TEACHING METHODS AND PRACTICE OF

MATHEMATICS FOR SME

YEAR 1, 2 & 3

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FOREWORD

Rwanda Education Board is honored to avail the Mathematics Teaching Methods and Practice for Teacher Training Colleges (TTCs) in SME option. The document ensures consistency and coherence in the delivery of quality education in TTCs, pre-primary and primary education.

The Rwandan education philosophy is to ensure that young people at every level of education achieve their full potential in terms of relevant knowledge, skills and appropriate attitudes that prepare them to be well integrated in society and exploit employment opportunities. Specifically, TTCs syllabus was reviewed to train quality teachers who will confidently and efficiently implement the Competence Based Curriculum in pre-primary and primary education. The rationale of the changes is to ensure that TTC leavers are qualified for job opportunities and further studies in Higher Education in different programs under education career advancement.

In line with efforts to improve the quality of education, the government of Rwanda emphasizes the importance of aligning the syllabus, teaching and learning and assessment approaches in order to ensure that the system produces the kind of citizens the country needs. Many factors influence what student teacher are taught, how well they learn and the professional competences they acquire, among them the relevance of the syllabus, the quality of teachers' pedagogical approaches, updated teaching methodologies and assessment strategies as well as the instructional materials.

The ambition to develop a knowledge-based society and the growth of regional and global competition in the jobs market has necessitated the shift to a competence-based curriculum. After a successful shift from knowledge to a competence based curriculum in general education, TTC curriculum also was revised to align it to the CBC in general education. The aim is to prepare teachers who are competent and confident to implement CBC in pre-primary and primary education.

I wish to sincerely express my appreciation to the people who contributed towards the development of this syllabus, particularly, Consultants, REB staff, UR-CE Lecturers, TTC Tutors, Teachers from general education and experts from Local and international Organizations for their technical support.. A word of gratitude goes to the Head Teachers and TTCs principals who availed their staff for various revision activities.

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Dr. MBARUSHIMANA Nelson

Director General

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I wish to sincerely express my special appreciation to the people who played a major role in development of Mathematics teaching Methods and Practice syllabus in SME option. It would not have been successful without the support from different education stakeholders.

. My thanks first go to the leadership of UR-CE who started the review of the TTC curriculum in 2015.

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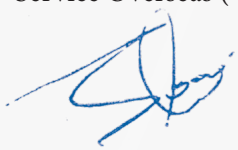
I owe gratitude to different education partners more especially USAID-Soma Umenye, Save the Children, Right To Play, Help a Child, Aegis Trust,Humanity and Inclusion, Flemish Association for Development Cooperation and Technical Assistance (VVOB), Voluntary Service Overseas (VSO), Teach Rwanda and IEE for their technical support



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1. GENERAL INTRODUCTION

1.1 Rwanda Education Sector Objectives

The Education Sector objectives are the reference point for the inclusion of education issues into other Rwandan policy documents. These objectives are aligned with those recommended in the Eastern African Curriculum Framework proposals. The Government of Rwanda through law number 36/2018 of 29th June, 2018 determining the organization of education revised the objectives of the sector. They are to:

1. provide Rwandans with adequate skills at all levels of general education as well as technical and vocational skills;
2. offer quality courses and education at all levels;
3. promote science, technology and research in order to equip many Rwandans with capacity to speed up national development;
4. promote the culture of peace, tolerance, justice, respect for human rights, solidarity, democracy and that of avoiding any form of discrimination or favoritism;
5. provide each Rwandan with an integrated education based on ethical values, science and social welfare and directed towards building a nation to ensure its sustainable development
6. install into Rwandans the love of a job well done, the value of hard work, punctuality and promotion of competence
7. train the Rwandan to have freedom of thought, be innovative, have abilities to acquire and be analytical towards other people's opinions and to communicate his or her own ideas, to be patriotic and encourage him or her to be updated on the situation prevailing elsewhere;
8. Eliminate all grounds and obstacles that hinder the development of girls and women education as well as of any other groups that need special attention.

These objectives and associated strategies are the backbone for developments in education including the curriculum and assessment policy and the curriculum framework.

1.2 Level Competences of Primary Teacher Education in the Republic of Rwanda

As stated earlier, Primary Teacher Education is under the responsibility of Rwanda Education Board. The following are the competences of Teacher Education. By the time a student teacher is exiting the college after three years he or she should:

- be a qualified teacher who can compete not only locally but regionally and internationally;
- have professional ethics and develop an inquiring mind for innovative education;
- be prepared adequately for efficiency in education, administration, management, evaluation and measurement;
- be competent, reliable, honest and responsible.
- be equipped with potentials that enable him/her to explore the learners" abilities and interests
- be able to develop the child's ability in critical thinking, free expression and ideas.

1.3. Background to curriculum review

The syllabus for Mathematics Teaching Methods and Practice (TMP) is developed for TTC student-teachers in the option of Science and Mathematics Education.

The motive of reviewing the syllabus was to ensure that the syllabus is responsive to the needs of the student- teachers and to shift from objective and knowledge-based learning to competence-based learning. Another reason was to align the draft TTC curriculum to the CBC in general education. Emphasis in the review was put more on skills and competences as well as the coherence within the existing content by drawing on the previous syllabus and benchmarking with syllabi elsewhere with best practices.

The Teaching Methods and Practice syllabus guides the interaction between the tutor and student -teachers in the learning processes of how to teach mathematics in primary levels and highlights the competences a student-teacher should develop during and at the end of each unit of learning.

The learning of student-teachers is influenced by many factors such as curriculum relevancy, necessary and sufficient pedagogical approaches, assessment strategies and sufficient instructional materials. In the review of the Teaching Methods and Practice subject syllabus, these factors have been aligned with the competence-based curriculum for general education. This will lead to having qualified and competent teachers who are ready to implement the competence based curriculum for pre-primary and primary education. This implies equipping-student teachers with relevant knowledge, skills, attitudes and values necessary to make them competitive in local, regional and global job market. This revised syllabus will allow future teachers to contribute to the development of equity and quality education at pre-primary and primary levels and then it will enable student-teachers to continue in further studies.

1.4. Rationale of teaching and learning TMP of mathematics

Teaching Methods and Practice in the options of Science and Mathematics Education (SME) provides instructional approaches in the teaching and learning of Mathematics in primary levels. It focuses on learner-centered approaches with a variety of teaching methodologies that help student-teachers to effectively teach mathematical concepts, motivate and engage all learners in the classroom activities.

During the three years in TTCs, student-teachers have opportunities to acquire teaching skills through different forms: organizing the subject content, lesson observation, microteaching, teaching practices and school attachment. During and after the process of each form above mentioned, tutors are required to provide constructive feedback to student-teachers and support them for improvement. Particularly, the microteaching will be carried out in the form of the lesson study. In this regard, the role of the tutor is very important because how much the student-teachers can learn from lesson study depends on the quality of facilitation provided to them during the review session. In addition, as new technologies have had a dramatic impact on all aspects of life, especially in the teaching and learning process, different opportunities of integrating ICT in the teaching and learning of Mathematics are provided to actively engage learners in their learning and make the learning more relevant, enjoyable and motivational experience.

1.4.1. Mathematics Teaching Methods and Practice and Society

Teaching Methods and practice of Mathematics is a key to the Rwandan education ambition of developing a knowledge-based and technology-led economy since it provides student teachers with all required knowledge and skills to be used in different learning areas. Therefore, Teaching Methods and practice of Mathematics is an important subject as it supports other subjects. This Teaching Methods and practice of Mathematics syllabus is intended to address gaps in the previous Teaching Methods and practice of Mathematics syllabus which lacks adequate and appropriate knowledge, skills, attitudes and values.

1.4.2. Mathematics Teaching Methods and Practice and Student Teachers

Student teachers need enough basic competences in the Teaching Methods and practice of Mathematics to be effective members of the Rwandan society including the ability to develop critical thinking skills and other cognitive competences. Therefore, Teaching Methods and practice of Mathematics equips student teachers with knowledge, skills and attitudes necessary to enable them to succeed in an era of rapid technological growth and socio-economic development. Mastery of basic concept of Mathematics makes student teachers being confident in problem solving. It enables the student teachers to be systematic, creative and self-confident in using mathematical techniques to reason; think critically; develop imagination, initiative and flexibility of mind. As new technologies have had a dramatic impact on all aspects of life, wherever possible in Mathematics Teaching Methods and Practice, student- teachers should gain experience of a range of ICT equipments and applications.

1.5. Professional standards and competences

1.5.1 Competences

Competence is defined as the ability to perform a particular task successfully, resulting from having gained an appropriate combination of knowledge, skills, attitudes and values. The present syllabus gives the opportunity to student-teachers to develop different broad teaching competences as well as the generic competences.

Broad subject competences are highlighted and broken into key competences for each year, these are further broken into key unit competences which are finally split into learning objectives knowledge, skills, attitudes and values) in every learning unit.

Taking into account the rationale behind the overall TTC curriculum review as well as the parameters and constraints of the local context, student -teachers will be equiped with professional and generic competences reflected in six core standards: Teacher as an expert of a competence-based curriculum, the teacher as an educator, the teacher as a subject expert, the teacher as a communicator and connector with student teachers, the school community and the society, the teacher as a guide, an organizer and a facilitator of the learning process and learning environment, and the teacher as an innovator and researcher. For student teachers, professional standards are acquired through generic competences and professional practices that emphasized and reflected in the learning process. The TMP tutors will ensure that student -teachers are exposed to teaching practices that help them acquire these competences.

1.5.2. Teaching professional standards

These refer to the characteristics that all teachers globally should have. All teachers in Rwanda should have the six characteristics listed below:

- **The teacher has a knowledge of CBC and how to implement it**

The professional teacher has understanding of CBC and how it works. He/she has knowledge of basic and generic competences and is able to integrate the cross cutting issues within and across subject area.

- **The teacher as an educator**

The professional teacher/tutor enhances and stimulates cognitive, social-emotional, physical and moral development of the children. She/he therefore has a thorough understanding of the child's background, interests, motivations and problems and can adjust his/her actions and the learning environment to the different needs of the student teachers. A competent educator is a role model, showing desired behavior and values. S/he guides and coaches his/her student teachers to become social, self-confident, independent, responsible, open-minded and innovative people and act like a role model. In order to be educator, the student teacher must *be supported in developing* cooperation, inter personal and life skills.

- **The teacher as subject expert**

Teaching Mathematics in primary requires teacher to stimulate the pupil's critical thinking, problem solving and creativity.

S/he uses Mathematics teaching/learning techniques that are appropriate to learn Mathematics in primary education;

s/he applies Mathematics content, plan lessons integrating play-based strategies in teaching/learning.

The teacher in primary education has a thorough knowledge about mathematics teaching methods that enable him/her to develop the teaching/learning materials, plan and facilitate lessons, connect the subject content with his/her daily life activities using correctly the language of instruction. The teacher as Mathematics expert in primary education stimulates English in the teaching/learning of Mathematics by considering the transition from Kinyarwanda to English as medium of Instruction in upper primary.

The teacher as expert of teaching uses appropriate methods/techniques to assess students and give constructive feedback to the whole class, links the content of Mathematics with other subjects and connect it with real life situations.

- **The teacher as a communicator**

The professional teacher displays a good example in his/her way of expressing him/herself, stimulates and enhances positive and clear communication between him/herself and the students, between the students, college community and the wider society. A good communicator is open-minded and respects diversity within and around the college. This requires teacher to communicate in official languages.

- The teacher as a guide and an organizer

The professional teacher facilitates the holistic development of all student teachers, taking into account the differences between them. S/he ensures that the learning environment (class, playground, etc.) is well maintained and conducive for expected learning outcomes. This requires a teacher to be equipped with managerial skills.

- The teacher as an innovator, researcher and reflective practitioner

The professional teacher looks at ways to improve his/her teaching, the wellbeing and the results of his/her learners. She/he is a reflective practitioner and knows how to perform small-scale reflective action.

The acquisition of such skills will requires student- teacher to update knowledge and skills with minimum external support and to cope with evolution of knowledge advances for personal fulfillment in areas that need improvement and development, thus becoming a lifelong learner.

1.5. 3 Broad TMP competences

At the end of the three years the student teacher should be able to:

1. Organize the content and produce teaching resources that are appropriate to primary learners' level considering their mathematics background and experiences (deepen one's own knowledge and ability);
2. Develop adequate lesson plan and set variant types of activities that involve all learners and develop their mathematical and generic competences (develop pedagogical knowledge);
3. Observe, evaluate and effectively apply appropriate teaching techniques and methods in the teaching and learning process of different mathematical concepts (classroom practice);

4. Use appropriate ICT tools in the process of teaching and learning Mathematics for primary levels to prepare young people who are flexible, creative, and proactive, who can solve problems, make decisions, think critically, communicate ideas effectively and work efficiently within teams and groups.

1.5.4 TMP of Mathematics and developing competences

Based on national aspirations, the national policy documents identify some 'basic competences' alongside the 'generic competences' that will develop higher order thinking skills and help student-teacher to learn how to teach mathematics subject content and promote the application of acquired knowledge and skills.

Through observations, Microteaching, teaching practice at the demonstration schools and school attachment, the student-teacher will acquire cooperation and communication, critical thinking and problem solving skills. Particularly, through TMP, student teachers will get a range of teaching methodologies and techniques that best serve the learning needs of their learners. This includes the ability to encourage learners' responsibility, provide a safe learning environment, have high expectations to motivate and engage all their learners, acknowledge individual differences, to build positive relationships and monitor progress and provide feedback.

These competences will be achieved through student-teachers' discussion, group work and cooperative learning which in turn will promote interpersonal relations and teamwork.

The acquired knowledge in learning the TMP for Mathematics should develop a responsible citizen who adapts to teach in primary, has positive attitudes and with high confidence in the teaching career. The student-teacher will be instilled to show concern of individual attitudes, environmental protection and to comply with the scientific method of reasoning.

2. PEDAGOGICAL APPROACH

The change to a competence-based curriculum is about transforming learning, ensuring that learning is deep, enjoyable and habit-forming.

2.1. Role of the Student Teacher

In the competence-based syllabus, the student-teacher is the principal actor of his/her education. He/she is not an empty bottle to fill. Taking into account the initial capacities and abilities of the student-teacher, the syllabus suggests under each unit, some activities of the student teacher and they all reflect his/her active participation in the learning process.

The teaching and learning processes will be tailored towards creating a student's friendly environment basing on the capabilities, needs, experience and interests.

The following are some of the roles or the expectations from the student teachers:

- Student teachers construct the knowledge either individually or in groups in an active way. From the observation, they put their understanding to conception of ideas and practice. Therefore, opportunities for practice and discussion should be given to student-teachers.
- Student teachers are encouraged to make teaching resources by the use of local materials. This stimulates student teacher to be familiar on how to find the home grown solution for resources needed.
- Student teachers work on one competence at a time to form concrete units with specific learning objectives (knowledge, skills and attitude).
- Student teachers will be encouraged to do research and present their findings through group work activities.
- Student teachers are cooperative: They work collaboratively in heterogeneous groups to increase tolerance and understanding and to benefit learners' learning during the teaching practices.
- Student teachers are responsible for their own participation and ensure the effectiveness of their work.

2.2. Role of the Tutor

In the competence-based curriculum, the tutor is a facilitator, organizer, advisor and conflict solver.

The specific duties of the tutor in a competence-based approach are the following, Tutor is:

- A facilitator, his/her role is to provide opportunities for student teachers to meet problems that interest and challenge them and that, with appropriate effort, they can solve. This requires an elaborated preparation to plan the activities, the place they will be carried, the required assistance;
- An organizer: his/her role is to organize the student- teachers in the classroom or outside and engage them through participatory and interactive methods through the learning processes as individuals, in pairs or in groups. To ensure that the learning is personalized, active and participative, co-operative the teacher/tutor must identify the needs of the student teachers, the nature of the learning to be done, and the means to shape learning experiences accordingly;
- An advisor: he/she provides counseling and guidance for student-teachers in need. He/she comforts and encourages student teachers by valuing their contributions in the class activities;
- A conflict-solver: most of the activities are performed in groups. The members of a group may have problems such as attribution of tasks; they should find useful and constructive the intervention of the teacher as a unifying element.
- Asked for help only when the whole group agrees to ask a question
- Ethical and preaches by examples as impartial, a role-model, caring for individual needs especially for slow student teachers and those with physical impairments through a special assistance, providing remedial activities or reinforcement activities.

2.3. Special Needs and Inclusive Education Approach

All Rwandans have the right to access education regardless of their different needs. The underpinnings of this provision would naturally hold that all citizens benefit from the same menu of educational programs. The possibility of this assumption is the focus of special needs education. The critical issue is that we have student teachers who are totally different in their ways of living and learning as opposed to the majority. The difference can either be emotional, physical, sensory and intellectual learning challenged.

These student teachers equally have the right to benefit from the free and compulsory basic education in the nearby ordinary/mainstream colleges. Therefore, the college's role is to enroll them and also set strategies to provide relevant education to them. The tutor therefore is requested to consider each student teacher's needs during teaching and learning process. Assessment strategies and conditions should also be standardized to the needs of these student teachers.

Detailed guidance for each category of student teachers with special educational needs is provided for in the guidance for teachers. The TMP tutor is advised to work closely with the tutor of Special Needs and Inclusive Education to provide appropriate support to any identified student teacher's needs.

2.4. Skill lab pedagogy in Mathematics teaching

Mathematics is a practical subject in which student teachers can learn and explore various mathematical concepts and how to teach them using a variety of practical activities and materials. The skill lab in teaching practices can be done through the Teaching Resources Center existing in TTCs. The use of skills Laboratory in Mathematics teaching helps to integrate pedagogical theory and practical work in mathematics teaching and learning where student teachers develop competences for teaching and apply acquired skills at school level before going to teach learners.

Skills lab ensures teachers are accountable to completing all the learning activities and projects as outlined in the syllabus.

The basic characteristics of Skills Lab are:

- Students work in small groups (manageable teams)
- Assessment takes place through portfolio activities
- Students talk more than teachers (10% tutor talk time and the rest is for the students)
- Students receive constructive feedback on their work (Tutor gives quality feedback on student presentations).
- Skills lab consists of three components: build, practice and present.

Skills Lab in Mathematics teaching makes a moment in which the student teacher is active, discusses and argues her/his own choices, builds meanings, learns to collect data and to compare them with the models.

This learning must be done through practice, discussion, exploration, development of thinking about the practice and way for building knowledge into learners.

Practical activities to be done in the mathematics teaching lab will provide a controlled setting for making various experiments in mathematics teaching methods. It has advantageous of providing self-evaluation of one's performance. It will allow student teachers to practice any one skill on their own, and then combine it with others when it has been mastered.

Role of the tutor is to prepare practical activities, to set groups of students and assign them their roles and responsibilities.

The tutor has to explore students' works: to analyze how and why the same final answer or product can be the result of different process or constructions followed by students, to mark and provide feedback and remediation to students.

He/she uses appraisal guide to rate the lesson taught by students and then discuss it with them for more improvement.

Role of the student teacher is to read carefully instructions related to the activity, apply the mathematics process in doing practical activity as provided, conduct micro-teaching, observe lessons taught by the colleagues during microteaching and give them the feedback.

The student teacher must have time to practice all the teaching skills before going to teach at primary school.

These skills include: lesson and unit planning, questioning, reinforcement, probing, explaining, stimulus variation, introducing a lesson, illustrating with examples, using a chalk board, demonstration, silence and non-verbal cues, using audio-visual aids, production of teaching and learning materials and the skill of improvisation.

Therefore, when doing practical activities in the Mathematics teaching, students build the knowledge and understanding, practice acquired skills, produce teaching materials, discuss teaching techniques and communicate the findings from their researches to colleagues and to the tutor. The following are tasks for the students: group building, communicate and discuss, argue correctly, understand views and arguments of others, get to know the community and learners, carry out exploration and needs assessment, coaching and guidance on managing challenging situations, investigation, task setting and question formulation, guessing problems and work collaboratively with peers to solve them, self-development on observation and inquiry, use scientific method and scientific research, develop a sense of taking responsibility for one's own learning, represent and build models of relationships among objects and events.

In this regard, mathematics teaching skills lab activities are the time when student teachers combine the teaching related competencies acquired to make learning more practical. Thus, in every unit, this syllabus suggests practical and learning activities that the tutor may adapt and give to students to ensure practical applications of the competencies acquired.

3. ASSESSMENT APPROACH

In TTCs, assessment is the process of evaluating the teaching and learning processes through collecting and interpreting evidence of individual student teacher's progress in learning and to make a judgment about a student teacher's achievements measured against defined standards. Assessment is an integral part of the teaching learning process. In the new competence-based curriculum assessment must be competence-based; whereby a student teacher is given a complex situation related to his/her everyday life and asked to try to overcome the situation by applying what he/she learned.

3.1 Types of assessments

There are two major types of assessment namely formative and summative assessments. Any form of assessment should reflect the three domains of learning, which are Cognitive, Psychomotor and Affective.

- Knowledge and understanding: Does the student- teacher demonstrate an understanding of the Mathematics concept? Has the student- teacher mastered the Mathematics concepts? Indicators: correctness of answers, coherence of ideas, logical reasoning, use correctly mathematical symbols and concepts, etc.
- Practical skills: How does the student-teacher perform on aptitude and practical tests? Indicators: accuracy, using appropriate methods, quality product, speed and efficiency, coherence.
- Attitude and values: How does the student-teacher respond to a task or a situation? What is the student-teacher's behavior? How the student-teacher persists on solving a given problem?

3.1.1 Formative Assessment

Formative assessment is done within the teaching and learning process and helps to check the efficiency of the process of learning.

Continuous assessment involves formal and informal methods used by the college to check whether learning is taking place. When a tutor is planning his/her lesson, he/she should establish criteria for performance and behavior changes at the beginning of a lesson. Then, at the end of every unit, the tutor should ensure that all student teachers have mastered the stated key unit competences basing on the criteria stated before going to the next unit. The tutor will assess how well each student teacher masters the subject, the generic competences described in the syllabus as well as the teaching practices. From this, the tutor will gain a picture of the all-round progress of the student teacher. The tutor will use one or a combination of the following techniques: observation, pen and paper, oral questioning and e-assessment where applicable.

3.1.2 Summative Assessment

When assessment is used to record a judgment of a competence development or performance of the student teacher, it serves a summative purpose. Summative assessment gives a picture of a student teacher's competence or progress at any specific moment. The main purpose of summative assessment is to evaluate whether competences have been achieved and to use the results for the ranking or grading of student teachers, for deciding on progression, for selection into the next level of education and for certification. This assessment should have an integrative aspect whereby a student must be able to show mastery of all competences. . It can be internal College based assessment or external assessment in the form of national examinations. College based summative assessment should take place once at the end of each term and once at the end of the year. College summative assessment average scores for the subjects which are examined at the national level will be weighted and included in the final national examinations grade. For the subjects that are not examined externally, the grade should be part of the continuous assessment reflected in the student's transcript.

3.2. Record keeping

This is gathering facts and evidence from assessment instruments and using them to judge the student's performance by assigning an indicator against the set criteria or standard. Whatever assessment procedures used generate data in the form of scores which will be carefully be recorded and stored in a portfolio. The latter is used in deciding remedial actions, alternative instructional strategy as well as feed back to the student teacher. The records also are important to parents to check the learning progress and to advice accordingly. Finally, the records are very essential to the final assessment of professional practice of the student teacher at the end of the college.

This portfolio is a folder (or binder or even a digital collection) containing the student teacher's work as well as the student teacher's evaluation of the strengths and weaknesses of the work. Portfolios reflect not only work produced (such as papers and assignments), but also it is a record of the activities undertaken over time as part of student learning. Besides, it will serve as a verification tool for each student teacher that he/she attended the whole learning before he/she undergoes the summative assessment for the subject.

3.3. Item writing in summative assessment

Before developing a question paper, a plan or specification of what is to be tested or examined must be elaborated to show the units or topics to be tested on, the number of questions in each level of the revised Bloom's taxonomy and the marks allocation for each question. In a competence-based curriculum, questions from higher levels of Bloom's taxonomy should be given more weight than those from knowledge and comprehension level.

Before developing a question paper, the item writer must ensure that the test or examination questions are tailored towards competence based assessment by doing the following:

- Identify topic areas to be tested on from the subject syllabus.
- Outline subject-matter content to be considered as the basis for the test.
- Identify learning outcomes to be measured by the test.
- Prepare a table of specifications.
- Ensure that the verbs used in the formulation of questions do not require memorization or recall answers only but also testing broad subject and generic competences as stated in the syllabus.

4. RESOURCES

4.1. Materials needed for implementation

The following list shows the main materials/equipments needed in the learning and teaching process:

- Primary mathematics syllabus, Teacher guide of primary mathematics and pupils' mathematics books;
- Materials to encourage group work activities and presentations: Computers (Desktops & laptops) and projectors; Manila papers and markers, textbooks and handouts;
- Materials for drawing & measuring geometrical figures/shapes and graphs: Geometric instruments, ICT tools such as Geogebra, Microsoft student ENCARTA, etc.

- Materials for enhancing research skills: Textbooks, workbooks, teacher prepared study guides, reference books, pamphlets, magazine, newspapers and internet (the list of the textbooks to consult is given in the reference at the end of the syllabus and those books can be found in printed or digital copies).
- Teaching multimedia to facilitate the teaching and learning:

Visual Aids: black board and chalk, Not projected pictures (photographs, illustrations, actual objects, models, pictures, charts, maps, flash cards, flannel board, bulletin board), projected pictures (slides, filmstrip, opaque projections, overhead projections), Graphical materials (charts, graphs, maps and globes, posters), Exhibits (school-made displays, bulletin boards), objects (specimens, televisions, video maps), community resources(field trips, resource person).

Audio Aids: radio, tape recorders, gramophone phonographs.

Audio - Visual Aids**:** television, film projector, film strips etc

The technology used when teaching and learning Mathematics has to be regarded as tools to enhance that process and not to replace the tutor or the student teacher.

4.2. Human Resources

The effective implementation of this curriculum needs a joint collaboration of educators at all levels. Given the material requirements, tutors are expected to accomplish their noble role as stated above. The staff in charge of education at District and sector level should ensure overall support to TTCs for a successful implementation. On the other hand, TTC principals and TTC deputy principals are required to make a close follow-up and assess the teaching and learning of this subject due to their profiles in the schools. These combined efforts will ensure bright future careers and lives for student teachers as well as the contemporary development of the country.

In a special way, the tutor of TMP of Mathematics at TTC level should have a firm understanding of mathematical concepts and technological pedagogical content knowledge of Mathematics at primary and secondary levels. He/she should be qualified in Mathematics Education and have a firm ethical conduct. The tutor should possess the qualities of a good facilitator, organizer, problem solver, listener and adviser. He/she is required to have basic skills and competence of guidance and counseling as students may come to him/her for advice.

5. SYLLABUS UNITS

5.1 Mathematics Teaching Methods and Practice syllabus units for year One

5.1.1 Key competencies at the end of year One

After completion of year one in Science and Mathematics Education, the TMP of Mathematics syllabus will enable the student teacher to:

1. Justify the use of primary mathematics in real life situation;
2. Select strategies to be used for facilitating any mathematics topic at primary;
3. Describe and develop a mathematics lesson plan, addressing, cross-cutting issues and integrating generic competences
4. Select appropriate teaching and learning resources for facilitating any upper – primary Math topic
5. Summarize the components and qualities of an effective learning environment.

5.1.2 Syllabus units for year 1

<table>
<tr><td colspan="3">Subject: TEACHING METHODS AND PRACTICE OF Mathematics</td><td>Year:1</td><td colspan="2">Option: : SME</td></tr>
<tr><td colspan="4">Topic Area: Understanding the Mathematics syllabus for primary education</td><td colspan="2">Sub Topic: -</td></tr>
<tr><td colspan="4">Unit 1: Introduction to teaching Mathematics at Primary School</td><td colspan="2">No. of periods:4</td></tr>
<tr><td colspan="6">Key unit competence: Explain the essence of teaching Mathematics in primary and how mathematical skills are applied in everyday life.</td></tr>
<tr><td colspan="3">Learning objectives</td><td rowspan="2">Content</td><td colspan="2" rowspan="2">Teaching/ Learning Activities</td></tr>
<tr><td>Knowledge and understanding</td><td>Skills</td><td>Attitudes and values</td></tr>
<tr><td>Explain the importance of learning mathematics in primary levels.
Explain the components and role of each mathematical concept found in the syllabus of primary levels.</td><td>Summarize the components of primary mathematics syllabus.
Describe the importance of teaching Mathematical concepts at primary schools.</td><td>Develop positive attitudes towards learning mathematics at primary school
Being cooperative and displaying a teamwork spirit.
Show curiosity about the role of mathematics in everyday life.</td><td>Rationale of teaching and learning Mathematics in basic education;
Description and role of primary mathematics syllabus components;
Importance of teaching Mathematics at primary schools.</td><td colspan="2">In groups, students-teachers carry out a research in the library or on internet and discuss the rationale of learning and teaching mathematics in primary education.
In groups, students analyze the components of primary mathematics syllabus, share ideas and present their findings to the whole class.</td></tr>
<tr><td colspan="6">Assessment criteria: Compare student teachers presentations with the content of primary mathematics syllabus</td></tr>
<tr><td colspan="6">Link to other subjects: Foundation of Education, mathematics for primary school, other TMP</td></tr>
<tr><td colspan="6">Resources: Mathematics syllabus for primary, syllabus for Foundation of education, manila paper and a projector where applicable.</td></tr>
</table>

Subject: TEACHING METHODS AND PRACTICE OF Mathematics	**Year:1**	**Option: : SME**
Topic Area: Understanding the Mathematics syllabus for primary		**Sub Topic: -**
Unit 2: Teaching and learning resources for mathematics lessons		**No. of periods:6**

Key unit competence: Differentiate available teaching and learning resources and produce more others required in the learning of Mathematics for primary school

Learning objectives			Content	Teaching/ Learning Activities
Knowledge and understanding	Skills	Attitudes and values		
Explain the use of both pupil's book and teacher's guide in mathematics teaching. Outline the appropriate materials used in mathematics teaching lessons.	Describe materials appropriate for learning and teaching a selected Mathematical concept; Use local materials in making teaching and learning resources as a home grown solution in education.	Develop positive attitudes towards books of mathematics used at primary and teacher made materials Being cooperative and displaying a teamwork spirit. Demonstrate creativity and innovation in making learning resources.	Teaching multimedia to facilitate the teaching and learning: Visual aids, Audio aids and Audio-visual aids. Structure of Primary mathematics books such as pupil's book and teacher's guide in the context of CBC. Teacher made materials such as flash cards, charts, and locally made materials such as: box, abacus, balls, and polygons.	In groups, students-teacher discuss the use of mathematics books; In pairs, student teachers select learning materials for facilitating the learning of given mathematical concepts. Using local materials, student teacher make individual materials for using in mathematics lessons.

			Other learning materials used in facilitating mathematics lessons such as: ICT tools and geometrical instruments.	
Assessment criteria: Student teacher can describe teaching resources and make his/her own teaching materials**.**				
Link to other subjects: Foundation of Education, integrated science, mathematics for primary school and SET.				
Resources: Mathematics syllabus for primary, Made in Rwanda policy, local materials: rice sacs, boxes, etc.				

Subject: TEACHING METHODS AND PRACTICE OF Mathematics	Year:1	**Option: : SME**
Topic Area: Teaching methods and strategies for learning mathematics in primary school		**Sub Topic: -**
Unit 3: General principles of teaching Mathematics		**No. of periods:8**
Key unit competence: Use a combination of teaching and assessment methods and techniques to make mathematics lessons successful		

Learning objectives			Content	Teaching/ Learning Activities
Knowledge and understanding	Skills	Attitudes and values		
Enumerate the principles of mathematics teaching; Explain different principles applied in mathematical skills assessment. Explain guidelines of mathematics lesson at primary school.	Differentiate general principle of teaching in a classroom from mathematics teaching principles; Describe the phases of learning mathematics; Justify the appropriate teaching methods to be used in each phase of learning mathematics; Justify guidelines of mathematics lesson at primary school.	Show concern on the application of principles of teaching and phases of learning mathematics Appreciate guidelines of teaching mathematics lessons at Primary school.	Principles applied in mathematics lessons: Progression, Activity Motivation Concretization Individualization Cooperation Transfer Assessment in Mathematics lessons;	In groups, students-teachers discuss the Principles of teaching and learning Mathematics lessons (Concretization, transfer, Activity, progression, individualization, motivation and cooperation) Carrying out a research on 3 phases of learning mathematics and identify teaching and assessment approaches that are appropriate in each phase;

			Appropriate teaching methods in each of the following phases of learning mathematics: Readiness, Engagement and Mastery. Guidelines of Mathematics lesson at Primary school: observation, analysis, synthesis.	In groups, student teachers discuss and present the guidelines of mathematics lesson at primary school.
Assessment criteria: Student teacher can use a combination of teaching and assessment methods and techniques to make mathematics lessons successful				
Link to other subjects: Foundation of Education, integrated science, mathematics for primary school, TMP for other subjects				
Resources: Mathematics syllabus for primary, Reference books, Internet where applicable.				

Subject: TEACHING METHODS AND PRACTICE OF Mathematics	Year:1	Option: : SME
Topic Area: Teaching methods and strategies for learning mathematics in primary school		Sub Topic:
Unit 4: Lessons on numbers and operations		No. of periods:6
Key unit competence: Prepare lessons on numbers and operations		

Learning objectives			Content	Teaching/ Learning Activities
Knowledge and understanding	Skills	Attitudes and values		
Explain concepts related to the lessons on numbers and operations; List the techniques and strategies for facilitating lessons related to numbers and operations; Choose suitable teaching and learning resources for facilitating lessons related to numbers and operations. List the components of a lesson plan on numbers and operations.	Discuss techniques and strategies for facilitating lessons related to numbers and operations. Make appropriate resources using low cost materials to be used in lessons related to numbers and operations.	Appreciate the concepts related to lessons on numbers and operations; Show concern on generic competences to be developed and cross-cutting issues to be integrated in the lessons related to numbers and operations.	Recall on concepts related to numbers and operations; Active teaching techniques and strategies for facilitating lessons related to numbers and operations; Activities for developing generic competences and integration of crosscutting issues in the lessons related to numbers and operations. Production and organization of appropriate resources for the lessons related to numbers and operations using low cost	In groups, student –teachers discuss different concepts related to numbers and operations; Through group discussion student teachers select and discuss techniques and strategies for facilitating lessons related to numbers and operations; Through think- pair -share student teachers select and produce appropriate resources to be used in the lessons related to numbers and operations using low cost materials.

	Develop lesson plans related to numbers and operations Use various techniques for developing generic competences and cross-cutting issues in the lesson plan for numbers and operations.		materials: *Manila cards or slips of paper; abacus and textbooks and objects of different colors, Scissors to make cut outs of numbers, Markers to write numbers that can be seen from back of the room.* Assessment tasks in the lessons related to numbers and operations; Lesson plan on numbers and operations.	In pairs, student teachers write a lesson plan on numbers and operations and present it to the whole class.
Assessment criteria: Student teachers can prepare lessons on numbers and operations.				
Link to other subjects: Foundation of Education, mathematics for primary school, integrated science, TMP for other subjects.				
Resources: Mathematics syllabus for primary				

Subject: TEACHING METHODS AND PRACTICE OF Mathematics	Year:1	Option: : SME
Topic Area: Teaching methods and strategies for learning mathematics in primary school		Sub Topic:
UNIT 5: Lessons related to fractions, decimals and proportional reasoning		No. of periods: 6
Key unit competence: Prepare active lessons related to fractions, decimals and proportional reasoning		

Learning objectives			Content	Teaching/ Learning Activities
Knowledge and understanding	Skills	Attitudes and values		
Describe different concepts related to lessons of fraction, decimals and proportional reasoning. Identify techniques and strategies for facilitating lessons related to fraction, decimals and proportional reasoning Choose appropriate resources to be used in lessons of fraction, decimals and proportional reasoning	Apply teaching and learning techniques to set activities in the lessons on fractions, decimals and proportional reasoning; Make appropriate resources using low cost materials for lessons on fractions, decimals and proportional reasoning;	Demonstrate creativity and innovation in making resources related to lessons of fraction, decimals and proportional reasoning; Show curiosity about planning lessons on fraction, decimals and proportional reasoning Appreciate the integrationof cross-cutting issues in the lesson plan on fractions, decimals and proportional reasoning.	Recall on concepts related to lessons on fraction, decimals and proportional reasoning; Techniques and strategies for facilitating lessons related to fraction, decimals and proportional reasoning; Activities for developing generic competences and integrating crosscutting issues in lessons on fraction, decimals and proportional reasoning;	Through groups, student – teachers discuss different concepts related to lessons on fractions, decimals and proportional reasoning; Through group discussion, student teachers select and discuss techniques and strategies for facilitating lessons related to fractions, decimals and proportional reasoning and how to assess related competences. Through think- pair –share, student teachers select and produce appropriate resources using low cost materials to beused in lessons on fractions, decimals and proportional reasoning;

	Develop lesson plan related to lessons on fractions, decimals and proportional reasoning; Use various techniques for developing generic competences and integrate crosscutting issues in lesson plan on fractions, decimals and proportional reasoning.		Locally made materials to be used in lessons on fraction, decimals and proportional reasoning; Resources to be used in lessons on fractions, decimals and proportional reasoning: *Concrete objects like oranges, paw paws, sugar canes; wall charts to show fractions; scissors, knives, plain papers or manila cards for learners to cut.* Appropriate tasks to assess competences in the lessons on fractions, decimals and proportional reasoning; Lesson plan for lessons on fractions, decimals and proportional reasoning.	In pairs, student teachers write a lesson plan related to fractions, decimals and proportional reasoning and share the result with the whole class.
Assessment criteria: Student teachers can prepare a competence- based lesson plan, make and organize teaching resources and identify teaching strategies related to lessons related on fractions, decimals and proportional reasoning.				
Link to other subjects: Mathematics for Primary, SET, Foundation of education, Integrated science.				
Resources: Text books, manila papers calculators, papers, masking tape, markers, scissors.				

Subject: TEACHING METHODS AND PRACTICE OF Mathematics	Year:1	Option: : SME
Topic Area: Teaching methods and strategies for learning mathematics in primary school		**Sub Topic:**
Unit 6 : Lessons related to metric measurement		No. of periods:6
Key unit competence: Prepare active lessons related to metric measurement		

Learning objectives			Content	Teaching/ Learning Activities
Knowledge and understanding	Skills	Attitudes and values		
Identify different concepts related to metric measurement; List techniques and strategies for facilitating lessons related to metric measurement; Choose appropriate resources to be used in lessons related to metric measurement.	Use local materials to produce materials to be used in lessons related to metric measurement; Use various techniques of teaching and learning to set activities that develop competences in the lessons related to metric measurement.	Show concern of the techniques and strategies used for facilitating lessons related to metric measurement. Being cooperative and display the teamwork spirit during the production of teaching material;	Recall on concepts related to metric measurement; Techniques and strategies for facilitating lessons related to metric measurement; Activities for developing generic competences and integrating crosscutting issues in lessons related to metric measurement; Teaching resources related to metric measurement: existing and locally made materials;	Through groups, student teachers discuss different concepts related to lessons on metric measurement. Through gallery walk, student teachers select and discuss techniques and strategies for facilitating lessons related to metric measurement.

	Develop lesson plan related to the teaching of metric measurement.	Demonstrate creativity and innovation in lesson planning.	Assessment tasks related to lessons of metric measurement. Lesson plan of metric measurement.	Using low cost materials, student teachers select and produce individually appropriate resources to be used in lessons on metric measurement. In pairs, student teachers write a lesson plan related to metric measurement and share the result with the others.
Assessment criteria: Student teacher can prepare active lessons related to metric measurement.				
Link to other subjects: Mathematics for primary school, Foundation of Education, integrated science, SET, TMP for other subjects.				
Resources: Mathematics syllabus for primary.				

Subject: TEACHING METHODS AND PRACTICE OF Mathematics	Year:1	Option: : SME
Topic Area: Teaching methods and strategies for learning mathematics in primary school		Sub Topic: -
Unit 7 : Lessons related to algebra		No. of periods: 6
Key unit competence: Prepare active lessons related to algebra		

Learning objectives			Content	Teaching/ Learning Activities
Knowledge and understanding	Skills	Attitudes and values		
Explain different concepts related to algebra Select the techniques and strategies for facilitating lessons related to algebra Choose appropriate resources to be used in lessons related to algebra	Use local materials to make teaching aids to be used in lessons for algebra. Use various techniques of teaching and learning to set activities that develop competences in the lessons related algebra. Prepare a lesson plan related to algebra lessons.	Show the curiosity of setting assessment tasks related to algebra lessons. Demonstrate creativity and innovation in lesson planning and making learning resources related to algebra lessons.	Recall of concepts related to algebra; Techniques and strategies for facilitating lessons related algebra Activities for developing generic competences and activities that help to integrate crosscutting issues in algebra lessons;	Through groups, student – teachers discuss on different concepts related to lessons of algebra; Through gallery walk, student teachers select and discuss techniques and strategies for facilitating lessons related to algebra; Individually, a student-teacher selects and produces appropriate resources using low cost materials to be used in lessons of algebra.

			Appropriate teaching and learning resources to be used in algebra lessons; Assessment tasks related to lessons of algebra; Writing lesson plan for algebra lessons.	In pairs, student teachers write a lesson plan related to algebra and share it with the whole class through gallery walk.
Assessment criteria: Student teachers Prepare effective and active lessons related to algebra.				
Link to other subjects: Foundation of Education, SET, Mathematics syllabus for Primary, integrated science, TMP for other subjects.				
Resources: Mathematics syllabus for primary				

Subject: TEACHING METHODS AND PRACTICE OF Mathematics	Year:1	Option: : SME
Topic Area: Teaching methods and strategies for learning mathematics in primary school		Sub Topic: -
Unit 8: Lessons related to geometry		No. of periods:6
Key unit competence: Prepare active lessons related to geometry		

Learning objectives			Content	Teaching/ Learning Activities
Knowledge and understanding	Skills	Attitudes and values		
Explain different concepts related to geometry taught in primary; Explain the techniques andstrategies for facilitating lessons related to geometry in primary Choose appropriate resources to be used in the teaching and learning process of geometry;	Apply van Hiele levels of geometric thoughts in geometry lesson plan. learning and teaching materials for geometry Organize and use local materials to make teaching resources to be used in geometry lessons. Use various techniques of teaching and learning to set activities that develop competences in the lessons related geometry Prepare a lesson plan related to geometry lessons	Show concern on the assessment tasks related to geometry lessons; Demonstrate creativity and innovation in lesson planning and making learning resources related to geometry lessons; Demonstrate the curiosity of using Van Hiele levels of geometric thoughts in teaching geometry at primary school.	Recall on concepts related to geometry taught in primary levels; Techniques and strategies for facilitating lessons related geometry; The van Hiele levels of geometric thoughts. Activities for developing generic competences and the integration of crosscutting issues in lessons of geometry;	Through groups, student –teachers discuss different concepts related to lessons of geometry in primary; Through gallery walk, student teachers select and discuss techniques and strategies for facilitating lessons related to geometry; Using low cost materials individual student teacher selects and produces appropriate resources to be used in lessons of geometry and share the result to the whole class.

Explain the Van Hiele levels of geometric thoughts.			Appropriate resources related to geometry such as: Geometrical instruments like rulers, pair of compasses, rubbers, pencils, dividers, sharpeners Assessment tasks related to lessons of geometry. Lesson plan in the teaching of geometry.	In pairs, student teachers write a lesson plan related to geometry.
Assessment criteria: Student teacher prepares effective lessons related to geometry.				
Link to other subjects: Foundation of Education, Mathematics for primary school, integrated science, SET, TMP for other subjects.				
Resources: Mathematics syllabus for primary				

Subject: TEACHING METHODS AND PRACTICE OF Mathematics	Year:1	Option: : SME
Topic Area: Teaching methods and strategies for learning mathematics in primary school		Sub Topic: -
Unit 9: Lessons related to statistics and elementary probability		Number of periods:6
Key unit competence: Prepare active lessons related to statistics and elementary probability		

Learning objectives			Content	Teaching/ Learning Activities
Knowledge and understanding	Skills	Attitudes and values		
Identify and explain the concepts related to statistics and elementary probability for primary; Explain the teaching and learning techniques to be applied in lessons related to statistics and elementary probability;	Make learning and teaching materials to be used in the teaching and learning of statistics and elementary probability at primary school; Prepare a lesson plan related to statistics and elementary probability ; Use various techniques to set activities that develop competences in the lesson plan for statistics and elementary probability.	Appreciate the role of teaching statistics and elementary probability in primary; Show the curiosity of setting assessment tasks in the lesson of statistics and elementary probability. Demonstrate creativity and innovation in making learning resources related to lessons of statistics and elementary probability.	Recall on concepts related to statistics and elementary probability Techniques and strategies for facilitating lessons related statistics and elementary probability; Activities for developing generic competences and integrating crosscutting issues in lessons related to statistics and elementary probability;	Through think-pair-share, student –teachers discuss concepts related to statistics and elementary probability for primary; Through gallery walk, student teachers select and discuss techniques and strategies for facilitating lessons related to statistics and elementary probability;

Choose appropriate resources to be used in lessons of statistics and elementary probability.		Appreciate the lesson planning process in the teaching of statistics and elementary probability.	Appropriate resources to be used in the teaching and learning of statistics and elementary probability: *Dice (improvise by using wooden cubes and label the sides as required), and cards* Assessment tasks in the lessons of statistics and elementary probability. Lesson plan of statistics and elementary probability.	Using low cost materials, individual student teacher selects and produces appropriate resources to be used in the lessons of statistics and elementary probability; Individually, student teachers write lesson plans on statistics and elementary probability.
Assessment criteria: Student teachers prepare effective lessons related to statistics and elementary probability to pe taught in primary				
Link to other subjects: Foundation of Education, Mathematics for primary, school integrated science.				
Resources: Mathematics syllabus for primary.				

Subject: TEACHING METHODS AND PRACTICE OF Mathematics Year:1			Option: : SME	
Topic Area: Teaching methods and strategies for learning mathematics in primary school			Sub Topic: --	
Unit 10: Lessons related to word problems				No. of periods:s8
Key unit competence: Prepare active lessons related to word problems				
Learning objectives			Content	Teaching/ Learning Activities
Knowledge and understanding Skills		Attitudes and values		
-Identify the concepts related to word problems in primary; -Explain the steps of solving word problems	- Describe steps of solving word problems in primary; -Prepare a lessons that include steps for solving word problems in primary; -Use local materials to make teaching resources to be used to visualize word problems in mathematics;	- Appreciate the process of solving word problems; Demonstrate creativity and innovation in making learning resources related to lessons on word problems;	Types of word problems in primary schools; Steps for solving word problems; Techniques and strategies for facilitating lessons related to word problems; Activities for developing generic competences and integrating crosscutting issues in lessons on word problems; Appropriate resources for visualization in solving word problems;	-Through think-pair-share, student –teachers discuss the types of word problems. -By the use of gallery walk technique, student teachers describe different steps for solving word problems. -Individually, student teacher selects and produces appropriate resources using low cost materials to be used in lessons on word problems.

	-Infuse teaching techniques and activities that develop the problem solving skills in the lesson plan.		Tasks for assessing the problem solving skills; Lesson plan on word problems.	-In group, student teachers write lesson plans related to the teaching of word problem.
Assessment criteria: Student teacher Prepare effective lessons related to word problems.				
Link to other subjects: Foundation of Education, Mathematics for primary school, Integrated science.				
Resources: Mathematics syllabus for primary.				

Subject: TEACHING METHODS AND PRACTICE OF Mathematics	Year:1	Option: : SME
Topic Area: Teaching practice		Sub Topic: -
Unit 11: Observation of model lessons of Mathematics		No. of periods: 4
Key unit competence: Evaluate adequacy of teaching and learning strategies used during model lessons.		

Learning objectives			Content	Teaching/ Learning Activities
Knowledge and understanding	Skills	Attitudes and values		
- Explain the main steps of a model lesson of Mathematics that appear on the observation sheet; - Identify the techniques and strategies used by the teacher to facilitate mathematics lessons.	-Use lesson observation sheet to record a lesson and to write report; -Apply lesson observation guidelines to provide constructive feedback related to the class management.	-Appreciate the steps and teaching techniques of mathematics lessons at primary schools; -Show concern of the use of teaching and learning materials in the lesson. -Show the curiosity of receiving constructive feedback	Components of a lesson observation sheet; Main steps of a mathematical model lesson; Techniques and strategies for facilitating mathematics lessons at primary schools; Classroom management;	-Individually, student teacher observes different lessons of mathematics, classroom management, use of teaching and learning materials on demonstration schools. .

-Explain when, how and why materials, teaching techniques are used in teaching mathematics.			Use of teaching and learning materials; Using lesson observation sheet; Lesson observation report; Constructive feedback.	-Individually, student teacher exchanges with teachers/ Tutors and make report on lesson observation
Assessment criteria: student teachers evaluate adequacy of teaching and learning process and make report on lessons observed.				
Link to other subjects: Foundation of Education, mathematics for primary school, Integrated science, TMP for other subjects.				
Resources: Mathematics syllabus for primary.				

<table>
<tr><td colspan="2">Subject: TEACHING METHODS AND PRACTICE OF Mathematics</td><td colspan="2">Year:1</td><td colspan="2">Option: : SME</td></tr>
<tr><td colspan="4">Topic Area: Teaching practice</td><td colspan="2">Sub Topic: -</td></tr>
<tr><td colspan="5">Unit 12: Micro-teaching in the form of lesson study</td><td>No. of periods:6</td></tr>
<tr><td colspan="6">Key unit competence: Facilitate Mathematics lessons to peers in a simulated context</td></tr>
<tr><td colspan="3">Learning objectives</td><td rowspan="2">Content</td><td rowspan="2">Teaching/ Learning Activities</td></tr>
<tr><td>Knowledge and understanding</td><td>Skills</td><td>Attitudes and values</td></tr>
<tr><td>-Define micro-teaching

Identify the steps of micro-teaching;

Identify the steps of lesson study;

Define the feedback in the micro-teaching and feedback in the lesson study.</td><td>- Compare Microteaching and lesson study;

-Prepare lessons to be taught in a simulated classroom of peers;

-Facilitate mathematics lessons as micro-teaching;
-Evaluate and provide constructive feedback on micro-teaching lessons.</td><td>-Show interest and curiosity during micro-teaching lessons.

-Appreciate the relevance of feedback after your lesson.</td><td>-Micro-teaching;

-Steps of a micro-teaching activity.
• Plan
• Teach
• Feedback
• Re-plan
• Re-teach
• Re-feedback
- Constructive feedback:
• Definition;
• role (to who, when and why to give feedback);
• Process of giving feed</td><td>-In groups, discuss the importance of micro-teaching.

-Through think, pair and share, explain the process of giving and receiving constructive feedback.

-In small groups, prepare lessons related to mathematics and do micro-teaching, provide constructive feed</td></tr>
</table>

			• back; • Receiving feedback: readiness to accept and to improve. **- Lesson study and its steps;** **- Comparison between microteaching and lesson study.**	-back (clearly show the student teacher's strengths and areas of improvement).
Assessment criteria: Each student teacher must effectively facilitate Mathematics lessons to peers, observe colleague's lesson and provide feedback.				
Link to other subjects: Foundation of Education, Mathematics for primary school, TMP of other subjects.				
Resources: Mathematics syllabus for primary, internet, locally made materials.				

5.2 TMP for Mathematics syllabus Units for year two

5.2.1 Key competencies at the end of year two

After completion of year two of Science and Mathematics Education, the Mathematics teaching methods and practice (TMP) syllabus will enable the student teacher to:

1. Interpret mathematics lessons.
2. Plan and facilitate effectively mathematics lessons at primary school.
3. Apply different strategies of giving and receiving feedback during teaching practices.

5.2.2 Syllabus units for Year two

<table>
<tr><td colspan="2">Subject: TEACHING METHODS AND PRACTICE OF Mathematics</td><td>Year: 2</td><td colspan="2">Option: : SME</td></tr>
<tr><td colspan="3">Topic Area 4: Teaching practice</td><td colspan="2">Sub Topic: -</td></tr>
<tr><td colspan="4">Unit 1: Classroom practice</td><td>No. of periods: 72</td></tr>
<tr><td colspan="5">Key unit competence: Facilitate various mathematics lessons in demonstration schools</td></tr>
<tr><td colspan="3">Learning objectives</td><td rowspan="2">Content</td><td rowspan="2">Teaching/ Learning Activities</td></tr>
<tr><td>Knowledge and understanding</td><td>Skills</td><td>Attitudes and values</td></tr>
<tr><td>- List activities to be done in a demonstration school;

- Explain steps of a lesson in a demonstration school;

-Identify materials to be used while facilitating mathematics lesson at a demonstration school;

-List the strategies of giving and receiving feedbacks.</td><td>-Implement teaching and learning techniques when facilitating different mathematics lessons in a demonstration school.

- Auto-evaluate the lesson taught and exchange ideas with the supervisor for further improvement.</td><td>-Show the curiosity of improvement while teaching practice is taking place in demonstration schools;

- Show concern on effective class management when teaching;</td><td>- Recall on the class management;

- Lesson observation in a demonstration school;

-Scheme of work (unit plan) in mathematics subject;</td><td>- Individually, each student-teacher prepares lessons and teaches them in demonstration schools.

-In groups, student teachers discuss the observed lessons and take conclusion.</td></tr>
</table>

		-Appreciate the way others facilitate lessons of mathematics.	-Preparation of lessons to be taught in a demonstration school.	
Assessment criteria: Each Student Teacher facilitates various mathematics lessons in demonstration schools.				
Link to other subjects: Foundation of Education, mathematics for primary school, TMP of other subjects.				
Resources: Primary mathematics syllabus, teachers' guides, students' books, internet.				

5.3 TMP for Mathematics syllabus units for year 3

5.3.1 Key competencies at the end of year three

After completion of year three of Science and Mathematics Education, the Mathematics teaching methods and practice (TMP) syllabus will enable student teacher to:

1. Interpret mathematics lessons.
2. Explain roles and responsibilities of student teacher during school attachment
3. Plan and facilitate effectively mathematics lessons during the school attachment activities.
4. Write a report on the school attachment activities.

5.3.2 The syllabus units in Year Three

Subject: TEACHING METHODS AND PRACTICE OF Mathematics	**Year: 3**	**Option: : SME**
Topic Area 4: SCHOOL ATTACHMENT		**Sub Topic: --**
Unit 1: Classroom management during the school attachment		**No. of periods: 72**
Key unit competence: Facilitate various mathematics lessons during school attachment		

Learning objectives			**Content**	**Teaching/ Learning Activities**
Knowledge and understanding	**Skills**	**Attitudes and values**		
Explain the roles and responsibilities of student teacher during school attachment	-Prepare lesson plan to be taught during school attachment; -Prepare a good scheme of work using primary syllabus of P_4, P_5 and P_6. -Implement teaching and learning mathematics lesson at primary school of school attachment; - Write a report on school attachment activities.	-Show the curiosity of improvement and learn from others while teaching practice is taking place; - Show concern on effective class management when teaching.	- Roles and responsibilities during school attachment; -Report writing on school attachment activities.	-Individually, student teacher observes and records data from the school environment. -Individually, student-teacher prepares good scheme of work to be used within a term in classroom; -Individually, student-teacher prepares mathematics lessons and facilitates them during school attachment. - Individually, student teacher writes a report on school attachment activities.

Assessment criteria: Each Student teacher Facilitates various mathematics lessons during school attachment and elaborates a related report.
Link to other subjects: Foundation of Education, mathematics for primary school, TMP of other subjects.
Resources: Primary mathematics syllabus, teachers' guides, students' books.

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22. ANNEXES

ANNEX 1: TMP of Mathematics overview

Topic area	COMPETENCES		
	YEAR 1	YEAR 2	YEAR 3
1. Understanding the Mathematics syllabus for primary school	Explain the essence of teaching Mathematics in primary and how mathematical skills are applied in everyday life.		
	Differentiate available teaching and learning resources and produce more others required in the learning of Mathematics for primary school.		

2. Teaching methods and strategies for learning mathematics in primary school	Use a combination of teaching and assessment methods and techniques to make mathematics lessons successful		
	Prepare active lessons on numbers and operations.		
	Prepare active lessons related to fractions, decimals and proportional reasoning.		
	Prepare active lessons on metric measurement		
	Prepare active lessons on algebra		
	Prepare active lessons on geometry		
	Prepare active lessons on statistics and elementary probability.		
	Prepare active lessons on real life word problems solving.		

3. Teaching practice	Evaluate adequacy of teaching and learning strategies used during model lessons		
	Facilitate mathematics lessons to peers in a simulated context (Microteaching in the form of lesson study).	Facilitate various mathematics lessons in demonstration schools.	Facilitate various mathematics lessons during school attachment.

ANNEX 2: TTC Subjects and time allocation

SN	Subject	Number of Periods							
		ECLPE		SSE		SME		LE	
		Y1	**Y2&3**	Y1	Y2&3	Y1	Y2&3	Y1	Y2&3
1	Foundations of Education	6	6	6	5	6	5	6	5
2	English	5	5	5	4	5	4	7	7
3	Kinyarwanda	5	5	2	2	2	2	5	6
4	Mathematics	3	3	3	3	6	6	2	2
5	Integrated Science	4	4	1	1	11	0	1	1
6	Physics	0	0	0	0	0	5	0	0
7	Biology	0	0	0	0	0	5	0	0
8	Chemistry	0	0	0	0	0	5	0	0
9	Social Studies	4	4	11	0	2	2	2	2
10	History	0	0	0	5	0	0	0	0
11	Geography	0	0	0	5	0	0	0	0
12	Economics	0	0	0	5	0	0	0	0
13	Creative Performance (Music and Fine Arts)	4	4	4	4	2	2	4	4
14	Physical Education	1	1	2	1	1	1	1	1
15	Entrepreneurship	2	2	2	2	2	2	2	2
16	ICT	2	2	2	2	2	2	2	2
17	TMP	7	7	4	4	6	4	4	4
18	SNE	2	2	2	2	2	2	2	2
19	Religious Education	1	1	4	3	1	1	1	1
20	French	4	4	2	2	2	2	7	7
21	Kiswahili	1	1	1	1	1	1	5	5
22	Co-Curricular	1	1	1	1	1	1	1	1
23	Individual Study	8	8	8	8	8	8	8	8
24	School Attachment	Year 3 (First term)							
	TOTAL	60	60	60	60	60	60	60	60