

**Course code : PS-4120**

**Course Title: DEVELOPING SCIENTIFIC SKILLS FOR MEANINGFUL LEARNING IN PRIMARY SCIENCE**

*Rationale:*

Science in schools has always been equated with practical work. Many science teachers consider practical work as an important activity-based learning that emphasizes the promotion of science processes and skills. Due to this, they now try to minimize the “transmission” mode of teaching because it is looked upon as equivalent to passive learning. Activity-based learning is therefore being encouraged because these teachers interpret “active doing” as effective learning. However, activity-based learning is not an effective form of learning if the pupils do not understand the concepts and principles behind the activities and experiments. Students carrying out the activities in a “robotic” manner and following some sort of “recipe science” are not engaged in meaningful science learning. This course will give an emphasis on developing science process skills in experimentation or investigative work. Planning and designing scientific investigations are important aspects of practical work that will not only promote scientific and thinking skills, but learning becomes more meaningful as well.

*Objectives:*

The main objective of the course is to develop participants’ knowledge and skills in the proper conduct of investigative practical work so as to enable them to develop their pupils’ scientific and thinking skills and make science learning more meaningful.

At the end of the course, participants should be able to:

- show an understanding of how practical work in science classrooms can promote meaningful learning;
- show an understanding of barriers to meaningful science learning and strategies to overcome them;
- assess students understanding of science concepts;
- develop instructional materials to promote meaningful science learning via practical work; and
- show a change in attitude towards practical work in science from illustrative to experimental work.

*Course Contents:*

This course emphasizes a good grounding of theory, classroom practice and action research. Emphasis will be given to discussions and activities to demonstrate the strategies involved in the teaching and learning of science to promote meaningful learning.

The major areas include:

- Barriers to meaningful science learning (e.g. teachers not aware of students' alternative conceptions, school science not relevant to daily lives, recipe science, teachers teach for test performance and not for understanding, assessment procedures limited, teachers lack content knowledge and pedagogical content knowledge etc);
- Strategies to promote meaningful science learning (e.g. metacognitive skills, higher order thinking skills, alternative assessments, multiple intelligence, etc);
- Types of practical work (illustrative work, experimental work, and teacher demonstrations);
- Enabling questions for teacher demonstrations;
- Planning and designing experimental work;
- Assessing understanding of science concepts (e.g. Interviews about Concepts, Predict-Observe-Explain, Concept Mapping etc); and
- Planning, designing, developing and trying out sample lesson plans/activities/materials with emphasis on the principles of instructional design to develop scientific skills.

Duration: Four weeks

Participants: Primary science teachers or science educators