



Teaching Fractions, Ratios and Proportions

A Certificate Course in Mathematics Education

Presented by Homi Bhabha Centre for Science Education in collaboration with St. Xavier's Institute of Education

Starts from 29th June, 2021

4p.m. – 6p.m.

TARGET GROUP: PRESERVICE AND INSERVICE TEACHERS



COURSE SUMMARY:

St. Xavier's Institute of Education is the oldest non-government, aided, Christian minority Teacher-Training College for the course of B.Ed., affiliated to the University of Mumbai and recognized by the National Council for Teacher Education (N.C.T.E.) The College has completed 65 years as a Teacher Training College par excellence, with alumni ranging from Principals of various colleges, a Vice Chancellor of Mumbai University and Heads of Department of Education. The College aims at imparting Quality Teacher Education and all round development. The College stands for academic excellence and the development of skills, and strives after character formation based on the love of God and the service of man. It seeks to educate citizens distinguished for their integrated development and sincere commitment to God and country, leading lives that are socially meaningful.

This certificate course aims at developing two broad sets of capabilities that are important for a mathematics teacher. The first set of capabilities involves a profound understanding of fractions, ratios and proportions. The course will provide opportunities for the participants to examine their beliefs, assumptions and understanding of the Specialised Content Knowledge (SCK) for teaching fractions, ratios and proportions. The second set consists of skills essential for the teaching of mathematics and include – learning from student thinking, making and using contexts, models and representations for teaching fractions, ratios and proportions. The instructors will try to achieve this by situating most of the learning activities within teaching contexts.

Course Objectives

- Develop profound understanding of fractions, ratios and proportions
- Develop skills for analysing contexts, models and representations for these topics
- Develop teaching trajectory for these topics

Course Outcomes

1. Understand and appreciate the importance of
 - 1.1 deep knowledge of fractions, ratio and proportion for teaching,
 - 1.2 how children learn fractions, ratios and proportions and
 - 1.3 tasks with learner-centred pedagogy for fractions, ratio and proportion
2. Develop skills towards teaching by
 - 2.1 analysing the content knowledge of fractions, ratio and proportion
 - 2.2 developing skills for maximisation of student engagement through effective planning and approaches
 - 2.3 developing reflective skills for effective teaching
 - 2.4 developing effective assessment to measure learning outcomes

COURSE REQUIREMENTS:

Homi Bhabha Centre for Science Education, TIFR

Homi Bhabha Centre for Science Education (HBCSE) is a National Centre of the Tata Institute of Fundamental Research (TIFR), Mumbai. The Centre's broad goals are to promote equity and excellence in science and mathematics education from primary school to undergraduate college level and encourage the growth of scientific literacy in the country. HBCSE is the country's premier institution for research and development in science, technology, mathematics, and teacher education. The Centre is India's nodal Centre for Olympiad programmes in mathematics, physics, chemistry, biology, astronomy and junior science. HBCSE runs a Graduate School in Science Education leading to a PhD degree of the Tata Institute of Fundamental Research, Deemed University.

All candidates selected for the course are required to attend all sessions to maximise their learning towards the topics of the course. All candidates must have a good internet connection, display device and audio-video facility. All tasks and assignments are supposed to be submitted to the course coordinator for assessment on the date announced for the same. Late entry to the sessions will not be accepted. The course is of total 30 hours duration where 20 hours consists of live sessions and the other 10 hours are notional hours which must be devoted to task/assignment requirements.

Registration Details:

The course is proposed from 21st June, 2021 to 1st July, 2021. The course will accommodate maximum of 30 participants only. The participants are required to register for the course in the below mentioned link. The course fee is Rs. 500/- The fees will not cover any materials in hard copy, some references in a soft copy may be sent by resource persons as and when the need arises. Certificate of completion will be awarded to participants who have completed all course requirements. The registration link is provided in this document for registration.

Course Plan:

The course is divided into three units. Each unit plans to attain the above mentioned objective in an interwoven manner. The description of the units is as follows.

Unit 1: Specialized Content Knowledge for Teaching Fractions, Ratios and Proportions

Earlier sessions will cover discussion on readings and problem solving around fractions and five sub-constructs of fractions. Ratio meaning will be discussed as one of the sub-construct and what constitutes proportional reasoning in contrast to additive reasoning will also be discussed.

Unit 2: Approaches to Teaching Fractions, Ratios and Proportions

Some sessions will cover discussion on readings and scenario working for teaching fractions, ratios and proportions. Learning from various artefacts such as – students' work, videos of teaching, and related curricular material would form the core of these sessions. These sessions would also make use of teachers' own experiences and episodes from their teaching to develop deeper understanding.

Unit 3: Operations on Fractions and Ratios

Towards the end of the course we will work on understanding meanings of fractions, ratios and proportions situated within operations, such as addition, subtraction, multiplication, and division. We will also see what would be effective evaluation of students.

Certificate Course in Mathematics – Teaching Fractions, Ratio and Proportion. Dates: June 29th, 2021 – July 9, 2021.

Last Date for Registration: June 25th, 2021.

MODE OF DELIVERY: ZOOM videoconferencing platform (Synchronous mode)

Google LMS (Asynchronous mode)

COURSE UTILITY: The course will help teachers develop a mathematical attitude towards the topics and make them confident to deal with problems of learning.

EXPECTATION FROM PARTICIPANTS: Knowledge of the concepts fractions, ratio and proportion.

Course Assessment

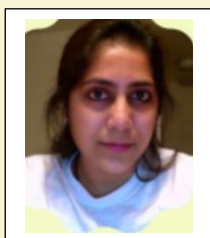
In the overall evaluation different weightage is given to different tasks of participation.

- Attendance in each session is essential and it has 10% weightage in the overall evaluation.
- Completing assignments (various readings / observations) has 40% weightage in the overall evaluation.
- Classroom interaction [Initiating and contributing to the dialogue though critical and insightful comments, meaningful listening of others' comments and being sensitive about the positions that each participant brings to the discussion] has 20% weightage in the overall evaluation.
- End of course assignment has 30% weightage in the overall evaluation.

About Course Instructors:



K. Subramaniam is Professor and Centre Director of the Homi Bhabha Centre for Science Education, Tata Institute of Fundamental Research in Mumbai, India. His main area of work for the last two decades, through research and teacher professional development workshops, is the improvement of the learning and teaching of school mathematics.



Shweta Naik is currently working with Mathematics Education Research group at Homi Bhabha Centre for Science Education, Mumbai and was an Adjunct faculty position with the University of Northern Colorado for year 2018-19. She has received her Ph.D. in Mathematics Education from the University of Michigan, USA, Masters in mathematics from Pune University and bachelors in Mathematics from Mumbai University. Her teaching and professional experience is diverse having worked with educational institutes like Central Board of Secondary Education (CBSE), Zonal Institute of Education Technology (ZIET) KV, St. Xavier's Institute of Education, Tata Institute of Social Sciences (TISS), Centre for Excellence in Basic Sciences (CEBS), HBCSE, University of Michigan and a number of Marathi and English medium schools.

Course Advisors: *College Development Cell, St. Xavier's Institute of Education*

Course Convenor: *Dr. Sosamma Samuel, Principal, SXIE*

Course Coordinator: *Dr. Vini Sebastian, Associate Professor, SXIE*

IMPORTANT INFORMATION:

Registration link: <https://forms.gle/DRDiu76NpskGna8>

Confirmed participants will be intimated via email.

Kindly contact for further details : sxiehcse@gmail.com

Please visit our websites : www.sxie.info (St. Xavier's Institute of Education)

<http://www.hbcse.tifr.res.in> (Homi Bhabha Centre for Science Education, TIFR)