

Elliptic Curve Cryptography

DISSERTATION

INTEGRATED MASTERS OF SCIENCE
In
APPLIED MATHEMATICS

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Declaration

Abstract

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Chapter 1

Introduction to Cryptography

1.1 Introduction

Intorduction

Chapter 2

Discrete Logarithms and Diffie–Hellman

2.1 Discrete Logarithms and Diffie–Hellman

chapter 2

Chapter 3

Elliptic Curves and Cryptography

3.1 Elliptic Curves

3.2 Elliptic Curves over Finite Field

3.3 The elliptic curve discrete logarithm
problem

3.4 Elliptic curve cryptography

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Bibliography

- [1] Jeffrey Hoffstein, Jill Pipher, Joseph H Silverman, and Joseph H Silverman. An introduction to mathematical cryptography. 1, 2008.