Four-Year B.Ed. Course Manual

INTRODUCTION TO GRAPHIC COMMUNICATION

GHANA TERTIARY EDUCATION COMMISSION

NATIONAL TEACHING COUNCIL

NTC

Building Confidence, Raising Teaching Standards

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Transforming Teaching, Education & Learning

FOREWORD

These Initial Teacher Education course manuals were developed by a team consisting of members from Colleges of Education and four universities namely the University of Ghana, Kwame Nkrumah University of Science and Technology, University of Education, Winneba, and University for Development Studies. This team was originally constituted by the National Council for Tertiary Education (now the Ghana Tertiary Education Commission) in 2019 to support the delivery of the new B.Ed. curriculum with assistance from T-TEL and UK Aid. The revision, finalization and printing of these manuals took place in 2021 with support from T-TEL and Mastercard Foundation.

The course manuals have been produced for use as general guides for the delivery of the new four-year B.Ed. curriculum in Colleges of Education in collaboration with their affiliated universities. They are designed to support student teachers, tutors and lecturers in delivering a complete B.Ed. course for training student teachers which meet the requirements of the National Teachers' Standards, enabling them to teach effectively in basic schools.

The first section of the manuals is focused on the course information and vision for the B.Ed. curriculum. The second section presents the course details, goal for the subject or learning area, course description, key contextual factors as well as core and transferable skills and cross-cutting issues, including equity and inclusion. The third section is a list of course learning outcomes and their related learning indicators. The fourth section presents the course content which is broken down into units for each week, the topic and sub-strands and their related teaching and learning activities to achieve the learning outcomes and the teaching and learning strategies. This is followed by course assessment components in section five. Each manual contains a list of required reading and references as well as teaching and learning resources. The final section presents course related professional development for tutors and lecturers to be able to use each section of the manual.

Field instructions to guide Supported Teaching in School are integrated into the course manuals to provide the student teacher with guidance in developing teaching throughout the entire period of study to be able to meet the requirements of the National Teachers' Standards (NTS) and the National Teacher Education Curriculum Framework (NTECF). To ensure maximum benefit the course manuals should be used in addition to other resources such as the NTS, NTCEF, National Teacher Education & Assessment Policy and the National Teacher Education Gender Equality and Social Inclusion (GESI) Strategy and Action Plan. This will help to ensure that student teachers learning is integrated within the wider teacher education policy framework.

Professor Mohammed Salifu Director General, Ghana Tertiary Education Commission

ACKNOWLEDGEMENTS

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INTRODUCTION TO COURSE MANUALS

Welcome to this B.Ed. Course manual.

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

The manuals serve the following purposes:

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

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

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

Specifically, they also:

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

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

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

    1. What is to be taught and why.

    2. how it can be taught.

    3. how it should be assessed.

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

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

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

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

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

Who are course manuals for:

- College of Education Tutors

- Teacher Education University Lecturers

- Student Teachers

- Mentors and Lead Mentors

- All Those with An Interested In Teacher Education.

USING THIS MANUAL

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

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

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

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

Course Manual Writing Guide

- Soft copies of the CWG, New Four-Year B.Ed. Curriculum introduction
- Soft and hard copies of the course specifications for the subject for year one and two
- Soft and hard Course Manual Writing Guide (CMWG)
- Relevant subject texts

Target Audience

- College of Education Tutors
- Teacher Education University Lecturers
- Student Teachers
- Mentors

The purpose of course manuals

- To provide a lesson by lesson overview of the course, building on, adapting and developing the material in the course specifications
- To provide a resource to support professional development sessions for tutors/lecturers on how to plan for and teach courses from the New Four-Year B.Ed. Curriculum
- To inform tutors /lecturers, student teachers and others working with student teachers about:
    – what is to be taught and why
    – how it can be taught
    – how it should be assessed
- To support consistency in the implementation of the New Four-Year B.Ed. across institutions who train teachers
- To ensure that all **training** information on skills, processes, and other information necessary to perform the teaching task are together in one place.
- To operationalize the Teacher Education Reform Policy; the requirements of the NTS & NTECF and the Four-Year B.Ed.

Guiding principles of course manual writing

1. They are written with the learner, the student teacher, in mind: what they will *be able* to cope with and only include what student teachers need to know, understand, be able to do and be as a basic school teacher
2. They take in to consideration the learner's, the student teacher's, context and possible barriers to, and enablers for, learning
3. They are written with the tutors /lecturers who are going to teach the course in mind. Tutors must be able to adapt and develop the plans in course manuals to fit the context they are teaching in and to support their teaching
4. They are aligned to the key principles and practices of the Teacher Education Reform Policy: the NTS, the NTECF and the New Four-Year B.Ed.
5. They are written to provide opportunities for student teachers to develop and apply knowledge during supported teaching in school
6. They are written to reflect the stage of student teacher development, set out in the model for progress in the New Four-Year B.Ed.
7. They are written to support progress in student teacher learning, including building on prior learning from the previous programme or course/s and supporting progress to the next course.
8. They are to be used as self-study tools.
9. They are written to have the following characteristics: easy to read; uses active voice and avoids jargon; uses bullet points to offset text; uses images

What a teacher educator needs to know, understand and use to inform what they do

- The aims and structure of the education system and Education strategic Plan
- The Basic School Curriculum
- The Inclusion Policy
- The teacher education system: The National Teacher's Standards, the vision for teacher education and the core principles of the New Four-Year B.Ed.
- Andragogy, effective methods and practices for teaching adult learners
- Assessment Literacy. Assessment for, of and as learning -Educative Assessment

Guidance for completing the course manual writing proforma: two sections

    A.   Course Information

Title Page

    i.   Introduction To Graphic Communication

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

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

iii.	Course Details: as in course specification unless important reason why not					
Pre-requisite/s	TVET related subjects from WASSCE/National Certificate II (Technical)					
Co-Requisites						
Course Level	200	Course Code		Credit Value	3	

Table of contents

Each manual will include:
1. The goal for the subject or learning area
2. Course description
3. Key contextual factors
4. Core and cross cutting issues, including equity and inclusion
5. Course Learning outcomes
6. Course content
7. Teaching and learning strategies
8. Course Assessment components
9. Reading and reference list
10. Handouts, power points and other resources for lessons
11. Plans for each lesson in the semester

A. Course information

1. Goal for the Subject or Learning Area

*IntroductionToGraphic Communication*is designed to introduce the student teacher to the concepts, foundations and history of the Technology based industry which dates back to the medieval era. The course is also intended for the student teacher to explore the nature of relevant tools,lines,drawing techniques and materials relevant to the foundational manipulative processes/skills in the Technology based industries expecially in the fields of Construction and Engineering.

2. Key contextual factors

The education system has focused on preparing students for examinations, instead of helping them to develop the relevant industry and entrepreneurial skills which could enable them function successfully in life.

3. Course Description

This course is designed to introduce the student teacher to the concepts, foundations and history of the Graphic Communication which dates back to the medieval era. The course is also intended for the student teacher to explore the nature of relevant tools, equipment,drawing skills and materials in the Technology industries. Through guided demonstrations and simulations the student teacher will be introduced to foundational manipulative processes/skills of Graphic Communication to the Construction and Engineering industry. The topics covered are: historical foundations of Graphic communication, tools and equipment,various materials,lines and letterings used in Graphic communication. It also focussed on introduction to Auto Cad for construction of geometrical shapes and forms. Also the techniques for constructing geometrical shapes ,conic sections, scale drawings ,pictorial drawings and orthographic projections of objects.

 These areas will provide the student teacher with the understanding of various Graphic communication processes which are necessary for efficient and effective utilization of Graphic communication for effective Engineering and Building construction works. Additionally, student teachers will have firm knowledge base and understanding for selecting appropriate graphic communication materials and making accurate decisions about the techniques and suitable views for good illustrations.

Graphic communication also prepares the student teacher for knowledge and skills in problem-solving, critical thinking and creativity. The student teacher is expected to cultivate interest in hands-on learning and develop responsible citizenship to appreciates the dignity of work and contribute to sustainable society. Thus, the. The course will be delivered using the following methods: Discussion, presentations (group/individual), seminar, project work/practical work, demonstrations, brainstorming, simulation, and industrial visits. The following assessment modes will be used: Examination, tests, project work, class assignments and presentations, and portfolio.

As part of the course requirements, the student teachers will be required to undertake various projects and produce effective views for clear interpretation of the desired figures. In the process of doing Graphic communication, the student teacher will be introduced to relevant issues of equity and inclusivity within the industry as well as the concept of greening TVET by way of considering recycling, re-designing or re-using waste.

As part of developing teaching, the student teachers are also exposed to observation in the school environment where they are to reflect on their professional practice by engaging positively with colleagues, mentors, learners and other stakeholders and build a portfolio reflecting a better understanding of the JHS learner and the learning environment showing growing comprehension and application of the concepts of inclusivity, equity, access for all learners irrespective of ability, gender or socio-economic status and cultural background. During such reflections, student teachers are to relate their knowledge acquired in Introduction to Graphic communication to the school environment. The course is designed to meet the following NTS and NTECF requirements: NTS pg. 14,c, j, 24e, f, 26 j, NTECF pg. 16, 29,33,38.

Core and transferable skills and cross cutting issues, including equity and inclusion
Core and transferable skills: Critical thinking, problem solving, communication skills, and use of ICT **Cross-cutting issues**:
This can be found in the course specification. Which core and transferable skills or cross cutting issues will be applied or developed through this course? This needs to be made explicit to student teachers. Are there specific issues to do with equity and inclusion which must be addressed so that all student teachers can fully take part? For example, issues related to gender and mathematics or science.

4. Course Learning Outcomes	5. Learning indicators
By the end of the course, Students teachers will be able to	
CLO 1 Demonstrate knowledge of the historical foundations of Graphic communication and materials	1.1 Prepare a report on the historical era which form the foundations of Graphic communication. 1.2 Present a portfolio of samples of appropriate and relevant materials used for Graphic communication. 1.3 Make a video recording(s) of theMaterials being used in Graphic Communication.
CLO 2 Demonstrate knowledge of the handling of tools and equipment, various Lines and letterings used for graphic communication	2.1 Make a video recording(s of the various tools and equipment used in Graphic communication 2.2 Exhibit knowledge, understanding and manipulative skills in the use of the various tools and equipment 2.3 Make portofolio of the various lines use in Graphic communication. Eg: main line, construction line,zig zag line and others. 2.4 Provide lettering to the drawings done using lines.eg showing upper case and lower case.
CLO 3 Demonstrate knowledge and understanding of the use of Auto Cad to construct geometrical shapes and forms in Graphic communication	3.1 Prepare an album of Geometrical forms and shapes drawn through the manipulation of the AutoCAD software 3.2 Produce a portfolio of Pictorial views namely: perspective, isometric and oblique drawings through the manipulation of the AutoCAD software. 3.3 Produce a portfolio of Conic sections through the manipulation of the AutoCAD software. 3.4 Produce a portfolio of Orthographic projections through the manipulation of the AutoCAD software.
CLO 4Demonstrate knowledge and understanding of the construction of Geometrical shapes and forms and Conic sections and Plain and Diagonal scales in Graphic communication	4.1 Prepare an album of circles ie (concentric and eccentric) 4.2 Produce a portfolio of the construction of the various Geometrical shapes and forms eg: Triangle, Quadrilaterals, Polygons 4.3 Prepare an album of the different types of Conic sections 4.4 Produce a portfolio on the construction of Plain and Diagonal scales.
CLO 5 Demonstrate knowledge and understanding of the Development of Surfaces of Prisms and Pyramids in Graphic communication	5.1 Prepare an album of the different types of surface development of Right Prisms namely: cylinder, square, rectangular, pentagonal and hexagonal. 5.2 Prepare drawings of the different types of surface development of Pyramids.
CLO 6 Demonstrate knowledge and understanding of the drawing of Pictorial views and Orthographic projections in Graphic communication	6.1 Prepare an album of the different types of three dimension drawing or pictorial drawings : perspective, oblique and isometric drawings. 6.2 Prepare an album of the Orthographic projection in first and third angles using different artefacts.

6. Course content
In the course specification. This should provide an outline of the academic and / or practical content of the course. It should be clear how this content relates to the achievement of the intended learning outcomes. The name of each unit in the course should be *briefly* set out – the name should make it clear what the unit is about.

Unit	Topic	Sub-topic (If any)	Teaching and learning activities to achieve the learning outcome
1	Historical Foundations and Materials used for Graphic Communication	1. Medieval, Industrial and revolution eras of Graphic communication 2. Appropriate materials used for Graphic communication	Tutor guides student teachers to brainstorm on the importance of history as a foundation for the present day developments in general terms
			Tutor uses interactive lecture to present the various historical eras of Graphic communication and their importance to the student teachers
			1. Tutor present a video recording (Animation) of the various appropriate materials being used for Graphic communication. 2.Tutor guides to student teachers to form groups to demonstrate the handling of the materials used for Graphic communication
2	Tools, equipment, lines and lettering in graphic communication	**1. Tools and equipment use for Graphic communication** **2.Lines use in Graphic communication** **3.Lettering in Graphic communication**	1.Tutor Introduce Graphic communication tools, equipment, lines and lettering in Graphic communication to students through video presentation 2. Tutor demonstrate the uses of the various Graphic communication tools and equipment using the various lines of Graphic communication to draw objects in both two and three dimensions. Eg plane figures and pictorial figures 3.Tutor produces a power point presentation on the strategies to make upper and lower case Lettering as used for Graphic communication. 4.Tutor demonstrates and guides student teachers to provide lettering to the drawings developed in two and three dimension.
3	Introduction to AutoCAD to construct Geometrical shapes and forms	**1.Drawing setup** **2.Drawing command** **3.Modifying commands** **4.Multi-view drawing** **5.Solid modelling** **6.Rendering**	Tutor Introduce the drawing setup procedure using AutoCAD through video presentation and discussion Tutor demonstrates the steps involved in the drawing commands of the software through overhead projection and discuss. 1.Tutor Introduce the modifying commands of the software and demonstrate the procedure step by step and explain. Tutor presents video on the processes involved in Multi-view of the AutoCAD software and demonstrate the processes. Tutor presents video on the processes involved in solid modelling of the AutoCAD software and demonstrate the solid modelling Tutor presents video on the processes involved in solid modelling of the AutoCAD software and demonstrate the rendering of solid.

4	Construction of geometrical shapes and forms ie : Circles, Triangles, Quadrilaterals, Polygons, Conic sections	**1. Construction of circles ie :** **Concentric and eccentric** **2 .Triangles: right angled, equilateral, isosceles and scalene.** **Quadrilaterals: square, rectangles, parallelogram, rhombus and kite.** **3 Polygons, pentagons, hexagons, octagons, and nonagon** 4 Conic sections ie :**Ellipse, Parabola, Hyperbola** **5 Plain scale and Diagonal scale**	Tutor introduce the student teachers to a general discussion about Geometrical shapes namely circles and triangles. .Tutor makes power point presentation on the techniques for the construction of various circles (concentric and eccentric) explain and lead a discussion the techniques. Tutor demonstrates the construction techniques for the different types of circular shapes Tutor leads discussion and demonstrates the techniques of constructing the various triangles, quadrilaterals and polygons.
5	Development of surfaces of Prisms and Pyramids	**Surface development of Right prisms:** **1.Cylinder, square, rectangular, triangular,** **2. Surface development of Polygonal prism :** **Pentagonal, Hexagonal etc** 3. Surface development of Cone, square, rectangle, triangle, Pentagon, and hexagonal pyramids.	1. Tutor engages student teachers in a discussion on the various types of Right prisms. 2. Tutor makes power point presentation on the techniques for the development of surfaces of cylindrical prisms. 3.Tutor demonstrates the construction techniques for surface development. 4.Tutor makes power point presentation on the techniques for the construction for the surface development of square, rectangular and triangular prisms. 5.Tutor demonstrates the construction techniques for the different types of Quadrilaterals Tutor engages student teachers in a discussion on the various types of Right Pyramid. . Tutor makes power point presentation on the techniques for the development of surfaces of Right Pyramid namely :cone, square and triangles
6	Pictorial Drawing and Orthographic Projection	**Pictorial drawing of objects in:** **Isometric view,**	Tutor engages student teachers in a discussion on the various types of Pictorial drawing. . Tutor makes power point presentation on the techniques for Isometric drawing. 2. Explain the specific techniques involved in isometric drawing. 3. Tutor demonstrates the construction techniques for isometric drawing. 1. Tutor makes power point presentation on the techniques for Oblique drawing

		Oblique view and	2. Explain the specific techniques involved.
			3.Tutor demonstrates the construction techniques for oblique drawing.
			Tutor makes power point presentation on the techniques for Perspective drawing.
		Perspective drawing.	2. Explain the specific techniques involved in Perspective drawing.
			3. Tutor demonstrates the construction techniques involved in Perspective drawing.
7.	*Course Assessment Components*		1. Tutor makes power point presentation on the techniques for Isometric drawing. 2. Explain the specific techniques involved in isometric drawing.
			3. Tutor demonstrates the construction techniques for isometric drawing.

In the course specification. The NTS and the NTECF require a move away from largely examination-based assessment to strategies to enable assessment of student teachers' skills, knowledge and understanding against the learning outcomes and through these the against the NTS

- There should be a maximum of 3 assessment components per 3 credit-course; to avoid over loading student and tutors/ lecturers
- The learning outcomes to be assessed by each assessment component should be identified.
- Each assessment component should explicitly reference the NTS or aspects of the NTS it will assess.
- Each assessment component should include:
  - The category or type, for example: written, coursework or practical, teaching, examination, collaborative project or presentation, poster, TLM
  - The type of assessment: of, for and /or as.
  - An indication of the size of each assessment component (e.g. duration of exams, word limit of written submissions, length of presentations; whether presentations have an individual or group etc.).
  - The weighting of each assessment component should be expressed as a % of total course mark (overall in each course: 60% continuous assessment of course work, 40% examination of course work).
- Each assessment should be manageable and relevant to supporting the student teachers' development.

The guidance on assessing student teachers from the NTS, the NTECF the CWG and the New Four Year B.Ed. should be used.

Summary of Assessment Methods

Component 1: Examination
Assessment Type: Assessment of Learning
Category of Assessment: Written Examination
Maximum Duration: 3 hours
Students teachers are assessed by summative examination on:
- The relevant foundational history, philosophy of Graphic communicationas the sole communicative channel for technology subjects.
- Tools, equipment, lines and lettering in graphic communication.
- Introduction to AutoCAD to construct Geometrical shapes and forms.
- Construction of geometrical shapes and forms ie : Circles, Triangles, Quadrilaterals, Polygons & Conic sections
Learning Outcomes Assessed: CLO 1; CLO 2,CLO3 & CLO4; NTS pg. 14(c & j); pg. 24 (e & f); pg. 26 (j)
Weighting: 40%

Component 2: Continuous Assessment 1
Assessment Type: Assessment for and as Learning
Category of Assessment:
Student teachers assessed through **Presentations** and **Reports**on:
- The relevant foundational history, philosophy of Graphic communication as the sole communicative channel for technology subjects.
- Tools, equipment, lines and lettering in graphic communication.
- Introduction to AutoCAD to construct Geometrical shapes and forms.
Learning Outcomes Assessed: CLO1,CLO2, & CLO 3; NTS pg. 14 (b)

Weighting: 30%

Component 3: Continuous Assessment 2

Student teachers assessed through**Portfolio** and **Project Work** on**:**

- The relevant foundational history, philosophy of Graphic communication as the sole communicative channel for technology subjects.
- Construction of geometrical shapes and forms ie : Circles, Triangles, Quadrilaterals, Polygons, Conic sections
- Development of surfaces of Prisms and Pyramids.
- Pictorial Drawing and Orthographic Projection.

Learning Outcomes Assessed: CLO1, CLO 4,CLO5 & CLO 6; NTS pg. 12 (a, b & c); pg. 13 (c); pg. 14 (b)

Weighting: 30%

1.   Teaching and learning strategies

Detail in this section should show how the total learning hours will be used to achieve the intended learning outcomes, to provide a guide to the teaching and learning strategies to be used. Each teaching strategy should be selected as most appropriate to achieving the learning outcomes. This may include team teaching or additional tutors. As stated in the B.Ed. experiential learning and interactive teaching approaches are encouraged

Discussion, presentations (group/individual), seminar, project work/practical work, demonstrations, brainstorming, simulation, and industrial visits

2.   Required Reading and reference list

One or two compulsory texts which must be made available to the student teachers and a SHORT list of 5 relevant references. These lists should be annotated with the key value of each text. Use APA style of writing.

Amoakohene, S.K. et al (1998). *Technical skills and drawing for teacher training Book 2 (Tools and processes and methodology)*. Accra: Unimaxin association with Macmillan Educ. Ltd. Cambridge University Press.

Forbes, B., et al (2017). *Higher graphic communication course notes.* HarperCollins publishers.

3.   Teaching and Learning Resources

Instructional resources required to support learning during the course e.g.: TLMs, lab and workshop equipment, videos, projectors

Graphic communication tools and equipment, materials (pencils, pens, drawing sheets, erasers, etc.)

Compact Disc (Audio & Video) player with a recording facility (possibly with a detached microphone) on the Medieval, Industrial and Evolutional eras of Graphic communication

Computers (Laptops or PCs) for simulations

Video Camera, LCD Projector and Screen, Tripod and Monitoring Unit (for viewing)

Course related professional development for tutors/ lecturers

This is not included the course manual but professional development needs must be identified to ensure all tutors / lecturers are prepared to teach the course identify any specific topics or issues which may be challenging for tutors / lecturers.

LESSON 1

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

Title of Lesson	Historical Foundations and Materials Used for Graphic Communication	Lesson Duration	180 minutes
Lesson description	This course is designed to lay the historical foundation for Engineering Drawing and Building Drawing. The historical Foundation is necessary for the student teacher to appreciate the stages of development of the subject Graphic communication and the materials necessary for it. This first lesson introduces student to the course learning outcomes and three 3 assessment components of the course.		
Previous student teacher knowledge, prior learning (assumed)	Student Teachers are: • Aware of the fact that those in the fields of Engineering and Building use Graphic communication or illustrations to express the ideas or views they have about solution to a problem. • They are also aware that the designs serve the role a communicative guide in the making of many local artifacts.		
Possible barriers to learning in the lesson	• Gender issues in the fact that *Graphic Communication is a male dominated skill area.* • Tutors of Graphic communication may not appreciate the fact that the female who do Graphic communication most often become very successful. • Graphic communication not being a vocation for SEN student teachers		

Lesson Delivery – chosen to support students in achieving the outcomes	Face-to-face ☑	Practical Activity ☑	Work-Based Leaning	Seminars	Independent Study	e-learning opportunities	Practicum

Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	• Use Face to Face to**think, pair and share** to enable students to discuss the various era of the history that form the foundation of Graphic communication in Technology today. • Use **demonstration** to engage student identify the various appropriate and relevant materials used for Graphic communication.
• **Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.** • **Write in full aspects of the NTS addressed**	The purpose of this lesson is predispose student teachers to the historical foundations of Graphic communication to enable them form a progressive concept of the subject and exposure to the appropriate and relevant materials used for Graphic communication.

- Learning Outcome for the lesson, picked and developed from the course specification - Learning indicators for each learning outcome	Learning Outcomes : By the end of the lesson, the student teacher will be able to:		Learning Indicators	Identify which cross-cutting issues - core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed.
	Demonstrate knowledge of the historical foundations of Graphic communication Demonstrate knowledge of the handling of materials used for graphic communication		Prepare a report on the historical era which form the foundations of graphic communication. 1. Present a portfolio of samples of appropriate and relevant materials used for Graphic communication. 1. Make a video recording(s) of the Materials being used in Graphic Communication	- Assessment skills, social skills, communication skills, reflection and honesty. - critical thinking and problem solving, - cultural and civic literacy, innovation and collaboration - Gender issues; SEN (therapeutic); - diversity and inclusivity, - information literacy,

Topic Historical Foundations and Materials used for Graphic Communication Preparations for use of course manual and Pre–Learning interactions	Topic Sub-topic	Stage/Time	Teaching and learning activities to achieve learning outcomes: depending on delivery mode selected. Teacher led, collaborative group work or independent study	
			Teacher Activity	Student Activity
	Self-Introduction (If Tutor is new to the Class) Introduction to the Historical Foundations and Materials used for Graphic Communication Relevant Previous Knowledge	1 **30 minutes**	**Self Introduction** Through face-to-face interaction, Tutor/Lecturer and student-teachers introduce themselves **Introduction of Course Manual** Tutor/Lecturer initiates discussion on the course manual emphasizing on the objectives, learning outcomes, course content and reference materials **Introduction of Lesson** Tutor facilitates student teachers revision of their knowledge of the lesson from pre-tertiary. Tutor asks the following questions: 1. What do those in the fields of Engineering and Building use to	**Self Introduction** Student-teachers do self-introduction (Tutor/Lecturer and student-teachers) **Introduction of Course Manual** Student teachers discuss the manual and what they expect to learn after studying the course **Introduction of Lesson** Students answer questions and do brief discussions
	Medieval , Industrial and revolution eras of			

	Graphic communication Appropriate materials used for Graphic communication			express their ideas or views about solutions to a problem? 2. What role does design serve in the making of many local artifacts?	
Historical Foundations and Materials used for Graphic Communication		2 90 minutes	**Interactive Lecture** Tutor uses interactive lecture to present the various historical eras of Graphic Communication and their importance to the student teachers	**Interactive Lecture** Student teachers listen, contribute to the interactive lecture and take notes of key points	
		3 60 minutes	**Video Presentation** Tutor presents a video recording (Animation) of various materials being used for Graphic Communication. **Group Demonstration** Tutor guides student teachers to form groups to demonstrate the handling of the appropriate materials used for Graphic Communication . Students with special needs are considered in terms of furniture suitability and convenience . **Closure** **Tutor summarises the lesson based on the key points to close .**	**Video Presentation** Student teachers watch the video and note down the important aspects of the animation. **Group Demonstration** Student teachers form groups and engage in hands-on demonstration of the uses of the various appropriate materials for Graphic Communication. **Closure** Student teachers listen the tutors summary to end the lesson.	

Lesson assessments – evaluation of learning: of, for and as learning within the lesson (linking to learning outcomes)	**In lesson assessment :** **Assessment Type for and as learning** **Category of Assessment :** • Individual presentation of portfolio on the historical foundations of Graphic communication. Learning outcome assessed : CLO 1 • Group presentation of the identification and uses of the various appropriate materials for Graphic communication. Learning outcome assessed : CLO 1
Teaching Learning Resources	1. Compact Disc (Audio & Video) player with a recording facility (possibly with a detached microphone) on the Medieval, Industrial and Evolutional eras of Graphic communication

	2. Computers (Laptops or PCs) for playing back MP3 and MP4 files.
	3. Video Camera, LCD Projector and Screen, Tripod and Monitoring Unit (for listening and recording and viewing).
Required Text (core)	Amoakohene, S.K. et al (1998). Technical skills and drawing for teacher training book 1 (Tools and processes and methodology). Accra Unimax
	Forbes, B., et al (2017). Higher graphic communication course notes. HarperCollins publishers.
Additional Reading List	Amoakohene, S.K. et al (1998). Technical skills and drawing for teacher training book 2 (Tools and processes and methodology). Accra Unimax
	Maguire D. (1998). Engineering Drawing from first principles using AutoCAD. London: Arnorld Publishers.
CPD Needs	Team teaching , ICT skills, Brainstorming and Critical analysis

LESSON 2

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

Title of Lesson	Tools, equipment, lines and lettering in graphic communication	Lesson Duration	180 minutes
Lesson description	This Lesson is designed to introduce student teachers to the knowledge and identity of the appropriate tools and equipment for Graphic communication. The tool, equipment, lines and lettering form the basis for effective knowledge and skills of Graphic communication. It is the tools, equipment, lines and lettering that serve as the vehicle for competence in Graphic communication.		
Previous student teacher knowledge, prior learning (assumed)	Student Teachers are: • Aware of the fact that those in the fields of Engineering and Building use specific tools and equipment to express their ideas or views graphically.		
Possible barriers to learning in the lesson	• Gender issues in the fact that *Graphic Communication is a male dominated skill area.* • Tutors of Graphic communication may not appreciate the fact that the female who do Graphic communication most often become very successful. Graphic communication not being a vocation for SEN student teachers		

Lesson Delivery – chosen to support students in achieving the outcomes	Face-to-face ☑	Practical Activity ☑	Work-Based Learning	Seminars	Independent Study ☑	e-learning opportunities ☑	Practicum
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	• Use Face to Face to **shower thoughts** to enable student teachers to identify and describe the various tools and equipment used for Graphic communication. • Use Independent study to **think, pair and share** to describe the appropriate uses of the tools and equipment for Graphic communication. • Use Practical Activity to Guide student teachers to demonstrate the various tools and equipment in drawing using lines for two and three dimension objects and lettering them using upper and lower cases. • Use E Learning Opportunities to organise**group discussion**s to get student teachers discuss their strengths and weaknesses in the use of tools, equipment, Lines and Lettering for Graphic communication.						
• **Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.** • **Write in full aspects of the NTS addressed**	The purpose of this lesson is to introduce student teachers to the use of tools, equipment, lines and lettering in Graphic communication for effective learning of the subject.						

• Learning Outcome for the lesson, picked and developed from the course specification • Learning indicators for each learning outcome	Learning Outcomes : By the end of the lesson, the student teacher will be able to:		Learning Indicators	Identify which cross-cutting issues - core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed.
	Demonstrate knowledge of the various tools and equipment use for Graphic communication		2.1 Make a video recording(s of the various tools and equipment used in Graphic communication	• Assessment skills, social skills, communication skills, reflection and honesty.
	Demonstrate knowledge of the manipulative skills of the various tools and equipment use for Graphic communication		2.2 Exhibit knowledge, understanding and manipulative skills in the use of the various tools and equipment	• critical thinking and problem solving, • cultural and civic literacy, innovation and collaboration
	Demonstrate knowledge of the lines use in Graphic communication		2.3 Make portofolio of the various lines use in Graphic communication. Eg: main line, construction line,zig zag line and others.	• Gender issues; SEN (therapeutic); • diversity and inclusivity,
	Demonstrate knowledge of the manipulative skills of lettering in Graphic communication		Provide lettering to the drawings done using lines.eg showing upper case and lower case.	• information literacy,

Topic Tools, equipment, lines and lettering in graphiccommunication	**Topic** **Sub-topic**	**Stage/Time**	**Teaching and learning activities to achieve learning outcomes: depending on delivery mode selected. Teacher led, collaborative group work or independent study**	
			Teacher Activity	**Student Activity**
	Previous Knowledge	1 **10 minutes**	**Introduction** Tutor Introduce Graphic communication tools, equipment, lines and lettering in Graphic communication to students based on their previous knowledge	**Introduction** Student teachers participate by carefully observing the tools, equipment, brainstorming by their contributions.
	1. Tools and equipment use for Graphic communication	2 80 minutes	**Demonstration & Discussion** Tutor demonstrate the	**Demonstration & Discussion** Student teachers observe

	2.Lines use in Graphic communication			uses of the various Graphic communication tools and equipment using the various lines of Graphic communication to draw objects in both two and three dimensions. Eg plane figures and pictorial figures	the tutors demonstration and practice the same.
	3.Lettering in Graphic communication	3 90 minutes		**Power Point Presentation** Tutor produces a power point presentation on the strategies to make upper and lower case Lettering as used for Graphic communication. **Group Demonstration** Tutor demonstrates and guides student teachers to provide lettering to the drawings developed in two and three dimensions. NB: The group demonstration considers students with special needs and mixed ability students. **Closure** Tutor reflects on the main points of the lesson to close it	**Power Point Presentation** Student teachers observe the power point presentation . **Group Demonstration** Student teachers form groups and engage in hands on demonstration of the uses of the various appropriate materials for Graphic communication. **Closure** Student teachers to reflect on main points of the lesson to close.

Lesson assessments – evaluation of learning: of, for and as learning within the lesson (linking to learning outcomes)	• Individual presentation of portfolio on the uses of tools, equipment, lines and lettering in Graphic communication. Learning outcome assessed : CLO 1 • Individual presentation of portfolio on two and three dimension drawings and their respective lettering as required in Graphic communication. Learning outcome assessed : CLO 1
Teaching Learning Resources	1. Over head projector. 2. Video Camera, LCD Projector and Screen, Tripod and Monitoring Unit (for viewing).
Required Text (core)	Amoakohene, S.K. et al (1998). *Technical skills and drawing for teacher training book 1 (Tools and processes and methodology)*. Accra Unimax Maguire D. (1998). Engineering Drawing from first principles using AutoCAD. London: Arnorld Publishers.
Additional Reading List	Amoakohene, S.K. et al (1998). Technical skills and drawing for teacher training book 2 (Tools and processes and methodology). Accra Unimax Maguire D. (1998). Engineering Drawing from first principles using AutoCAD. London: Arnorld Publishers.

CPD Needs	Team teaching , ICT skills, Brainstorming and Critical analysis
	Constant practice to ensure mastery

LESSON 3

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

Title of Lesson	Introduction to AutoCAD			Lesson Duration	**3 hours**
Lesson description	The introduction to AutoCAD for the construction of geometrical shapes and forms involve the techniques that can be used to practice the manipulative skills of the AutoCAD software.				
Previous student teacher knowledge, prior learning (assumed)	Student Teachers are: • Aware of the fact that the manipulative skills in the construction of geometrical shapes and forms using AutoCAD important and relevant in the fields of Engineering and Building as Graphic communication tool to accelerate the appropriate ideas or views in problem solving.				
Possible barriers to learning in the lesson	• Gender issues in the fact that *Graphic Communication is a male dominated skill area.* • Tutors of Graphic communication may not appreciate the fact that the female who do Graphic communication most often become very successful. Fear and anxiety, lack of practical know-how Graphic communication not being a vocation for SEN student teachers				

Lesson Delivery – chosen to support students in achieving the outcomes	Face-to-face ☑	Practical Activity ☑	Work-Based Leaning	Seminars	Independent Study	e-learning opportunities ☑	Practicum

Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	• Use **demonstration methods to guide** student teachers to use the techniques involved in geometrical shapes and forms using AutoCAD software. • Use **think, pair and share** to describe the appropriate procedures involved • Guide student teachers to demonstrate the various manipulative skills in drawing geometrical shapes and forms using the AutoCAD software. • Use **group discussion**s to get student teachers discuss their strengths and weaknesses in the use of the AutoCAD software.
• **Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.** • **Write in full aspects of the NTS addressed**	The purpose of this lesson is to introduce student teachers to the use of AutoCAD software in the manipulative skills of constructing geometrical shapes and forms to enhance their competence in Engineering and Building drawings as required in Graphic communication.

• Learning Outcome for the lesson, picked and developed from the course specification • Learning indicators for each learning outcome	Learning Outcomes	Learning Indicators	Identify which cross-cutting issues - core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed.
	• Demonstrate knowledge and skills involved in manipulating AutoCAD software to construct Geometrical forms and shapes	Prepare an album of Geometrical forms and shapes drawn through the manipulation of the AutoCAD software.	• Assessment skills, social skills, communication skills, reflection and honesty. • critical thinking and problem solving, • cultural and civic literacy, innovation and collaboration • Gender issues; SEN (therapeutic); • diversity and inclusivity, • information literacy,
	• Demonstrate knowledge and skills involved in manipulating AutoCAD software to construct Pictorial views	Produce a portfolio of Pictorial views namely: perspective, isometric and oblique drawings through the manipulation of the AutoCAD software.	
	• Demonstrate knowledge and skills involved in manipulating AutoCAD software to construct Pictorial views Demonstrate knowledge and skills involved in manipulating AutoCAD software to construct Pictorial views	Produce a portfolio of Conic sections through the manipulation of the AutoCAD software. Produce a portfolio of Orthographic projections through the manipulation of the AutoCAD software.	

Topic	Topic Sub-topic	Stage/Time	Teaching and learning activities to achieve learning outcomes: depending on delivery mode selected. Teacher led, collaborative group work or independent study	
Introduction to AutoCAD			Teacher Activity	Student Activity
	Previous Knowledge	1 15 minutes	**Introduction** Tutor Introduce the drawing setup procedure using AutoCAD through video presentation and discussion	**Introduction** Student teachers participate by carefully observing the procedures and discuss the presentation.
	Drawing setup	2 25minutes	**Demonstration** Tutor demonstrates the steps involved in the drawing commands of the software through overhead projection and discuss.	**Demonstration** Student teachers participate by carefully observing the steps and participate in the discussion.

	Drawing commands	3 35 minutes	**Demonstration & Explanation** Tutor Introduce the modifying commands of the software and demonstrate the procedure step by step and explain.	**Demonstration & Explanation** Student teachers carefully observe and practice the modifying command and listen to tutors explanation.
	Modifying commands			
	Multi-view drawing	4 35minutes	**Demonstration& Discussion** Tutor use video presentation to introduce Multi-view drawing and use interactive lecture discuss and demonstrate.	**Demonstration& Discussion** Student teachers carefully observe the Multi-view drawing procedures and practice the demonstration.
	Solid modelling			
	Rendering	5 35minutes	**Video Presentation & Demonstration** Tutor presents video on the processes involved in solid modelling of the AutoCAD software and demonstrate the solid modelling	**Video Presentation & Demonstration** Student teachers observe the processes involved in solid modelling of the AutoCAD software and practise the demonstration.
		6 35minutes	**Video Presentation & Demonstration** Tutor presents video on the processes involved in solid modelling of the AutoCAD software and demonstrate the rendering of solid. **Closure** Tutor summarises the lesson to end the lesson	**Video Presentation & Demonstration** Student teachers carefully observe the Rendering procedures and practice the demonstration **Closure** Student teachers listen to the tutor's summary end the lesson**.**
Lesson assessments – evaluation of learning: of, for and as learning within the lesson (linking to learning outcomes)	- Individual presentation of portfolio on the shapes and forms drawn using the manipulation of the AutoCAD software Learning outcome assessed : CLO 2 - Individual presentation of album on pictorial, orthographic projection and conic sections using the manipulations of the AutoCAD software. Learning outcome assessed : CLO 2			
Teaching Learning Resources	Computer laboratory and Accessories			
Required Text (core)	Hunt, M., & Clemens, B. (2017). *Illustrated Microsoft Office 365 & Office 2016: Fundamentals*. Boston, MA:			

	Integrating Technology and Digital Media in the Classroom. (7th ed).
	O' Leary, T. J., & O' Leary L. I. (2017). *Computing essentials, 26th edition*. New York: McGraw Hill.
	Wempen, F. (2014) *Computing Fundamentals: Introduction to Computers.* New York: Wiley
	Microsoft Encarta (2018). 1993-2005 Microsoft Corporation.
	Shelly, G. B., Vermaat, M. E. (2011). *Discovering computers 2012: Living in a digital world, Complete International*
	Edition. Boston, MA: Thompson Course Technology.
	Shelly, R., Cashman, T.J., Gunter, G.A., and Gunter, R.E. (2013). Teachers Discovering Computers.
	Thomson Course Technology.
Additional Reading List	Selected articles and online resources (youtube.com, MOOCs: Khan Academy, TESSA [www.tessafrica.net], Udemy etc)
CPD Needs	Team teaching , ICT skills, Brainstorming and Critical analysis

LESSON 4

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

Title of Lesson	Construction of geometrical shapes (Circles and Triangles)	Lesson Duration	3 hours
Lesson description	Construction of Geometrical shapes (circles and triangles) involve the construction techniques needed to develop the various circular and triangular shapes		
Previous student teacher knowledge, prior learning (assumed)	Student Teachers are: Aware that Geometrical shapes play very important role in the fields of Engineering and Building for Graphic communication. The study of the skills in Geometrical shapes construction is necessary to enhance their understanding of Technological issues.		
Possible barriers to learning in the lesson	Fear and anxiety, lack of practical know-how • Gender issues in the fact that *Graphic Communication is a male dominated skill area.* • Tutors of Graphic communication may not appreciate the fact that the female who do Graphic communication most often become very successful. Graphic communication not being a vocation for SEN student teachers		

Lesson Delivery – chosen to support students in achieving the outcomes	Face-to-face	Practical Activity	Work-Based Leaning	Seminars	Independent Study	e-learning opportunities	Practicum
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	• Use **demonstration methods** to guide student teachers to construct Geometrical shapes . • Use **think, pair and share** to enable student teachers to identify the difference between the various Geometrical shapes. • Use concept mapping to describe the links and connections the various types of Geometrical shapes. • Use **group discussion** to enable student teachers discusses their strengths, weakness, aspirations and use the information to connect to improve their competence.						
• **Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.** • **Write in full aspects of the NTS addressed**	The purpose of this lesson is to introduce student teachers to the specific manipulative skills of constructing geometrical shapes and forms to enhance their competence in Engineering and Building drawings as required in Graphic communication.						

	Learning Outcomes	Learning Indicators	**Identify which cross-cutting issues - core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed.**
• **Learning Outcome for the lesson, picked and developed from the course specification** • **Learning indicators for each learning outcome**	• Demonstrate knowledge and skills involved in constructing circles ie (concentric and eccentric) • Demonstrate knowledge and skills involved in the construction of Triangles	Prepare an album of circles ie (concentric and eccentric) Produce a portfolio of the construction of the various Triangles.	• Assessment skills, social skills, communication skills, reflection and honesty. • critical thinking and problem solving, • cultural and civic literacy, innovation and collaboration • Gender issues; SEN (therapeutic); • diversity and inclusivity, • information literacy,

Topic	**Topic Sub-topic**	**Stage/Time**	**Teaching and learning activities to achieve learning outcomes: depending on delivery mode selected. Teacher led, collaborative group work or independent study**	
			Teacher Activity	**Student Activity**
Construction of geometrical shapes (Circles and Triangles)	**Previous Knowledge** **Construction of circles Concentric and eccentric**	1 15 minutes	**Introduction** Tutor introduce the student teachers to a general discussion about Geometrical shapes namely circles and triangles based on the student teachers previous	**Introduction** Student teachers participate in the introduction based upon their previous knowledge.
		2 60 minutes	**Power Point Presentation & Discussion** Tutor makes power point presentation on the techniques for the construction of various circles (concentric and eccentric) explain and lead a discussion the techniques. **Demonstration &Practise** Tutor demonstrates the construction techniques for the different types of circular shapes	**Power Point Presentation & Discussion** Student teachers observe the steps in the presentation of the techniques Listen to the tutors explanation on the techniques. **Demonstration &Practise** Student teachers observe the tutors demonstration note the specific techniques in the different types of the circular shapes. Student teachers practise the construction of circular geometrical shapes.

	Triangles: right angled, equilateral, isosceles and scalene.	3 105 minutes	**Demonstration , Explanation & Practise** Tutor guide student teachers to classify the Triangles. Tutor demonstrates the techniques of constructing the various triangles. Explain the specific principles guiding the construction of the Triangles. 4.Assign student teachers to practise the construction of triangles. **Closure** Tutor reflects on the main points of the lesson to end.	**Demonstration , Explanation & Practise** Observe and take note of the classification of triangles. Student teachers observe the tutors demonstration on the specific types of triangles and the techniques involved. Listen to tutors explanation on the specific guiding principles for construction of triangles. Student teachers practise the construction of triangles. **Closure** Student teachers reflect on the main points of the lesson to close.

Lesson assessments – evaluation of learning: of, for and as learning within the lesson (linking to learning outcomes)	• Individual presentation of portfolio on the construction of circular shapes construction Learning outcome assessed : CLO 2 • Individual presentation of album on the construction of the various triangles Learning outcome assessed : CLO 2
Teaching Learning Resources	Geometrical Drawing Equipment and Drawing room
Required Text (core)	Amoakohene, S.K. et al (1998). Technical skills and drawing for teacher training book 1 (Tools and processes and methodology). Accra Unimax Maguire D. (1998). Engineering Drawing from first principles using AutoCAD. London: Arnorld Publishers.
Additional Reading List	Amoakohene, S.K. et al (1998). Technical skills and drawing for teacher training book 2 (Tools and processes and methodology). Accra Unimax Maguire D. (1998). Engineering Drawing from first principles using AutoCAD. London: Arnorld Publishers.
CPD Needs	Team teaching , ICT skills, Brainstorming and Critical analysis

LESSON 6

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

Title of Lesson	Construction of geometrical forms (Quadrilaterals and Polygons)	Lesson Duration	3 hours
Lesson description	The construction of Geometrical forms for Quadrilaterals and polygons provides the specific constructional techniques needed to ensure that the required manipulative skills are transmitted and practise for effective training in geometrical construction for competency.		
Previous student teacher knowledge, prior learning (assumed)	Student Teachers are: Aware that Geometrical shapes play very important role in the fields of Engineering and Building for Graphic communication. The study of the skills in Geometrical shapes construction is necessary to enhance their understanding of Technological issues.		
Possible barriers to learning in the lesson	Fear and anxiety, lack of practical know-how • Gender issues in the fact that *Graphic Communication is a male dominated skill area.* • Tutors of Graphic communication may not appreciate the fact that the female who do Graphic communication most often become very successful. Graphic communication not being a vocation for SEN student teachers		

Lesson Delivery – chosen to support students in achieving the outcomes	Face-to-face	Practical Activity	Work-Based Leaning	Seminars	Independent Study	e-learning opportunities	Practicum
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	• Use **think, pair and share** to enable student teachers to identify the difference between the various Geometrical shapes. • Use concept mapping to describe the links and connections the various types of Geometrical shapes. • Use **group discussion** to enable student teachers discusses their strengths, weakness, aspirations and use the information to connect to improve their competence.						
• **Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.** • **Write in full aspects of the NTS addressed**	The purpose of this lesson is to introduce student teachers to the specific manipulative skills of construction techniques of developing Quadrilaterals and Polygons.						

Learning Outcome for the lesson, picked and developed from the course specification Learning indicators for each learning outcome	Learning Outcomes	Learning Indicators	Identify which cross-cutting issues - core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed.
• Learning Outcome for the lesson, picked and developed from the course specification • Learning indicators for each learning outcome	• Demonstrate knowledge and skills involved in constructing Quadrilaterals • Demonstrate knowledge and skills involved in the construction of Polygons	Prepare an album of the different types of Quadrilaterals Produce a portfolio of the construction of the various Polygons.	• Assessment skills, social • skills, communication skills, reflection and honesty. • critical thinking and problem solving, • Gender issues; SEN (therapeutic); • diversity and inclusivity, information literacy

Topic	Topic Sub-topic	Stage/Time	Teaching and learning activities to achieve learning outcomes: depending on delivery mode selected. Teacher led, collaborative group work or independent study	
Construction of geometrical forms (Quadrilaterals and Polygons			Teacher Activity	Student Activity
	Previous Knowledge **Quadrilaterals: square, rectangles, parallelogram, rhombus and kite.** **Polygons, pentagons, hexagons, octagons, and nonagon**	1 10 minutes	**Introduction** Tutor lead the student teachers in a general discussion about Quadrilaterals and Polygons based on the student teachers' previous knowledge.	**Introduction** Student teachers participate in the introduction discussion on **Quadrilaterals and Polygons based on the student teachers' previous knowledge .**
		2 85 minutes	**Power Point Presentation, Explanation& Demonstration** Tutor makes power point presentation on the techniques for the construction of the various Quadrilaterals. Explain and lead a discussion on the techniques involved. Tutor demonstrates the construction techniques for the different types of Quadrilaterals	**Power Point Presentation, Explanation & Demonstration** Student teachers observe the steps in the presentation of the techniques Listen to the tutor's explanation on the techniques. Student teachers observe the tutors demonstration note the specific techniques in the different types of Quadrilaterals. Student teachers practise the construction of Quadrilaterals
		3 85 minutes	**Demonstration, Explanation & Practise** Tutor guide student teachers to classify the Polygons according to sides.	**Demonstration, Explanation & Practise** Observe and take note of the classification of Polygons. Student teachers observe

	Tutor demonstrates the techniques of constructing the various triangles. Explain the specific principles guiding the construction of Polygons. Assign student teachers to practise the construction of Polygons. **Closure** Tutor summarise the main points of the lesson to end the lesson	the tutors demonstration on the specific types of Polygon and the techniques involved. Listen to tutors explanation on the specific guiding principles for construction of Polygons. Student teachers practise the construction of Polygons. **Closure** Student teachers listen to the tutor's summary to end the lesson.

Lesson assessments – evaluation of learning: of, for and as learning within the lesson (linking to learning outcomes)	• Individual development of portfolio on the construction of the different types of Quadrilaterals Learning outcome assessed : CLO 2 • Individual presentation of album on the construction of the various sides of Polygon Learning outcome assessed : CLO 2
Teaching Learning Resources	Geometrical Drawing Equipment and Drawing room
Required Text (core)	Amoakohene, S.K. et al (1998). Technical skills and drawing for teacher training book 1 (Tools and processes and methodology). Accra Unimax Maguire D. (1998). Engineering Drawing from first principles using AutoCAD. London: Arnorld Publishers.
Additional Reading List	Amoakohene, S.K. et al (1998). Technical skills and drawing for teacher training book 2 (Tools and processes and methodology). Accra Unimax Maguire D. (1998). Engineering Drawing from first principles using AutoCAD. London: Arnorld Publishers.
CPD Needs	Team teaching , ICT skills, Brainstorming and Critical analysis

LESSON 6

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

Title of Lesson		Conic sections and scale drawing	Lesson Duration	3 hours
Lesson description		Conic sections represent the plane figure interpretation of Ellipse, Parabola and Hyperbola shapes and Scale drawing involve Plain and Diagonal scales for representing reduction or enlarging of sizes objects convenience.		
Previous student teacher knowledge, prior learning (assumed)		Student Teachers are: Aware that Conic sections and scale drawing play very important role in the fields of Engineering and Building for Graphic communication. The study of these skills are necessary to enhance their understanding of Technological issues.		
Possible barriers to learning in the lesson		Fear and anxiety, lack of practical know-how • Gender issues in the fact that *Graphic Communication is a male dominated skill area.* • Tutors of Graphic communication may not appreciate the fact that the female who do Graphic communication most often become very successful. Graphic communication not being a vocation for SEN student teachers		

Lesson Delivery – chosen to support students in achieving the outcomes	Face-to-face ☑	Practical Activity ☑	Work-Based Leaning ☑	Seminars	Independent Study	e-learning opportunities ☑	Practicum
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	• Use **think, pair and share** to enable student teachers to identify the difference between the various Conic sections and the idea of Scale drawing. • Use concept mapping to describe the links and connections the various types of Conic shapes and Scale drawing. • Use **group discussion** to enable student teachers discusses their strengths, weakness, aspirations and use the information to connect to improve their competence.						

• **Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.** • **Write in full aspects of the NTS addressed**	The purpose of this lesson is to introduce student teachers to the techniques of presenting Conic sections like Ellipse, Parabola and Hyperbola geometrical drawing. Also Scale drawing is to introduce student teachers to the techniques involved in the construction of Plain and Diagonal scales.		
• **Learning Outcome for the lesson, picked and developed from the course specification** • **Learning indicators for each learning outcome**	**Learning Outcomes**	**Learning Indicators**	**Identify which cross-cutting issues - core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed.**
	• Demonstrate knowledge, understanding and techniques involved in the construction of Conic sections	Prepare an album of the different types of Conic sections	• Assessment skills, social • skills, communication skills, reflection and honesty. • critical thinking and problem solving, • Gender issues; SEN (therapeutic); • diversity and inclusivity, information literacy
	• Demonstrate knowledge and skills involved in the construction of Scales for drawing	Produce a portfolio on the construction of Plain and Diagonal scales.	

Topic Conic sections and scale drawing	Topic Sub-topic	Stage/Time	Teaching and learning activities to achieve learning outcomes: depending on delivery mode selected. Teacher led, collaborative group work or independent study	
			Teacher Activity	**Student Activity**
	Previous Knowledge	1 15 minutes	**Introduction** Tutor lead the student teachers in a general discussion on Conic sections and Scale drawing.	**Introduction** **Student teachers participate in the discussion.**
	Ellipse **Parabola** **Hyperbola** **Plain scale** **Diagonal scale**	2 90 minutes	**Power Point Presentation, Explanation & Demonstration** Tutor makes power point presentation on the techniques for the construction of the variousConic sections. Explain the differences between the types and their specific techniques. Tutor demonstrates the construction techniques for the different types of Quadrilaterals	**Power Point Presentation, Explanation & Demonstration** Student teachers observe the steps in the presentation of the techniques Listen to the tutor's explanation on the techniques. Student teachers observe the demonstration note the specific techniques in the different types of Conic sections and practise the constructions.
		3 75 minutes	**Demonstration&Explanation** Tutor guide student teachers to identify the type of scales. Tutor demonstrates the techniques of constructing Plain and Diagonal scales. Explain the specific principles guiding the construction of each scale. Assign student teachers to practise the construction of scales. **Closure** **Tutor summarises the main points of the lesson to close.**	**Demonstration& Explanation** Observe and take note of the type of drawing scales Student teachers observe the demonstration on the types of scale and the techniques involved. Listen to tutors explanation on the principles for constructing drawing scales. Student teachers practise the construction of scales. **Closure** **Student teachers listen to the tutor's summary.**

Lesson assessments – evaluation of learning: of, for and as learning within the lesson (linking to learning outcomes)	• Individual development of portfolio on the construction of the different types of Conic sections Learning outcome assessed : CLO 3 • Individual presentation of album on the construction of Plain and Diagonal scales. Learning outcome assessed : CLO 3
Teaching Learning Resources	Geometrical Drawing Equipment and Drawing room
Required Text (core)	Amoakohene, S.K. et al (1998). Technical skills and drawing for teacher training book 1 (Tools and processes and methodology). Accra Unimax Maguire D. (1998). Engineering Drawing from first principles using AutoCAD. London: Arnorld Publishers.
Additional Reading List	Amoakohene, S.K. et al (1998). Technical skills and drawing for teacher training book 2 (Tools and processes and methodology). Accra Unimax

	Maguire D. (1998). Engineering Drawing from first principles using AutoCAD. London: Arnorld Publishers.
CPD Needs	Team teaching , ICT skills, Brainstorming and Critical analysis

LESSON 7

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

Title of Lesson	Development of surfaces of Right Prisms		Lesson Duration	3 hours
Lesson description	Development of surfaces involved techniques in presenting the various surfaces of solid figures like cylinders, square, rectangular, triangular and polygonal prisms. The surfaces involved are plan, front view and the true shape and length.			
Previous student teacher knowledge, prior learning (assumed)	Student Teachers are: • Aware of the fact that those in the fields of Engineering and Building use Graphic communication or illustrations to express the ideas or views they have about solution to a problem. They are also aware that the designs serve the role a communicative guide in the making of many local artefacts			
Possible barriers to learning in the lesson	Fear and anxiety, lack of practical know-how • Gender issues in the fact that *Graphic Communication is a male dominated skill area.* • Tutors of Graphic communication may not appreciate the fact that the female who do Graphic communication most often become very successful. Graphic communication not being a vocation for SEN student teachers			

Lesson Delivery – chosen to support students in achieving the outcomes	Face-to-face	Practical Activity	Work-Based Leaning	Seminars	Independent Study	e-learning opportunities	Practicum
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	• Use **think, pair and share** to enable student teachers to identify the difference between the various Right prisms and their associated surface development. • Use concept mapping to describe the links and connections of the various types of Right prisms their surface development. • Use **group discussion** to enable student teachers discusses their strengths, weakness, aspirations and use the information to connect to improve their competence.						
• **Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.** • **Write in full aspects of the NTS addressed**	The purpose of this lesson is to introduce student teachers to the manipulative techniques of presenting the surface development of Right prisms.						

	Learning Outcomes	Learning Indicators	Identify which cross-cutting issues - core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed.
• **Learning Outcome for the lesson, picked and developed from the course specification** • **Learning indicators for each learning outcome**	• Demonstrate knowledge, understanding and techniques involved in constructing the surface development for the right prisms	Prepare an album of the different types of surface development of Right Prisms namely: cylinder, square, rectangular ,pentagonal and hexagonal.	• Assessment skills, social • skills, communication skills, reflection and honesty. • critical thinking and problem solving, • Gender issues; SEN (therapeutic); • diversity and inclusivity, information literacy

Topic Development of surfaces of Right Prisms	**Topic Sub-topic**	**Stage/Time**	**Teaching and learning activities to achieve learning outcomes: depending on delivery mode selected. Teacher led, collaborative group work or independent study**	
			Teacher Activity	**Student Activity**
	Previous Knowledge **Right prisms:**	1 10 minutes	**Introduction** Tutor engages student teachers in a discussion on the various types of Right prisms to introduce the lesson based on student teachers previous knowledge.	**Introduction** Student teachers participate in the discussion on the e various types of Right prisms based on their previous knowledge.
	Cylinder square, rectangular, triangular,	2 30 minutes	**Power Point Presentation, Explanation & Demonstration** Tutor makes power point presentation on the techniques for the development of surfaces of cylindrical prisms. Explain the specific techniques involved. 3.Tutor demonstrates the construction techniques for surface development	**Power Point Presentation, Explanation & Demonstration** Student teachers observe the steps in the presentation of the techniques Listen to the tutor's explanation on the techniques. Student teachers observe the demonstration techniques and practise the drawing.
	Polygonal : **Pentagonal and Hexagonal**	3 70 minutes	**Power Point Presentation, Explanation & Demonstration** Tutor makes power point presentation on the techniques for the construction for the surface development of square, rectangular and triangular prisms Explain the specific techniques involved. Tutor demonstrates the construction techniques for the different types of Quadrilateral prisms.	**Power Point Presentation, Explanation & Demonstration** Student teachers observe the steps in the presentation of the techniques Listen to the tutor's explanation on the techniques. Student teachers observe the demonstration note the specific techniques and practise the development of surfaces.

		4 70 minutes	**Power Point Presentation, Explanation & Demonstration** Tutor makes power point presentation on the techniques for surface development of Polygonal prisms. 2. Explain the specific techniques involved. 3.Tutor demonstrates the construction techniques in the surface development of Polygonal prisms **Closure** Tutor summarises the main points of the lesson to close.	**Power Point Presentation, Explanation & Demonstration** Student teachers observe the steps in the surface development of Polygonal prisms. Listen to the tutor's explanation on the techniques. Student teachers observe the demonstration note the specific techniques and practise the development of surfaces. **Closure** Student teachers listen to the tutor's summary to end the lesson.

Lesson assessments – evaluation of learning: of, for and as learning within the lesson (linking to learning outcomes)	• Individual development of portfolio on the surface development of cylindrical, square and rectangular and triangular prisms. Learning outcome assessed : CLO 4 • Individual presentation of album on the surface development of Polygonal prism namely : pentagonal and hexagonal prisms . Learning outcome assessed : CLO 4
Teaching Learning Resources	Geometrical Drawing Equipment and Drawing room
Required Text (core)	Amoakohene, S.K. et al (1998). Technical skills and drawing for teacher training book 1 (Tools and processes and methodology). Accra Unimax Maguire D. (1998). Engineering Drawing from first principles using AutoCAD. London: Arnorld Publishers.
Additional Reading List	Amoakohene, S.K. et al (1998). Technical skills and drawing for teacher training book 2 (Tools and processes and methodology). Accra Unimax Maguire D. (1998). Engineering Drawing from first principles using AutoCAD. London: Arnorld Publishers.
CPD Needs	Team teaching , ICT skills, Brainstorming and Critical analysis

LESSON 8

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

Title of Lesson	Development of surfaces of Right Pyramid.	Lesson Duration	3 hours

Lesson description	Development of surfaces involved techniques in presenting the various surfaces of solid figures like cylinders, square, rectangular, triangular and polygonal prisms. The surfaces involved are plan, front view and the true shape and length.
Previous student teacher knowledge, prior learning (assumed)	Student Teachers are: • Aware of the fact that those in the fields of Engineering and Building use Graphic communication or illustrations to express the ideas or views they have about solution to a problem. They are also aware that the designs serve the role a communicative guide in the making of many local artifacts
Possible barriers to learning in the lesson	Fear and anxiety, lack of practical know-how • Gender issues in the fact that *Graphic Communication is a male dominated skill area.* • Tutors of Graphic communication may not appreciate the fact that the female who do Graphic communication most often become very successful. Graphic communication not being a vocation for SEN student teachers

Lesson Delivery – chosen to support students in achieving the outcomes	Face-to-face ☑	Practical Activity ☑	Work-Based Learning	Seminars ☑	Independent Study	e-learning opportunities	Practicum

Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	• Use **think, pair and share** to enable student teachers to identify the difference between the various Right prisms and their associated surface development. • Use concept mapping to describe the links and connections of the various types of Right prisms their surface development. • Use **group discussion** to enable student teachers discusses their strengths, weakness, aspirations and use the information to connect to improve their competence.
• **Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.** • **Write in full aspects of the NTS addressed**	The purpose of this lesson is to introduce student teachers to the manipulative techniques of presenting the surface development of Right prisms.

	Learning Outcomes	Learning Indicators	Identify which cross-cutting issues - core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed.
• Learning Outcome for the lesson, picked and developed from the course specification • Learning indicators for each learning outcome	• Demonstrate knowledge, understanding and techniques involved in constructing the surface development for the Right Pyramid	Prepare an album of the different types of surface development of Right Pyramid namely :,pentagonal and hexagonal .	• Assessment skills, social • skills, communication skills, reflection and honesty. • critical thinking and problem solving, • Gender issues; SEN (therapeutic); • diversity and inclusivity, information literacy

TOPIC Development of surfaces of Right Pyramid	Topic Sub-topic	Stage/Time	Teaching and learning activities to achieve learning outcomes: depending on delivery mode selected. Teacher led, collaborative group work or independent study	
			Teacher Activity	**Student Activity**
	Previous Knowledge	**1** **10 minutes**	**Introduction** Tutor engages student teachers in a discussion on the various types of Right Pyramid based on the previous knowledge of the student teachers.	**Introduction** Student teachers participate in the discussion **on the various types of Right Pyramid based on their previous knowledge**
	Cone, square, rectangle, triangle	**2** **85 minutes**	**Power Point Presentation, Explanation & Demonstration** Tutor makes power point presentation on the techniques for the development of surfaces of Right Pyramid namely :cone, square and triangles Explain the specific techniques involved. Tutor demonstrates the construction techniques for surface development	**Power Point Presentation, Explanation & Demonstration** Student teachers observe the steps in the presentation of the techniques Listen to the tutor's explanation on the techniques. Student teachers observe the demonstration techniques and practise the drawing.
	Pentagon, and hexagonal pyramids.	3 85 minutes	**Power Point Presentation, Explanation & Demonstration** Tutor makes power point presentation on the	**Power Point Presentation, Explanation & Demonstration** Student teachers observe the steps in the presentation of the

		techniques for the development of surfaces of Right Pyramids namely: pentagon and hexagonal pyramids. Explain the specific techniques involved. Tutor demonstrates the construction techniques for surface development **Closure** Tutor summarises main points of the lesson to close.	technique Listen to the tutor's explanation on the techniques. Student teachers observe the demonstration techniques and practise the drawing. **Closure** Student teachers listen to the tutor's summary to end the lesson.
Lesson assessments – evaluation of learning: of, for and as learning within the lesson (linking to learning outcomes)	• Individual development of portfolio on the surface development of cylindrical, square and rectangular and triangular prisms. Learning outcome assessed : CLO 4 • Individual presentation of album on the surface development of Polygonal prism namely : pentagonal and hexagonal prisms . Learning outcome assessed : CLO 4		
Teaching Learning Resources	Geometrical Drawing Equipment and Drawing room		
Required Text (core)	Amoakohene, S.K. et al (1998). Technical skills and drawing for teacher training book 1 (Tools and processes and methodology). Accra Unimax Maguire D. (1998). Engineering Drawing from first principles using AutoCAD. London: Arnorld Publishers.		
Additional Reading List	Amoakohene, S.K. et al (1998). Technical skills and drawing for teacher training book 2 (Tools and processes and methodology). Accra Unimax Maguire D. (1998). Engineering Drawing from first principles using AutoCAD. London: Arnorld Publishers.		
CPD Needs	Team teaching , ICT skills, Brainstorming and Critical analysis		

LESSON 9

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

Title of Lesson		Pictorial drawings	Lesson Duration	3 hours
Lesson description		Pictorial drawing involves the presentation of objects in three dimensional drawings namely : Perspective, Isometric and Oblique drawings.		
Previous student teacher knowledge, prior learning (assumed)		Student Teachers are: Aware of the fact that those in the fields of Engineering and Building use Graphic communication or illustrations to express the ideas or views they have about solution to a problem. They are also aware that the designs serve the role a communicative guide in the making of many local artifacts		
Possible barriers to learning in the lesson		Fear and anxiety, lack of practical know-how - Gender issues in the fact that *Graphic Communication is a male dominated skill area.* - Tutors of Graphic communication may not appreciate the fact that the female who do Graphic communication most often become very successful. Graphic communication not being a vocation for SEN student teachers		

Lesson Delivery – chosen to support students in achieving the outcomes	Face-to-face ☑	Practical Activity ☑	Work-Based Leaning	Seminars	Independent Study	e-learning opportunities	Practicum
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	- Use **think, pair and share** to enable student teachers to identify the difference between different types of the Pictorial drawings. - Use concept mapping to describe the links and connections of the various types of Pictorial drawings. - Use **group discussion** to enable student teachers discusses their strengths, weakness, aspirations and use the information to connect to improve their competence.						
Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description. **Write in full aspects of the NTS addressed**	The purpose of this lesson is to introduce student teachers to the various manipulative techniques of presenting objects in three dimension or pictorial drawings						

	Learning Outcomes	Learning Indicators	Identify which cross-cutting issues - core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed.
• **Learning Outcome for the lesson, picked and developed from the course specification** • **Learning indicators for each learning outcome**	• Demonstrate knowledge, understanding and techniques involved in drawing objects three dimension or pictorial.	Prepare an album of the different types of three dimension drawing or pictorial drawings : perspective, oblique and isometric drawings.	• Assessment skills, social • skills, communication skills, reflection and honesty. • critical thinking and problem solving, • Gender issues; SEN (therapeutic); • diversity and inclusivity, information literacy

Topic Pictorial drawings	Topic Sub-topic	Stage/ Time	Teaching and learning activities to achieve learning outcomes: depending on delivery mode selected. Teacher led, collaborative group work or independent study	
			Teacher Activity	Student Activity
	Previous Knowledge **Pictorial drawing of objects in:** **Isometric** **Oblique**	1 5 minutes	**Introduction** Tutor engages student teachers in an introduction discussion on the various types of Pictorial drawing based on student teachers previous knowledge.	**Introduction** Student teachers participate in the introduction discussion **on the various types of Pictorial drawing based on student teachers previous knowledge.**
		2 60 minutes	**Power Point Presentation** Tutor makes power point presentation for Isometric drawing and practice. **Explanation & Discussion** Explain and Discuss the specific techniques involved in isometric drawing. **Demonstration** Tutor demonstrates the construction techniques for isometric drawing and practice.	**Power Point Presentation** Student teachers observe the steps in the presentation of Isometric drawing and practise. **Explanation & Discussion** Listen to the tutor's explanation and discuss the isometricdrawing techniques. **Demonstration** Student teachers observe the demonstration techniques and practise the drawing.
		3 50 minutes	**Power Point Presentation** Tutor makes power point presentation on the techniques for Oblique drawing **Demonstration, Explanation & Discussion** Tutor demonstrate,	**Power Point Presentation** Student teachers observe the steps in the presentation of the techniques and practise **Demonstration, Explanation & Discussion** Observe the demonstration, Listen to

			Explain and discussthe specific techniques involved in oblique drawing.	the tutor's explanation and discuss the techniques in oblique drawing.
	Perspective.			
		4 65 minutes	**Demonstration &Practise** Tutor demonstrates the construction techniques involved in Perspective drawing and asks student teachers to practice. **Discussion & Explanation** Tutor engage student teachers in discussion and explain the specific techniques involved in Perspective drawing. **Closure** Tutor summarises the main points of the lesson to close.	**Demonstration &Practise** Student teachers observe the steps involved in the demonstration techniques of perspective drawing and practise it. **Discussion & Explanation** Student teachers participate in the discussion and listen to the tutors explanations on the steps involved in the presentation of the perspective techniques. **Closure** Student teachers listen to the tutor's summary of the lesson.

Lesson assessments – evaluation of learning: of, for and as learning within the lesson (linking to learning outcomes)	• Individual development of portfolio on Oblique and isometric drawings. Learning outcome assessed : CLO 5 • Individual presentation of album on the different forms of Perspective drawings . Learning outcome assessed : CLO 5
Teaching Learning Resources	Geometrical Drawing Equipment and Drawing room
Required Text (core)	Amoakohene, S.K. et al (1998). Technical skills and drawing for teacher training book 1 (Tools and processes and methodology). Accra Unimax Maguire D. (1998). Engineering Drawing from first principles using AutoCAD. London: Arnorld Publishers.
Additional Reading List	Amoakohene, S.K. et al (1998). Technical skills and drawing for teacher training book 2 (Tools and processes and methodology). Accra Unimax Maguire D. (1998). Engineering Drawing from first principles using AutoCAD. London: Arnorld Publishers.
CPD Needs	Team teaching , ICT skills, Brainstorming and Critical analysis

LESSON 10

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

Title of Lesson	Orthographic projections (first angle projections)	Lesson Duration	3 hours
Lesson description	The Orthographic projection in first angle involves a special representation of objects or pictorial views into two dimensions with the separate sides of the object presented in arrangement of the front elevation and the section view or the cross section on the same axis and the plan projected below the elevation		
Previous student teacher knowledge, prior learning (assumed)	Student Teachers are: • Aware of the fact that those in the fields of Engineering and Building use Orthographic projection in first angle as a working drawing to guide in the manufacturing process in achieving the required solution to a problem. They are also aware that the designs serve the role a communicative guide in the making of many local artifacts		
Possible barriers to learning in the lesson	Fear and anxiety, lack of practical know-how • Gender issues in the fact that *Graphic Communication is a male dominated skill area.* • Tutors of Graphic communication may not appreciate the fact that the female who do Graphic communication most often become very successful. Graphic communication not being a vocation for SEN student teachers		

Lesson Delivery – chosen to support students in achieving the outcomes	Face-to-face ☑	Practical Activity ☑	Work-Based Leaning	Seminars	Independent Study	e-learning opportunities	Practicum
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	• Use **think, pair and share** to enable student teachers to identify the views involved in first angle projection. • Use concept mapping to describe the links and connections of the various views in the first angle. • Use **group discussion** to enable student teachers to discuss their strengths, weakness, and aspirations and use the information to connect to improve their competence.						
• **Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.** • **Write in full aspects of the NTS addressed**	The purpose of this lesson is to introduce student teachers to the specific techniques of presenting drawings in Orthographic projection first Angle.						

	Learning Outcomes	Learning Indicators	Identify which cross-cutting issues - core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed.
• Learning Outcome for the lesson, picked and developed from the course specification • Learning indicators for each learning outcome	• Demonstrate knowledge, understanding and techniques involved in presenting the views of artefacts in Orthographic projection first angle.	Prepare an album of the Orthographic projection in first angle using different artefacts.	• Assessment skills, social • skills, communication skills, reflection and honesty. • critical thinking and problem solving, • Gender issues; SEN (therapeutic); • diversity and inclusivity, information literacy

Topic Orthographic projections (first angle projections)	Topic Sub-topic	Stage/ Time	Teaching and learning activities to achieve learning outcomes: depending on delivery mode selected. Teacher led, collaborative group work or independent study	
			Teacher Activity	Student Activity
	Previous Knowledge	1 **5minutes**	**Introduction** Tutor introduces the lesson through discussion on First Angle projection based on the student teachers previous knowledge.	**Introduction** Student teachers participate in the discussion on first angle orthographic projection based on their previous knowledge**.**
	First Angle and Third Angle Views of Orthographi c Projection **Elevations plans and Cross sections**	2 **40 minutes**	**Video Presentation** Tutor present video first angle projection in Orthographic and engages student teachers in a discussion on Orthographic projection in First angle.	**Video Presentation** Student teachers observe the video on first and third angle projections in Orthographic and participate in the discussion.
		2 140 minutes	**Power Point Presentation** Tutor makes power point presentation on the techniques for Orthographic projection in firstangle. **Discussion** Discuss and explain the specific techniques involved in first and third angles projection	**Power Point Presentation** Student teachers observe the steps in the presentation of the techniques. **Discussion** Discuss and listen to the tutor's explanation on third angle projection techniques. **Demonstration** Student teachers observe the demonstration of techniques involved in first angle projection.

			Demonstration Tutor use differentobjects to demonstrate the first angle projection techniques. Tutor assign student teachers to do a class exercise on. **Closure** Tutor summarises the main points of the lesson to close.	Student teachers do class exercise on first angle projection practise. **Closure** Student teachers listen to the tutor's summary of the lesson to end.

Lesson assessments – evaluation of learning: of, for and as learning within the lesson (linking to learning outcomes)	Individual development of portfolio on orthographic projections in first angle. Learning outcome assessed : CLO 6
Teaching Learning Resources	Geometrical Drawing Equipment and Drawing room
Required Text (core)	Amoakohene, S.K. et al (1998). Technical skills and drawing for teacher training book 1 (Tools and processes and methodology). Accra Unimax Maguire D. (1998). Engineering Drawing from first principles using AutoCAD. London: Arnorld Publishers.
Additional Reading List	Amoakohene, S.K. et al (1998). Technical skills and drawing for teacher training book 2 (Tools and processes and methodology). Accra Unimax Maguire D. (1998). Engineering Drawing from first principles using AutoCAD. London: Arnorld Publishers.
CPD Needs	Team teaching , ICT skills, Brainstorming and Critical analysis

LESSON 11

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

Title of Lesson	Orthographic projections (third angle projections)	Lesson Duration	3 hours
Lesson description	The Orthographic projection in third angle involves a special representation of objects or pictorial views into two dimensions with the separate sides of the object presented in arrangement of the Plan presented above the elevation and end view or the cross section on the same axis.		
Previous student teacher knowledge, prior learning (assumed)	Student Teachers are: • Aware of the fact that those in the fields of Engineering and Building use Orthographic projection in third angle as a working drawing to guide in the manufacturing process in achieving the required solution to a problem. They are also aware that the designs serve the role a communicative guide in the making of many local artifacts		
Possible barriers to learning in the lesson	Fear and anxiety, lack of practical know-how • Gender issues in the fact that *Graphic Communication is a male dominated skill area.* • Tutors of Graphic communication may not appreciate the fact that the female who do Graphic communication most often become very successful. Graphic communication not being a vocation for SEN student teachers		

Lesson Delivery – chosen to support students in achieving the outcomes	Face-to-face ☑	Practical Activity ☑	Work-Based Leaning	Seminars	Independent Study	e-learning opportunities	Practicum
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	• Use **think, pair and share** to enable student teachers to identify the views involved in third angle projection. • Use concept mapping to describe the links and connections of the various views in the third angle. • Use **group discussion** to enable student teachers discusses their strengths, weakness, aspirations and use the information to connect to improve their competence.						
• **Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.** • **Write in full aspects of the NTS addressed**	The purpose of this lesson is to introduce student teachers to the specific techniques of presenting drawings in Orthographic projection Third Angle.						

• Learning Outcome for the lesson, picked and developed from the course specification • Learning indicators for each learning outcome	Learning Outcomes		Learning Indicators	Identify which cross-cutting issues - core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed.
	• Demonstrate knowledge, understanding and techniques involved in presenting the views of artefacts in Orthographic projection third angle.		Prepare an album of the Orthographic projection in third angle using different artefacts.	• Assessment skills, social • skills, communication skills, reflection and honesty. • critical thinking and problem solving, • Gender issues; SEN (therapeutic); • diversity and inclusivity, information literacy

Topic Orthographic projections (third angle projections)	Topic Sub-topic	Stage/Time	Teaching and learning activities to achieve learning outcomes: depending on delivery mode selected. Teacher led, collaborative group work or independent study	
			Teacher Activity	Student Activity
	Previous Knowledge **Third Angle Views of Orthographic Projection** **Elevations plans and Cross sections**	**1** **5minutes** **2** **40 minutes**	**Introduction** Tutor engages student teachers in a discussion on Third Angle Orthographic projection based on their previous knowledge. **Video Presentation** Tutor present video on third angle projection in Orthographic and engages student teachers in a discussion on Orthographic projection in Third angle.	**Introduction** Student teachers participate in an introduction discussion on Third Angle projection based on their previous knowledge. **Video Presentation** Student teachers observe the video on third angle projection in Orthographic and participate in the discussion with the tutor.
		2 140 minutes	**Powerpoint Presentation& Explanation** Tutor makes power point presentation on the techniques involved in Orthographic projection in third angle. Explain the specific techniques involved in Third angle projection **Demonstration &Practise** . Tutor use different objects to	**Powerpoint Presentation& Explanation** Student teachers observe the steps in the presentation of the techniques and practise. Listen to the tutor's explanation on the techniques. **Demonstration &Practise** Student teachers observe the demonstration techniques. Student teachers do class exercise in third angle projection.

		demonstrate the third angle projection techniques. .Tutor assign student teachers to do a class exercise in third angle projection. **Closure** Tutor reflects on the main points of the lesson to close.	**Closure** Student teachers listen to the tutor's summary to end the lesson.
Lesson assessments – evaluation of learning: of, for and as learning within the lesson (linking to learning outcomes)	• Individual development of portfolio on orthographic projection of artefacts in third angle. Learning outcome assessed : CLO 6		
Teaching Learning Resources	Geometrical Drawing Equipment and Drawing room		
Required Text (core)	Amoakohene, S.K. et al (1998). Technical skills and drawing for teacher training book 1 (Tools and processes and methodology). Accra Unimax Maguire D. (1998). Engineering Drawing from first principles using AutoCAD. London: Arnorld Publishers.		
Additional Reading List	Amoakohene, S.K. et al (1998). Technical skills and drawing for teacher training book 2 (Tools and processes and methodology). Accra Unimax Maguire D. (1998). Engineering Drawing from first principles using AutoCAD. London: Arnorld Publishers.		
CPD Needs	Team teaching , ICT skills, Brainstorming and Critical analysis		

LESSON 12

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

Title of Lesson	Methods and resources for teaching graphic communication.		Lesson Duration	3 hours
Lesson description	The methods and teaching resources for Graphic communication involve teaching syllabus, lesson order, scheme of work, information sheet and the appropriate and relevant methods of teaching.			
Previous student teacher knowledge, prior learning (assumed)	Student Teachers are: Aware that identification of good methods and appropriate resources are necessary for effective teaching of topics under the introduction to Graphic communication.			
Possible barriers to learning in the lesson	• Fear and anxiety, lack of practical know-how of the techniques involved in Graphic communication • Gender issues in the fact that *Graphic Communication is a male dominated skill area.* • Tutors of Graphic communication may not appreciate the fact that the female who do Graphic communication most often become very successful. Graphic communication not being a vocation for SEN student teachers			

Lesson Delivery – chosen to support students in achieving the outcomes	Face-to-face ☑	Practical Activity ☑	Work-Based Leaning	Seminars	Independent Study	e-learning opportunities	Practicum
Lesson Delivery – main mode of delivery chosen to support student teachers in achieving the learning outcomes.	• Use **think, pair and share** to enable student teachers identify all the teaching resources ,their uses and the skills involved developing them. • Use concept mapping to describe the links and connections of the various teaching resources and methods of teaching. • Use **group discussion** to enable student teachers discuss their strengths, weakness, aspirations and use the information to connect to improve their competence.						
• **Purpose for the lesson, what you want the students to achieve, serves as basis for the learning outcomes. An expanded version of the description.** • **Write in full aspects of the NTS addressed**	The purpose of this lesson is to introduce student teachers to the preparation of teaching and learning resources for effective teaching and learning of Graphic communication.						

• Learning Outcome for the lesson, picked and developed from the course specification • Learning indicators for each learning outcome	Learning Outcomes	Learning Indicators	Identify which cross-cutting issues - core and transferable skills, inclusivity, equity and addressing diversity. How will these be addressed or developed.
	• Demonstrate knowledge, understanding and techniques of developing teaching resources and using appropriate methods for teaching Graphic communication.	Prepare an album of teaching resources , and present group video recording of micro teaching using the appropriate methods.	• Assessment skills, social • skills, communication skills, reflection and honesty. • critical thinking and problem solving, • Gender issues; SEN (therapeutic); • diversity and inclusivity,

Topic Methods and resources for teaching graphic communication.	Topic Sub-topic	Stage/Time	Teaching and learning activities to achieve learning outcomes: depending on delivery mode selected. Teacher led, collaborative group work or independent study	
			Teacher Activity	Student Activity
	Previous Knowledge	**1** **5 minutes**	**Introduction** Tutor introduces the lesson on the methods and resources for teaching Graphic Communication based on student teachers previous knowledge**.**	**Introduction** Student teachers participate in the introduction discussion on the methods and resources for teaching Graphic Communication based on their previous knowledge**.**
	Resources: a. **Teaching syllabus** b. **Lesson order** c. **Scheme of work** d. **Lesson plan** e. **Information sheet** 1. **Teaching methods** a. **Demonstration** b. **Illustration** c. **Discussion** d. **Brainstorming** e. **Project.**	**2** **45 minutes**	**Video Presentation** Tutor presents video on the appropriate resources and methods of teaching for teaching and learning of Graphic communication. **Group Discussion** Organize student teachers into groups to discuss the video presentation.	**Video Presentation** Student teachers observe the video on teaching and learning resources and methods of teaching. **Group Discussion** Student teachers organise themselves into groups to discuss the video presentation.
		3 30 minutes	**Interactive Lecture** Tutor gives an interactive lecture on the preparation of the various teaching resources.	**Interactive Lecture** Student teachers listen to tutors lecture on the preparation of the various teaching resources.

			Demonstration&Practise	Demonstration&Practise
		4 70 minutes	Demonstrate the techniques involved in preparing the various teaching resources and ask them to practice.	Student teachers observe the tutors demonstration of the preparation of teaching resources and practise.
		5 30 minutes	**Interactive Lecture** Tutor gives an interactive lecture on the effectiveness of the teaching methods . **Micro Teaching** Guide the student teachers through micro teaching for practice. **Closure** **Tutor summarises the key points of the lesson and close.**	**Interactive Lecture** Student teachers listen to the lecture on the effectiveness of the teaching methods. **Micro Teaching** Student teachers observe the micro teaching and practise. **Closure** **Student teachers listen to the tutor's summary to end the lesson.**

Lesson assessments – evaluation of learning: of, for and as learning within the lesson (linking to learning outcomes)	• Individual development of portfolio on the various teaching resources. Learning outcome assessed : CLO 6 • Groups presentation of videos on the micro teaching . Learning outcome assessed : CLO 6
Teaching Learning Resources	Geometrical Drawing Equipment and Drawing room.
Required Text (core)	Amoakohene, S.K. et al (1998). Technical skills and drawing for teacher training book 1 (Tools and processes and methodology). Accra Unimax Maguire D. (1998). Engineering Drawing from first principles using AutoCAD. London: Arnorld Publishers.
Additional Reading List	Amoakohene, S.K. et al (1998). Technical skills and drawing for teacher training book 2 (Tools and processes and methodology). Accra Unimax Maguire D. (1998). Engineering Drawing from first principles using AutoCAD. London: Arnorld Publishers.
CPD Needs	Team teaching , ICT skills, Brainstorming and Critical analysis Mastery of the sequence through constant practise
Course Assessment	**Component 1:Subject** Portfolio Assessment (overall score = **30%)** **Selected items of students work (3 of them=10% each)** • **Written Assignment** • **Group Presentation**

| | **Individual Presentation** **Midterm assessment/Quiz**…………………………………………………………………**=20%** **Reflective Journal** ……………………………………………………………………….. **=40%** **Organisation of the Portfolio** …………………………………………………………= **10% (how it is presented/ organized)** Weighting :30%
Assesses Learning Outcomes ; CLO 1,2,3,4,5 and 6
Component 2 : Subject Project**(30% overall assessment)**
Task student teachers to design a survey instrument to collect data on their peers perception of various ATR beliefs. Should be analysed and the outcome used to create a poster to be presented during the 11 lesson.
Introduction; clear statement of aim and purpose……………………= 10%
Methodology : what the student has done and why…………………= 20%
Substantive or main sections ………………………………………………= 40%
Conclusion……………………………………………………………………… = 30%
Assesses Learning Outcomes ; CLO 2,3,4 and 6

Component 3: End of Semester Examination………………………………………… =**40%**
Assesses Learning Outcomes ; CLO 1,2,3,4,5 and 6 |

• **Individual Presentation** • **Midterm assessment/Quiz**…………………………………………………………………**=20%** • **Reflective Journal** ……………………………………………………………………….. **=40%** • **Organisation of the Portfolio** …………………………………………………………= **10% (how it is presented/ organized)** Weighting :30% Assesses Learning Outcomes ; CLO 1,2,3,4,5 and 6 **Component 2** : Subject Project**(30% overall assessment)** **Task student teachers to design a survey instrument to collect data on their peers perception of various ATR beliefs. Should be analysed and the outcome used to create a poster to be presented during the 11th lesson.** • Introduction; clear statement of aim and purpose……………………= 10% • Methodology : what the student has done and why…………………= 20% • Substantive or main sections ………………………………………………= 40% • Conclusion……………………………………………………………………… = 30% Assesses Learning Outcomes ; CLO 2,3,4 and 6 **Component 3:** End of Semester Examination………………………………………… =**40%** Assesses Learning Outcomes ; CLO 1,2,3,4,5 and 6