to: <ul style="list-style-type: none"> ◇ Co-plan and co-teach for all required subjects ◇ Undertake classroom enquiry on teaching and learning ◇ Build professional teaching portfolio (By refining work done in year 1)
<p>4 (Extending Teaching Stage)</p>	<p>Twelve (12) continuous weeks in school 3 in semester 1 to:</p> <ul style="list-style-type: none"> ◇ Plan and teach lessons in all subjects required of school curriculum ◇ Conduct action research ◇ Complete professional teaching portfolio <p>Semester 2: Back to college to complete course work.</p>

Note that the table above presents the current position on the delivery of STS in Year 1 which is an update on the write-up in Unit 8 of Theme 7.

STS: COURSE CONTENT FOR YEAR 1

- Induction into school culture, key education policies and the basic school curriculum
- Observation (Audio-visual/tactile)
 - ◊ Observe class teaching and learning
 - ◊ Observe and record good practices in whole class and small group teaching & learning
 - ◊ Observe peers carrying out collaboratively planned activity with their group or an individual, and how feedback is given on the learning
 - ◊ Observe wider school life: staff meetings and assemblies
- Personal teaching and learning Philosophy: Student teachers begin to prepare their personal teaching and learning philosophy statement.
- Listening and providing constructive feedback to peer(s)
- Child Study (Classroom enquiry):
 - ◊ Conduct child studies into children's learning and progress in the Core Subjects
 - ◊ Plan for, work with, and create a safe learning environment (for the 4 identified children based on gender balance, if applicable)
 - ◊ Identify the learning and teaching approaches and progress in learning of children
 - ◊ Manage behaviour and learning, create a safe learning environment.
 - ◊ Track the planning, teaching and learning of a topic or the development of an essential skill in the Core Subjects to identify the learning and teaching approaches and progress in learning
- Beginning to develop professional teaching portfolio
- Beginning to keep student reflective journal (SRJ)
- Identify traits of professionalism in school
- Discuss key features of the official school curriculum, specifically focusing on literacy, numeracy and science.

Annex 7.2: Expectations from student teachers during the Beginning Teaching stage of STS

1. Observation (Audio-visual/tactile)

Student teachers will observe:

- a. class teaching and learning
- b. demonstration towards differentiated instruction strategies for diversity and inclusivity.
- c. and record good practices in whole class and small group teaching and learning
- d. assessment for, of and as learning as used by mentor for assessing learners as well as take note of how common issues of misunderstandings/misconceptions in assessment are addressed by mentor.
- e. peers carrying out collaboratively planned activity in their groups or an individual, and how feedback is given on the learning
- f. wider school life: staff meetings and school assemblies

2. Personal teaching and learning Philosophy: Student teachers begin to prepare their personal teaching and learning philosophy statement by writing down a number of beliefs and values in teaching and learning and compare the similarities and difference among themselves. They will also look at their mentors' teaching and learning philosophy and compare with theirs.

3. Professional teaching Portfolio building: Student teachers will begin to build a professional teaching portfolio as evidence of their progress towards being a teacher. They will collect some artefacts and discuss their relevance to teaching and learning. They will also use ICT tools (e.g. audio, braille, embossers) to compile artefacts to begin building a professional portfolio.

4. Key features of the Basic school curriculum and related materials

Student teachers will observe

- a. key features of the basic school curriculum and other related materials with emphasis on literacy, numeracy and science
- b. and familiarise themselves with the development of scheme of work from the syllabus

5. Child study: Student teachers will

- a. Conduct child studies into children's learning and progress in the Core Subjects
- b. Plan for, work with, and create a safe learning environment (for 2 identified children based on gender balance, if applicable)
- c. Identify the learning and teaching approaches and progress in learning of children
- d. Use structured observation checklist to collect data, analyse and produce reports
- e. Manage behaviour learning and create a safe learning environment.
- f. Track the planning, teaching and learning of a topic or the development of an essential skill in the Core Subjects to identify the learning and teaching approaches and progress in learning.

References

MoE (2017). National Teacher Education Curriculum Framework: *The essential elements of initial teacher education*. Accra: Ministry of Education.

UNIT 8 - QUALITY ASSURING CURRICULUM DELIVERY

Learning Outcomes By the end of this unit every tutor should be able to:	Learning Indicators
1. Demonstrate knowledge of <i>quality assurance</i> in curriculum delivery.	1.1 Explain quality assurance. 1.2 Identify the various officers/tutors responsible for ensuring quality delivery of the curriculum. 1.3 Give a specific example of how quality assurance can be used to enhance curriculum delivery.
2. Demonstrate familiarity with the mechanisms for ensuring that the delivery of the curriculum takes into account all aspect of the curriculum including equity and inclusivity as well as tutors' capacity to successfully deliver the curriculum.	2.1 Identify the various aspects of college life that need to be monitored. 2.2 State how the monitoring of the various aspects can be done. 2.3 Give an example of how to ensure equity and inclusivity in curriculum delivery. 2.4 Describe the type and content of the professional development programme that can support tutors to effectively deliver the new curriculum.
3. Recognise benefits and envisaged challenges associated with quality assuring the delivery of the new curriculum as well as ways of addressing the challenges.	3.1 Write some benefits that can be derived from ensuring quality delivery of the new curriculum. 3.2 Predict some challenges associated with ensuring quality delivery of the new curriculum and suggest ways of addressing them.

Revision Activity (10 minutes)

INTRODUCTION (5 MINUTES)

Quality Assurance (QA) is the process of maintaining acceptable standards reliably and consistently by applying criteria of success in every endeavour. In the College of Education, it involves constantly monitoring and evaluating all aspects of college life as an integral part of self-evaluation and improvement. All sections of the college must respond positively to QA issues since the performance of each section has impact on the outcome of teaching and learning. Internal QA is therefore expected to monitor and evaluate all operations including:

- Teaching and learning activities and programmes.
- Research output of staff.
- Assessment of learning habits of students.
- Staff performance.
- Teaching and learning environment.
- Governance and Institutional Management.
- Any other activities which can help to enhance the quality of academic work in the college.

QA has become a major issue in higher education worldwide. This has been due to a number of factors, including an increased focus on:

- Higher student achievement and success in learning.
- Increased stakeholder satisfaction.
- Improved institutional public image and better relations with the wider society.
- Enhanced confidence level of staff and students.
- Improved accountability and accreditation requirement.
- Improved inclusivity of learning opportunities.

Activity 1: Quality Assurance in Curriculum Delivery (25 minutes)

- Study the questions on the sheets provided.
- Identify a colleague to answer any of the questions on the sheet.
- and write the names of the tutors who answered a question.
- Each tutor should call the name(s) of colleagues whose name(s) they have written down to give their answers to the question they say they can respond to.

Activity 2: Mechanisms for Quality Assuring Curriculum Delivery (25 minutes)

In your groups answer the question assigned to you:

1. What do you monitor in the curriculum delivery process?
2. What professional development support do tutors need to enable them to deliver the curriculum effectively?
3. How can you ensure equity and inclusivity in the curriculum delivery process?
4. How do you monitor the curriculum delivery process?

Write your answers on a flip chart and present to the whole class for discussion.



Activity 3: Benefits and Challenges Associated with Ensuring Quality Delivery of the New 4-year B.Ed. Curriculum (20 minutes)

Brainstorm on the following questions:

1. What benefits can be derived from ensuring quality delivery of the new 4-year B.Ed. curriculum?
2. What challenges are associated with ensuring quality delivery of the new 4-year B.Ed. curriculum, and how can these be addressed?



REFLECTION (5 MINUTES)

1. What could be the impact of quality assurance on curriculum delivery in the College?



UNIT 8 - ANNEXES

ANNEXE 8.1: QUALITY ASSURANCE IN CURRICULUM DELIVERY

Who is responsible for ensuring QA of curriculum delivery?

Key officers

- a. Principal
- b. Vice Principal
- c. Quality Assurance Officer
- d. Heads of Departments/Units

Other officers

- a. Academic Affairs Officer
- b. Internship Coordinators
- c. Student Affairs Officer
- d. Tutors

Institutions

- a. Governing Council
- b. Academic Board
- c. Quality Assurance Unit

How do you monitor curriculum delivery process?

- a. Staff appraisal by student
- b. Staff appraisal by peers
- c. Students' progression
- d. Infrastructure/facilities Survey
- e. TLMs audit

How can QA enhance curriculum delivery?

- a. It improves class attendance and participation of both staff and students
- b. Improves the professional and academic competence of both staff and students
- c. Improves research output of both staff and students
- d. Improves inclusive learning
- e. It brings about fairness, trust, transparency, openness, efficiency, effectiveness in college operations

Some benefits of ensuring quality delivery of the curriculum

- a. Holds employees accountable for their job performance
- b. Improves institutional public image and better relations with the wider society
- c. Enhances confidence level of staff and students
- d. Improves accountability and accreditation requirement
- e. Higher student achievement and success in learning
- f. Better public and stakeholder satisfaction
- g. Enhances individual staff confidence level and encourages staff to perform better in the future
- h. Improves availability of instructional resources including academic facilities

Some envisaged challenges associated with ensuring quality delivery of the new curriculum

- a. Inadequate infrastructure: library, computer laboratory, internet connection
- b. Unavailability of TLRs (TLMs)
- c. Indifferent, negative attitude of some tutors (resistance to change)
- d. Accessibility to support services, counseling, course materials

ANNEXE 9

PD SESSION - TUTOR SURVEY (Tutors should be encouraged to submit survey at the end of each pd session)

A. Answer the questions	Fill in your answers:
<p>1. Please enter your college ID number <i>Answer must be the Identification Number of the code you are reporting on.</i></p>	
<p>2. Please enter the date of the session <i>Answer must be a date in the following format: day.month.year. Example: 25.10.2018</i></p>	
<p>3. Did today's session take place? a. Yes b. No <i>Choose 1 answer from the list. Example: a</i></p>	
<p>4. What subjects do you teach at your institution? a. Mathematics b. Science c. English d. Methodology e. Other <i>Choose 1 answer from the list. Example: a</i></p>	
<p>5. How would you rate the content of today's topic/unit? a. Not at all relevant or useful b. Indifferent about it c. Somewhat relevant and useful d. Very relevant and useful e. N/A - The session did not happen <i>Choose 1 answer from the list. Example: a</i></p>	
<p>6. How likely are you to try the teaching strategies you learned today in class? a. Not likely b. Somewhat likely c. Very likely d. N/A - The session did not happen <i>Choose 1 answer from the list. Example: a</i></p>	

A. Answer the questions	Fill in your answers:
<p>7. How much impact do you think the session will have on the learning of students? a. Very good b. Good c. Minimal d. No Impact e. N/A - The session did not happen <i>Choose 1 answer from the list. Example: a</i></p>	
<p>8. How do you rate the performance of the PDC on how well he/she facilitated the session? a. He/she was not prepared b. He/she was somewhat prepared c. He/she was very prepared d. N/A - The session did not happen <i>Choose 1 answer from the list. Example: a</i></p>	
<p>9. How likely are your students to model these teaching strategies if you use them in class? a. Not likely b. Somewhat likely c. Very likely d. N/A - The session did not happen <i>Choose 1 answer from the list. Example: a</i></p>	
<p>10. In your opinion, what was the level of participation in today's session? a. 75-100% of the tutors were engaged b. 50-75% of the tutors were engaged c. 25-50% of the tutors were engaged d. 0-25% of the tutors were engaged e. N/A - The session did not happen <i>Choose 1 answer from the list. Example: a</i></p>	

B. Prepare your SMS

Enter all your answers. Use a space to separate them.

Example: 015 answer1 answer2 answer3 answer4 answer5 answer6 answer7 answer8 answer9 answer10

C. Send your answers using SMS

Send your SMS to the telephone number: 7000 for MTN users only and 1904 for Airtel, Vodafone & Espresso users (If you have done the training, these numbers should already be saved in your phone).

D. Wait for our reply SMS

You will receive an SMS confirmation or specific error message.

PD SESSION - TUTOR SURVEY

(Tutors should be encouraged to submit survey at the end of each pd session)

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<p>1. Please enter your college ID number <i>Answer must be the Identification Number of the code you are reporting on.</i></p>	
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A. Answer the questions	Fill in your answers:
<p>7. How much impact do you think the session will have on the learning of students?</p> <ul style="list-style-type: none"> a. Very good b. Good c. Minimal d. No Impact e. N/A - The session did not happen <p><i>Choose 1 answer from the list. Example: a</i></p>	
<p>8. How do you rate the performance of the PDC on how well he/she facilitated the session?</p> <ul style="list-style-type: none"> a. He/she was not prepared b. He/she was somewhat prepared c. He/she was very prepared d. N/A - The session did not happen <p><i>Choose 1 answer from the list. Example: a</i></p>	
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S/N	Name of College of Education	College Code
1	KIBI COLLEGE OF EDUCATION	coe1
2	JASIKAN COLLEGE OF EDUCATION	coe10
3	ST. FRANCIS COLLEGE OF EDUCATION	coe11
4	ST. TERESA COLLEGE OF EDUCATION	coe12
5	PEKI COLLEGE OF EDUCATION	coe13
6	E.P. COLLEGE OF EDUCATION, AMEDZOFE	coe14
7	DAMBAI COLLEGE OF EDUCATION	coe15
8	NJAHMADIYYA COLLEGE OF EDUCATION	coe16
9	TAMALE COLLEGE OF EDUCATION	coe17
10	TUMU COLLEGE OF EDUCATION	coe18
11	ST. JOHN BOSCO COLLEGE OF EDUCATION	coe19
12	PRESBYTERIAN WOMEN COLLEGE OF EDUCATION, ABURI	coe2
13	E.P. COLLEGE OF EDUCATION, BIMBILLA	coe20
14	BAGABAGA COLLEGE OF EDUCATION	coe21
15	GBEWAA COLLEGE OF EDUCATION	coe22
16	KOMENDA COLLEGE OF EDUCATION	coe23
17	ENCHI COLLEGE OF EDUCATION	coe24
18	WIAWSO COLLEGE OF EDUCATION	coe25
19	HOLY CHILD COLLEGE OF EDUCATION	coe26
20	OLA COLLEGE OF EDUCATION	coe27
21	FOSO COLLEGE OF EDUCATION	coe28
22	BEREKUM COLLEGE OF EDUCATION	coe29
23	SDA COLLEGE OF EDUCATION	coe3
24	MAMPONG TECHNICAL COLLEGE OF EDUCATION	coe30
25	ST. JOSEPH COLLEGE OF EDUCATION	coe31
26	ST. LOUIS COLLEGE OF EDUCATION	coe32
27	AKROKERRI COLLEGE OF EDUCATION	coe34
28	ATEBUBU COLLEGE OF EDUCATION	coe35
29	WESLEY COLLEGE OF EDUCATION	coe36
30	ST. MONICA COLLEGE OF EDUCATION	coe37
31	AGOGO PRESBYTERIAN WOMEN'S COLLEGE OF EDUCATION	coe38
32	GAMBAGA COLLEGE OF EDUCATION	coe39
33	ABETIFI PRESBYTERIAN COLLEGE OF EDUCATION	coe4
34	ST. AMBROSE COLLEGE OF EDUCATION	coe40
35	MOUNT MARY COLLEGE OF EDUCATION	coe5
36	ACCRA COLLEGE OF EDUCATION	coe6
37	PRESBYTERIAN COLLEGE OF EDUCATION, AKROPONG	coe7
38	AKATSI COLLEGE OF EDUCATION	coe9
39	BIA LAMPLIGHTER COLLEGE OF EDUCATION	coe43
40	ALFARUQ COLLEGE OF EDUCATION	coe41

S/N	Name of College of Education	College Code
41	AGONA SDA COLLEGE OF EDUCATION	coe42
42	METHODIST COLLEGE OF EDUCATION	coe44
43	ST. VICENT COLLEGE OF EDUCATION	coe45
44	MCCOY COLLEGE OF EDUCATION	coe46
45	ADA COLLEGE OF EDUCATION	coe8
46	OFFINSO COLLEGE OF EDUCATION	coe33

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West African Wisdom: Adinkra Symbols & Meanings

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Production Team

Theme 9 is on preparing tutors for the implementation of the new 4-year Bachelor of Education (B.Ed.) and draws on the National Teachers' Standards, the National Teacher Education Curriculum Framework and other relevant documents developed by the Ministry of Education through its agencies.

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