*For favour of Posting*

THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

## Department of Mathematics

# PHD STUDENT SEMINAR

# 2-to-1 Functions over Finite Fields

**By**

## Miss Farhana KOUSAR

**Abstract**

Two-to-one (2-to-1) functions have gained significant attention due to their relevance in cryptography and their application in constructing classes of cryptographic functions. These functions occur naturally in certain structures such as differential 2-uniforms and APN functions, bent functions, and semi-bent functions. Despite the significant interest in 2-to-1 mappings, there is still a gap in our understanding of them. As a result, our motivation is to conduct a systematic study of these mappings by presenting several results, including new tools, constructions, and applications.

During the first part of this talk, I will provide an introduction to 2-exceptional rational functions over finite fields and discuss some techniques for constructing 2-exceptional functions. In the second part of this seminar, I will present a new criterion for constructing 2-to-1 polynomials of the form $f(x) = x^r B(x^{\frac{(q-1)}{d}})$ over finite fields of odd characteristic.

**Date : 15 November 2023 (Wednesday)**
**Time : 2:00pm**
**Venue : Room 5510 (Lifts 25/26)**

*All are Welcome!*